REMEDIAL INVESTIGATION REPORT

for

LOWER DARBY CREEK AREA SITE, CLEARVIEW LANDFILL GROUNDWATER OPERABLE UNIT 3 (OU-3)

DARBY TOWNSHIP
PHILADELPHIA AND DELAWARE COUNTIES, PENNSYLVANIA

VOLUME III
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TETRA TECH

APPENDIX G

HUMAN HEALTH RISK ASSESSMENT

APPENDIX G-1

PART 1 – METHODS

APPENDIX G, PART 1: HUMAN HEALTH RISK ASSESSMENT

This section provides a description of the human health risk assessment (HHRA) methods used for the RI, as well as a summary of the risk assessment results. The general objectives of the risk assessment were to estimate the actual or potential risks to human health resulting from the presence of contamination attributable to the site and to provide information for determining appropriate environmental clean-up measures for these media (if warranted).

1.0 INTRODUCTION

The objectives of the HHRA were as follows:

- To estimate potential risks to human health resulting from the presence of contamination directly measured in groundwater. Risks were assessed separately for several distinct areas of interest, including groundwater within the landfill, shallow groundwater outside of the landfill, and deep groundwater outside of the landfill.

- To estimate potential risks to human health resulting from the intermittent localized exposure to pore water. Risks were assessed for each sampling location by comparing the concentration of each detected contaminant to its receptor-specific risk-based screening level. Risks associated with exposure to pore water were calculated separately from groundwater because of the expected limited exposure to pore water contaminants.

- To provide a basis for attainment of concentrations that are protective of potential human receptors under residential, industrial, and construction exposure scenarios.

Three major aspects of chemical contamination must be considered when assessing human health risks:

(1) Contaminants with toxic characteristics must be found in environmental media and must be released either by natural processes or by human action.

(2) Potential exposure points must exist either at the source or via migration pathways if exposure occurs at a remote location other than the source.

(3) Human or environmental receptors must be present at the point of exposure.

Risk is a function of both toxicity and exposure; without any one of the three factors listed above, there is no risk. The site-specific potential pathways for contaminant migration and exposure media which provide a potential route of contact with human receptors are illustrated in Figures 1-1 and 1-2.

Potential human exposure routes are specific to the land use and human activity patterns associated with each area of interest. Exposure routes that are assessed in this report include tap water use of potable groundwater by future residents; direct contact with groundwater in excavations by industrial and construction workers; and inhalation of outdoor vapors emitted from groundwater in open excavations by construction workers and industrial workers.

Appendix G, Part 2, contains Risk Assessment Guidance for Superfund (RAGS) Table 1, which delineate the details of all receptor exposure scenarios considered in this risk assessment and the rationale for including or excluding particular exposure locations or routes of exposure for the receptors and receptor activities considered.

The HHRA was divided into seven components, including

- Data evaluation (Section 2.0).
- Estimation of exposure point concentrations (EPCs) (Section 3.0).
- Exposure assessment (Section 4.0).
- Toxicity assessment (Section 5.0).
- Risk characterization (Section 6.0).
- Uncertainty analysis (Section 7.0).
- Summary and conclusions (Section 8.0).

Each section is discussed below. The tables associated with the HHRA follow the format adopted by EPA RAGS, Volume I, Part D: Standardized Planning, Reporting, and Review of Superfund Risk Assessments (EPA, 2001).

2.0 DATA EVALUATION

The following discussion summarizes the data evaluation process that was used to evaluate the analytical data sets for each area of interest and select concentrations of substances for use in estimating receptor exposure.

2.1 Data Quality Evaluation

All data used in the risk assessment were validated following EPA data validation procedures (EPA, 2014a, 2014b). Before accepting data for use in the risk assessment, a data quality evaluation included a review of validated data for any problems with detection limit adequacy, rejected data, blank qualified data, and bias or imprecision. Rejected or blank qualified data are not considered acceptable for use in the risk assessment, while estimated values are accepted for use, but may be associated with caveats in the HHRA uncertainty analysis. Available data and the data qualifiers were reviewed and used, as follows, for the quantitative risk assessment.

- Estimated values flagged with a J (estimated value), J+ (estimated bias high), J- (estimated bias low), or Z (estimated maximum possible concentration) qualifier were treated as unqualified detected concentrations.

- Data qualified with an R (rejected) were not used in the risk assessment.

- For duplicate samples, the maximum of the two concentrations was used for selecting COPCs. For calculating exposure point concentrations the average of the two concentrations was used as the sample concentration.

- PAHs were analyzed for by both SIM and SW-846. The results from each method was used in the selection of COPCs. In the calculation of exposure point concentrations, the maximum result for each sample was used if both results were detected. If one result was detected and one was non-detected, the detected result was used to calculate the exposure point concentration. If both results were non-detected the lower of the detection limits was used to calculate the exposure point concentration. In most instances the SIM result was selected for the calculation of the exposure point concentration.

- Depending on when the sample was analyzed, 1,4-Dioxane was analyzed either as a volatile, a semivolatile, or a semivolatile by selective ion monitoring (SIM). The results from each method was used in the selection of COPCs. In the calculation of exposure point concentrations when 1,4-dioxane was analyzed for by two or more methods, the maximum result was used if all results were detected. If only one result was detected the detected result was used to calculate the exposure point concentration. If all results were non-detected the lower of the detection limits was used to calculate the exposure point concentration.

- The cancer risk characterization for polychlorinated dibenzo-p-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) congeners was performed using World Health Organization (WHO) TEFs (WHO, 2006), which are recommended by EPA (EPA, 2010b), for 2,3,7,8-TCDD and 16 other dioxins/furans.

TEFs reflect the potency of each of these compounds relative to that of 2,3,7,8-TCDD. TEFs are used to convert each individual dioxin/furan concentration into an equivalent concentration of 2,3,7,8-TCDD. The sum of these equivalent concentrations for the 16 other dioxins/furans and 2,3,7,8-TCDD is the 2,3,7,8-TCDD equivalents (toxicity equivalent or TEQ) concentration. The maximum TEQ of all samples was then screened against the RSL criterion for 2,3,7,8-TCDD to determine if dioxin was to be selected as a COPC. In calculating the TEQ, a value of zero was used if a congener was not detected. If all the congeners were non-detected the detection limit for 2,3,7,8-TCDD was used for the TEQ. If dioxin was selected as a COPC, then the total TEQs from all samples was used to estimate the 95 percent UCL of the total TEQ. The TEQ was then used to estimate a cancer risk and hazard index from exposures to all chlorinated dioxin and furan congeners present using the toxicity criteria for 2,3,7,8-TCDD.

- The cancer risk characterization for dioxin-like PCB congeners was performed using WHO TEFs (WHO, 2006), which are recommended by EPA (EPA, 2010b), for the 12 PCB congeners which are considered to have chemical structures, physico-chemical properties, and toxic responses similar to 2,3,7,8-TCDD. As with dioxins, TEFs reflect the potency of each of these compounds relative to that of 2,3,7,8-TCDD. TEFs were used to convert each individual dioxin-like PCB congener concentration into an equivalent concentration of 2,3,7,8-TCDD. The sum of these equivalent concentrations for the 12 dioxins-like PCBs is the total dioxin-like PCB TEQ concentration. The maximum TEQ of all samples was then screened against the RSL criterion for 2,3,7,8-TCDD to determine if dioxin-like PCBs were to be selected as a COPC. In calculating the TEQ, a value of zero was used if a dioxin-like PCB congener was not detected. If all the dioxin-like PCB congeners were not detected the detection limit for a dioxin-like PCB congener was used for the TEQ. If dioxin-like PCBs were selected as a COPC the total TEQs from all samples was used to estimate the 95 percent UCL for total dioxin-like PCBs. The UCL was then used to estimate a cancer risk and hazard index from exposures to all dioxin-like PCB congeners present using the toxicity criteria for 2,3,7,8-TCDD.

- A total non-dioxin-like PCB concentration was calculated by summing the concentrations of all the non-dioxin-like PCBs. In calculating the total, a value of zero was used if a non-dioxin-like PCB congener was not detected. The maximum total non-dioxin-like PCB concentration of all samples was then screened against the RSL criterion for PCBs to determine if non-dioxin-like PCBs were to be selected as a COPC. If non-dioxin-like PCBs were selected as a COPC, the total non-dioxin-like PCB concentration from all samples was used to estimate the 95 percent UCL for total non-dioxin-like PCBs. The UCL was then used to estimate a cancer risk from exposures to all non-dioxin-like PCB congeners present using the toxicity criteria for PCBs.

2.2 Summary of Sampling Data for Each Exposure Medium

Groundwater samples were collected from four sampling events occurring in March 2014, December 2014, July 2015, and April 2016. Groundwater samples were analyzed for full Target Compound List (TCL) organics (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides, dioxins/furans, polychlorinated biphenyls (PCBs) congeners, perfluorinated compounds (PFOAs/PFOSs), and Target Analyte List (TAL) metals (total and dissolved), and included 185 samples for VOCs, 164 samples for SVOCs, 137 samples for polycyclic aromatic hydrocarbons (PAHs), 174 samples for pesticides, 88 samples for dioxins/furans, 76 samples for PCBs, 73 samples for PFOAs/PFOSs, and 182 samples for total metals. In addition, 184 samples were collected for TAL analysis for dissolved (filtered) metals, although only the total (unfiltered) samples were used to conservatively assess exposure. Samples used in this HHRA are listed on the chemicals of potential concern (COPCs) selection tables and in Appendix G, Part 3.

2.3 Identification and Selection of COPCs

The selection of COPCs for groundwater was based on chemical-specific concentrations, occurrence, distribution, and toxicity. The main criteria used to identify COPCs are based on EPA Regional Screening Levels (RSLs) (EPA, 2016a). The RSLs are risk-based concentrations (RBCs) based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e., ingestion, dermal contact, and inhalation) for specific land-use conditions and do not consider impact to groundwater or vapor intrusion. The screening concentrations based on the RSLs correspond to a systemic hazard quotient (HQ) of 0.1 for noncarcinogens or an incremental lifetime cancer risk (ILCR) of $1x10^{-6}$ for carcinogens. The RSLs for noncarcinogens are based on an HQ of 0.1 to account for the potential cumulative effects of several chemicals affecting the same target organ or producing the same adverse noncarcinogenic effect.

In addition, screening levels from EPA's Vapor Intrusion Screening Level (VISL) Calculator Version 3.5.1 (EPA, 2016b) were used for evaluating the vapor intrusion pathway (i.e., the migration of volatile organic chemicals from groundwater to indoor air). The values correspond to a target cancer risk level of $1x10^{-6}$ for carcinogens, or a HQ of 0.1 for noncarcinogens. The vapor intrusion screening criteria are based on the default subsurface attenuation factor of 0.001 from groundwater concentrations to indoor air concentrations (EPA, 2015). The vapor intrusion screening criteria were derived to identify chemical concentrations in groundwater that may adversely affect the indoor air quality of a building overlying subsurface VOC contamination.

Other considerations were applied to evaluate whether chemicals that do not have published RBC criteria should be selected as COPCs. Essential nutrients were not considered as COPCs, including calcium,

chloride, magnesium, potassium, and sodium. Where possible, detected chemicals that did not have published toxicity criteria were compared to surrogate RBC criteria that were adopted from available RBCs for substances having similar chemical structure.

For COPC screening, 1,4-dichlorobenzene was selected as a surrogate for 1,3-dichlorobenzene, 1,3-dichloropropene was selected as a surrogate for cis-1,3-dichloropropene, acenaphthalene was selected as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was selected as a surrogate for alpha- and gamma-chlordane, endosulfan was selected as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate, and endrin was selected as a surrogate for endrin aldehyde and endrin ketone.

Screening criteria for PFOA and PFOS were derived using EPA's RSL calculator and toxicity criteria from the Drinking Water Health Advisory for PFOA (EPA, 2016c) and the Drinking Water Health Advisory for PFOS (EPA, 2016d).

Lead was evaluated as a potential COPC in groundwater and surface water based upon comparison to its EPA action level (AL) of 15 µg/L.

The tap water RBCs for methyl mercury were used for COPC selection because the form of mercury at the site is unknown and methyl mercury is considered the most toxic form of mercury.

For the PCB congeners, a total dioxin-like PCB concentration and a total non-dioxin-like PCB concentration was calculated and used in the selection of COPCs. Section 5.9 discusses how the total dioxin-like and non-dioxin-like PCB concentrations were calculated.

Results of the COPC selection process for each area or medium of concern are presented in the following subsections. The COPC selections and the rationale for inclusion or exclusion of chemicals are presented in Appendix G, Part 2, RAGS D Tables 2.1 through 2.13.

COPC selection for direct contact with groundwater is shown in Appendix G, Part 2, on RAGS D Tables 2.1 through 2.13. Samples were labeled LDCA-MWXXX-MMYY, where LDCA represents the site name (Lower Darby Creek Area), MW represents monitoring well sampling location within the site. The MMYY suffix indicates the month and year the sample was collected.

COPCs Selected for Direct Contact with Groundwater Inside Landfill

- 1,3-Dichlorobenzene
- Benzene
- Trichloroethene (TCE)
- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Bis(2-ethylhexyl)phthalate
- Dibenzofuran
- Naphthalene
- Phenanthrene
- 4,4'-DDE
- beta-BHC
- Dieldrin
- Heptachlor
- Perfluorooctanoic Acid (PFOA)
- Aluminum
- Arsenic
- Beryllium
- Cadmium
- Cobalt
- Cyanide
- Lead
- Mercury
- Silver
- Vanadium
- 1,2,3,4,6,7,8,9-OCDD
- 1,2,3,4,6,7,8-HPCDD
- 1,2,3,4,7,8,9-HPCDF
- 1,2,3,4,7,8-HXCDF
- 1,2,3,6,7,8-HXCDF
- 1,2,3,7,8,9-HXCDF
- 1,2,3,7,8-PECDF
- 2,3,4,7,8-PECDF
- 2,3,7,8-TCDF
- PCB-105
- 1,4-Dichlorobenzene
- Chlorobenzene
- 1,4-Dioxane
- Benzo(a)pyrene
- Benzo(k)fluoranthene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Pentachlorophenol
- 4,4'-DDD
- Aldrin
- delta-BHC
- gamma-BHC (Lindane)
- Heptachlor Epoxide
- Perfluorooctane Sulfonic Acid (PFOS)
- Antimony
- Barium
- Boron
- Chromium
- Copper
- Iron
- Manganese
- Nickel
- Thallium
- Zinc
- 1,2,3,4,6,7,8,9-OCDF
- 1,2,3,4,6,7,8-HPCDF
- 1,2,3,4,7,8-HXCDD
- 1,2,3,6,7,8-HXCDD
- 1,2,3,7,8,9-HXCDD
- 1,2,3,7,8-PECDD
- 2,3,4,6,7,8-HXCDF
- 2,3,7,8-TCDD
- 2,3,7,8-TCDD Equivalents
- PCB-114

- PCB-118
- PCB-123
- PCB-156/157
- PCB167
- PCB-189
- PCB-77
- PCB-81
- Total Dioxin-Like PCBs
- Total Nondioxin-Like PCBs

COPCs Selected for Direct Contact with Groundwater Outside Landfill - Shallow Wells

- 1,1,2-Trichloroethane
- 1,2-Dibromo-3-Chloropropane
- 1,2-Dichloroethane
- 1,4-Dichlorobenzene
- 1,1-Dichloroethane
- 1,2-Dichlorobenzene
- 1,3-Dichlorobenzene
- 2-Hexanone
- Benzene
- cis-1,2-Dichlorobenzene
- Ethylbenzene
- m+p-Xylenes
- TCE
- Vinyl Chloride
- 1,4-Dioxane
- 2,6-Dinitrotoluene
- 2-Methylnaphthalene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Bis(2-chloroethyl)ether
- Naphthalene
- Pentachlorophenol
- Aldrin
- beta-BHC
- delta-BHC
- Dieldrin
- Heptachlor
- Heptachlor Epoxide
- PFOA
- PFOS
- Aluminum
- Antimony
- Arsenic
- Barium
- Boron
- Cadmium
- Chromium
- Cobalt
- Copper
- Cyanide
- Iron
- Lead
- Manganese
- Mercury
- Silver
- Thallium
- Vanadium
- Zinc
- 1,2,3,4,6,7,8,9-OCDD
- 1,2,3,4,6,7-HPCDD
- 1,2,3,4,6,7,8-HPCDF
- 1,2,3,4,7,8-HXCDF
- 1,2,3,6,7,8-HXCDD
- 1,2,3,6,7,8-HXCDF
- 1,2,3,7,8,9-HXCDD
- 1,2,3,7,8,9-HXCDF

- 1,2,3,7,8-PECDD
- 2,3,4,7,8-PECDF
- 2,3,7,8-TCDD Equivalents
- Total Nondioxin-Like PCBs
- 2,3,4,6,7,8-HXCDF
- 2,3,7,8-TCDD
- Total Dioxin-Like PCBs
- Cyclohexane

COPCs Selected for Direct Contact with Groundwater Outside Landfill - Deep Wells

- 1,1-Dichloroethane
- Chloroform
- TCE
- 1,4-Dioxane
- Bis(2-ethylhexyl)phthalate
- Indeno(1,2,3-cd)pyrene
- delta-BHC
- PFOA
- Aluminum
- Arsenic
- Beryllium
- Chromium
- Iron
- Manganese
- 1,2,3,4,7,8-HPCDD
- 1,2,3,6,7,8-HXCDD
- 1,2,3,7,8,9-HXCDF
- 2,3,4,7,8-PECDF
- Total Dioxin-Like PCBs
- Benzene
- cis-1,2-Dichloroethene
- Vinyl Chloride
- Benzo(a)pyrene
- Dibenzo(a,h)anthracene
- Naphthalene
- Dieldrin
- PFOS
- Antimony
- Barium
- Cadmium
- Cobalt
- Lead
- Vanadium
- 1,2,3,4,7,8-HXCDF
- 1,2,3,7,8,9-HXCDD
- 1,2,3,7,8-PECDD
- 2,3,7,8-TCDD Equivalents

COPCs Selected for Groundwater Inside Landfill – Vapor Intrusion

- 1,2,3,4,6,7,8,9-OCDD
- 1,2,3,4,7,8-HXCDD
- 1,2,3,7,8,9-HXCDD
- 2,3,7,8-TCDD
- Cyanide
- 1,4-Dichlorobenzene
- Chlorobenzene
- PCB-105
- 1,2,3,4,6,7,8-HPCDD
- 1,2,3,6,7,8-HXCDD
- 1,2,3,7,8-PECDD
- 2,3,7,8-TCDD Equivalents
- Mercury
- Benzene
- TCE
- PCB-118

COPCs Selected for Groundwater Outside Landfill - Shallow Wells – Vapor Intrusion

- Naphthalene
- Mercury
- Benzene
- Vinyl Chloride
- Cyanide
- 1,2-Dibromo-3-Chloropropane
- TCE

The list of COPCs is mostly the same for SVOCs, dioxin/furans, perfluorinated compounds, and metals in groundwater inside the landfill and shallow and deep groundwater outside of the landfill. Nine pesticides were retained as COPCs in groundwater from within the landfill while five pesticides were retained as COPCs in shallow groundwater outside the landfill and only two pesticides were retained as COPCs in deep groundwater outside the landfill. There were more VOCs retained as COPCs in shallow (10) and deep (10) groundwater outside the landfill than in groundwater inside the landfill (5).

For assessment of pore water, it was assumed that all detected contaminants would be considered COPCs. Each pore water sampling location was considered a potential exposure point for the construction worker and the recreational receptor.

3.0 EXPOSURE POINT CONCENTRATIONS

The EPC is an estimate of the chemical concentration within an exposure unit (EU). The EPC is assumed to be the concentration to which the receptor is exposed and is used to estimate exposure intakes. An EU is the area over which receptor activity is expected to occur. Three groundwater exposure units were evaluated in this HHRA: groundwater inside the landfill, shallow groundwater outside of the landfill, and deep groundwater outside of the landfill. EPCs were calculated following EPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (EPA, 2002a) and using EPA's ProUCL Software Version 5.1.002 (EPA, 2016e). ProUCL Outputs are included in Appendix G, Part 4. Appendix G-2, Tables 3.1 through 3.14 provide EPC calculations.

The following guidelines were used to calculate EPCs for groundwater:

- EPA guidance (EPA, 2014c) recommends the 95 % Upper Confidence Limit (UCL) of the wells in the highly concentrated area of the plume should be used as the EPC for groundwater. For this evaluation the plume was considered to extend across the EU; therefore, all groundwater wells within the EU were used to calculate the EPC.

- If there were less than four detected concentrations, the maximum detected concentration was used as the EPC.

- If the UCL recommended by ProUCL was greater than the maximum detected concentration, the maximum detected concentration was used as the EPC.

- As stated in the guidance manual for the Integrated Exposure Uptake Biokinetic Model (IEUBK) model (EPA, 1994b) the arithmetic mean concentration was used as the EPC for lead.

- Non-detected values were evaluated in accordance with the ProUCL guidance using Kaplan-Meier (KM) statistics. Duplicates were averaged for purposes of calculating EPCs for COPCs in environmental media. In calculating the averages, when a positive result was reported for one sample in a duplicate pair but a non-detect result was reported for the other sample in the duplicate pair *and* the non-detect result (i.e., the "U" qualified value) exceeded the positive result, the positive result was selected to represent the sample. If the detection limit was less than the detected value, then the average of the detected value and one-half the detection limit was used.

- There were four groundwater sampling events (March 2014, December 2014, July 2015, and April 2016). EPCs were calculated for each event and the maximum EPC from all the sampling events was used to estimate risks. Samples collected from inside the landfill during the fourth sampling event were only analyzed for anions (nitrate, nitrite, and sulfate) and volatile gases (acetylene and methane). Only sulfate, acetylene, and methane were detected in the groundwater samples collected during the fourth sampling event and toxicity criteria is not available for these chemicals; consequently, only data from the first three sampling events was used to calculate EPCs for groundwater inside the landfill. Data from all four sampling events were used for calculating EPCs for shallow and deep groundwater outside the landfill.

- The same EPCs were used to evaluate both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios.

Fate and transport modeling was applied to estimate exposure route-specific EPCs based on transfer of contaminants from a source medium to another exposure medium or exposure point where contact may occur with human receptors:

- EPCs representing air concentrations predicted within a narrow excavation trench impacted by volatilization of COPCs from groundwater were estimated using the Virginia Department of Environmental Quality (VDEQ) trench worker model. The EPCs calculated from measured groundwater concentration data were converted to EPCs in air concentration units. Model assumptions

are discussed in Section 4.0. EPCs were only calculated for chemicals identified as volatiles in EPA's RSL table. Copies of the VDEQ model calculations are included in Appendix G, Part 8.

- EPCs representing air concentrations predicted in outdoor air impacted by volatilization of COPCs from groundwater used for irrigating were estimated using a simple box model developed by the University of Florida for the Florida Department of Environmental Protection (UF, 2009). EPCs were only calculated for chemicals identified as volatiles in EPA's RSL table. The model is presented in Appendix G, Part 5.

For evaluation of pore water, each sampling location was considered an EU. Therefore, the actual detected concentration of each contaminant at each sampling location was the EPC.

4.0 EXPOSURE ASSESSMENT

The exposure assessment identifies categories of potential human health exposure based upon a characterization of the site setting, delineates potential receptors consistent with current and possible future land use patterns, outlines possible exposure routes by medium, documents the parameters and equations used in exposure estimates for each pathway, and explains the exposure evaluation used in blood-lead modeling. To determine whether there is an actual or potential exposure, the most likely pathways of contaminant release and transport, as well as the human and environmental activity patterns, were considered. A complete exposure pathway has three components: a source, a route of transport, and an exposure point for receptors. Exposure input parameters for each receptor and the exposure pathways for all media of concern are presented on RAGS D Table 4s.

4.1 Receptor Exposure Pathways

The possible pathways for contaminant migration and exposure media which provide a potential route of contact with human receptors are shown in Figure 1-2. The potential human exposure risks that were assessed included potable tap water usage, outdoor excavation trench worker exposure to groundwater, contact with soils, contact with surface water and sediment, ingestion of contaminated fish, vapor intrusion to indoor air, and soil gas volatilization to outdoor air. RAGS D Table 1 in Appendix G, Part 2, delineates the details of the receptor exposure scenarios considered in this risk assessment and the rationale for including or excluding applicable exposure locations or routes of exposure for the receptors and receptor activities considered.

4.2 Potential Receptors

The potential receptors chosen for the HHRA are presented in this section. The receptors were selected based on several criteria (current and possible future land use, including industrial, residential settings, and possible construction activities). For exposure to groundwater, the receptors are:

- Current/Future Construction Worker - This receptor is an adult who performs full time construction work, in some scenarios involving trench utility work, for a one-year duration at or near the site. Exposure to COPCs from contact with groundwater during excavation work may occur for 30 days per year via incidental ingestion, dermal absorption, and groundwater vapor emissions to air within narrow trenches. Scenario timeframes and receptor-specific areas and media of exposures for the construction worker are presented in Appendix G (Part 2) Table 4 (RAGS D 4.1 and 4.2).

- Current/Future Industrial Worker - This receptor is an adult who maintains the grounds (groundskeeper), lawn mower, or other light industrial activities. Exposure to COPCs from contact with groundwater while performing routine activities such as lawn irrigation, utility digging (shallow groundwater), and/or showering at work if groundwater is used as a water supply. Potential exposure pathways include incidental ingestion, dermal absorption, and groundwater vapor emissions. Scenario timeframes and receptor-specific areas and media of exposures for the industrial worker are presented in Appendix G (Part 2) Table 4 (RAGS D 4.3, 4.4, and 4.5).

- Current/Future Residential Child - This receptor is a child (age 0 to 6) who resides off-site within the area of influence of the contaminated groundwater plume, or at an existing or future residence near the site. This receptor is potentially exposed to several types of media: tap water ingestion and dermal absorption of COPCs in groundwater; and inhalation of indoor air in residences affected by subsurface vapor intrusion. Scenario timeframes and receptor-specific media of exposures for the residential child are presented in Appendix G (Part 2) Table 4 (RAGS D 4.6).

- Current/Future Residential Adult - This receptor is an adult (20-year exposure duration) who resides off-site within the area of influence of the contaminated groundwater plume, or at an existing or future residence near the site. This receptor is potentially exposed to several types of media: tap water ingestion and dermal absorption of COPCs in groundwater; inhalation of groundwater vapors during showering; and inhalation of indoor air in residences affected by subsurface vapor intrusion. Scenario timeframes and receptor-specific media of exposures for the residential adult are presented in Appendix G (Part 2), RAGS D Tables 4.7 and 4.8.

- Current/Future Lifetime Resident - Lifetime exposure (26-year exposure duration) is a combination of the exposure scenarios for an adult and a child in order to estimate the cumulative lifetime cancer risk under residential land use scenarios. The RME lifetime cancer risk was estimated by adding the cancer risk for a 20-year adult exposure to the cancer risk for a 6-year child exposure. It was assumed that all receptor exposure scenarios applied to both age groups, except for showering, which was only considered for the adult.

For exposure to pore water, the receptors are:

- Recreational User (Child and Adult) – This receptor is assumed to be present here over a residential lifetime with limited exposure to pore water. Exposure to contaminants from contact with pore water may occur twice per week for a 2-hour event duration during the warmest 6 months of the year (52 days per year).

- Current/Future Construction Worker - This receptor is an adult who performs full time construction work and in some scenarios may have limited exposure to pore water for a one-year duration at or near the site. Exposure to contaminants from contact with pore water may occur once per week for a 10-minute duration during the warmest 6 months of the year (26 days per year) via incidental ingestion and dermal absorption.

Details regarding the exposure assumptions for exposures to pore water are presented in Appendix G (Part 12).

4.3 Exposure Estimates

The exposure estimation routes, methods, and models presented in this section are consistent with EPA guidance (EPA, 1989, 1993a, 2004, 2009, 2010a, 2011a, 2014d). Exposure estimates associated with each exposure route are presented below. All exposure scenarios incorporated RME and CTE EPCs in the estimation of intakes.

Noncarcinogenic risks were estimated using the concept of an average annual exposure or intake. The intake incorporates terms describing the exposure time and/or frequency that represent the number of hours per day and the number of days per year that exposure occurs. This was used along with the "averaging time," which converted the daily exposure frequency and duration to an annual exposure by dividing by 365 days per year of exposure. Noncarcinogenic risks for some exposure routes (e.g., ingestion and dermal exposures) were generally greater for children than for adults because of differences in body weight and intake. Carcinogenic risks, on the other hand, were estimated as an incremental lifetime risk and,

therefore, incorporated terms to average the exposure duration (years) over the course of a lifetime (70 years).

For groundwater exposure estimates, the following pathway-specific assumptions and estimation methods should be noted:

- Ingestion of tap water or incidental ingestion of water during outdoor activities: Residential tap water consumption assumed 2.5 liters per day or 0.78 liter per day for adults and children; 350 days per year. Construction workers are assumed to incidentally ingest 0.05 L/day and industrial workers 0.01 L/day.

- Dermal absorption of tap water during bathing or outdoor activities: Skin surface areas available for dermal contact were based on values presented in dermal guidance (EPA, 2004, 2014d). Activity-specific exposure assumptions are listed in footnotes to RAGS D Table 4s. Chemical-specific dermal absorption constants were obtained from EPA's RSL table and are listed in Appendix G, Part 6 (EPA, 2004).

- RAGS Part E (EPA, 2004) recommends not evaluating dermal exposures to groundwater for chemicals that fall outside the effective predictive domain of the dermal model. The May 2016 RSL table was used to identify chemicals that fall outside the effective predictive domain of the dermal model. Dermal exposures to groundwater were not evaluated for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, 2,3,7,8-TCDD, pentadecafluorooctanoic acid, perfluorooctane sulfonic acid, 4,4'-DDE, Aldrin, dioxin-like PCBs, and non-dioxin-like PCBs.

- Inhalation during showering: The Foster and Chrostowski showering model (1987) was applied to estimate time-varying air concentrations of volatile COPCs and inhaled dose during the time spent showering and while in the bathroom after showering. Showering model input assumptions were adopted from EPA national guidance (EPA, 2004) and regional EPA recommendations, and are shown in Appendix G, Part 2, Table 4.8. Assumptions include a showerhead flow rate of 10 L/min, 43 minutes duration of shower, 60 minutes total time spent in bathroom room, a shower water temperature of 318 degrees Kelvin (113 degrees F), a shower droplet diameter of 1 mm, a droplet free fall time of 0.5 seconds, a shower room volume of 12 m^3, and an air exchange rate of 0.01667 room air volumes replaced per minute. Inhalation exposures while showering were only evaluated for those chemicals identified as volatiles in EPA's RSL table. Calculations for the Foster and Chrostowski shower model are provided in Appendix G, Part 7.

- Inhalation of air within a narrow utility trench containing exposed groundwater: The VDEQ groundwater volatilization model for workers in a utility trench (VRP Table 3.8) was used to estimate the mass flux

(emission rate) of VOC vapors from groundwater within an excavation trench, taking into account a conservative assumption of 2 air exchanges within the trench per hour, which is the default recommended by VDEQ (VDEQ, 2016). Inhalation exposures for workers in a utility trench were only evaluated for those chemicals identified as volatiles in EPA's RSL table. Spreadsheets listing the model input assumptions and calculated air concentrations are provided in Appendix G, Part 8.

4.4 Blood-Lead Modeling

As outlined in OSWER Directive 9355.4-12, EPA (1994a) has developed an approach to evaluating lead risks that recognizes the multimedia nature of lead exposures, incorporating absorption and pharmacokinetic information. Research has been conducted concerning lead intake and resultant blood-lead levels. Determinations of lead uptake from groundwater were considered. Potential blood-lead level increases are estimated and are discussed, along with the potential implications of predicted blood-lead results for residential children and workers.

4.4.1 Effects of Lead Exposure and Relationship to Blood Lead Increases

No threshold has been defined for effects related to blood-lead increases. Effects below blood-lead levels of 10 microgram/deciliter (µg/dL) are difficult to define. Inhibition of certain enzymes involved in red blood cell metabolism has been reported to occur at 10 to 15 µg/dL and possibly lower. Small increases in blood pressure were observed in adults with blood-lead levels down to 7 µg/dL (EPA, 1994b). The most sensitive subpopulation to effects below 7 µg/dL would be infants, whose early neurological development can be affected by blood-lead concentrations reportedly down to 5 µg/dL.

For drinking water exposure, children 0 through 6 months old are expected to experience blood-lead increases at the rate of 0.26 µg/dL per µg/L lead in water up to 15 µg/L and at the rate of 0.04 µg/dL for every µg/L lead in water above 15 µg/L (EPA, 1994b). For older children, the ratio is 0.12 µg/dL blood lead per µg/L lead in water up to 15 µg/L and 0.06 µg/dL for every µg/L lead in water above 15 µg/L. For adults, the ratio is approximately 0.06 µg/dL blood lead per µg/L in water. Dietary intake of lead is assumed to produce increases of 0.02 to 0.04 µg/dL blood lead per µg/day ingested by adults and 0.16 µg/dL blood lead per µg/day ingested by infants (EPA, 1986a). Blood-lead levels are estimated to increase by 0.6 to 6.8 µg/dL per 1,000 mg/kg lead in soil.

4.4.2 Blood Lead Models

Blood-lead levels in residential children (age 0 to 6) were estimated using the IEUBK Model (Version 1.1 Build 11) developed by EPA (EPA, 2010a). The model was applied to groundwater in areas of interest where lead was selected as a COPC.

4.4.3 Model Inputs

The arithmetic mean of lead concentrations was used as the EPC for the IEUBK child lead model, consistent with current EPA lead guidance. This approach is used because lead models were designed and calibrated to utilize a single-point estimate of mean environmental lead concentrations, and already take into account a population geometric standard deviation, which encompasses all sources of population blood lead variability, including variability in media lead concentrations ingested, receptor activity patterns, and physiologic/metabolic variability.

For the assessment of ingestion of lead by residential children, default values in the model were used to represent background lead concentrations in air, house dust, and the level of maternal contribution. Default values were used to represent respiratory rate, soil and water RME ingestion rates, and the percent of lead absorption by the various exposure routes. The arithmetic mean concentration was used as the EPC for groundwater.

4.4.4 Model Outputs

The output of the IEUBK Model is a histogram that presents the estimated percentage of residential children (age 0 through 6 years) with a blood-lead level above 10 µg/dL (considered to be the threshold significance level above which adverse effects cannot be ruled out). When the percentage of the population estimated to have blood-levels above 10 µg/dL is greater than 5 percent, then EPA considers the potential for adverse effects to be significant (EPA, 1994a). These histograms, along with input information particular to each run of the IEUBK model, are presented in Appendix G, Part 9. The estimated percentages of residential children (age 0 through 6 years) with blood-lead levels above 10 µg/dL are also presented in Section 6.0. Uncertainties associated with the IEUBK model are discussed in Section 7.0.

5.0 TOXICITY ASSESSMENT

The toxicity assessment identifies the potential health hazards associated with exposure to each COPC. Literature references establish that the selected COPCs have the potential to cause carcinogenic and/or noncarcinogenic health effects in humans. Dose-response relationships and the potential for exposure

must be evaluated before the risks to receptors can be determined. Dose-response relationships correlate the magnitude of the intake with the probability of toxic effects. As discussed below, dose-response values [reference doses (RfDs) and cancer slope factors (CSFs)] have been developed by EPA and other sources for many organics and inorganics. Oral and inhalation RfDs and CSFs were obtained from the following primary recommended sources (EPA, 2003):

- Tier 1 - Integrated Risk Information System (IRIS).
- Tier 2 - EPA Provisional Peer Reviewed Toxicity Values (PPRTVs) (2016i) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by EPA's Superfund program.
- Tier 3 - Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values (2008, 2009), Agency for Toxic Substances and Disease Registry (ATSDR) values (2007), and the Health Effects Assessment Summary Tables (HEAST) (2016h).

Although RfDs and CSFs can be found in several toxicological sources, EPA's IRIS online database is the preferred source of toxicity values. This database is continuously updated and values presented have been verified by the agency's consensus peer review process.

5.1 Reference Doses

The RfD is developed by EPA for chronic and/or subchronic human exposure to hazardous chemicals and is based solely on the noncarcinogenic effects of chemical substances. Subchronic RfDs are specifically developed to be protective for a portion of a lifetime exposure to a compound (as a Superfund program guideline, short term). Chronic RfDs are specifically developed to be protective for long-term exposure to a compound (as a Superfund program guideline, long term). The RfD is usually expressed as a dose (mg) per unit body weight (kg) per unit time (day). It is generally derived by dividing a No-Observed-(Adverse)-Effect-Level (NOAEL or NOEL) or a Lowest-Observed-Adverse-Effect-Level (LOAEL) by an appropriate uncertainty factor. NOAELs, etc. are determined from laboratory or epidemiological toxicity studies. The uncertainty factor is based on the availability of toxicity data.

Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the available data. A factor of 10 is used to account for variations in the general population (to protect sensitive subpopulations), when test results from animals are extrapolated to humans (to account for interspecies variability), when a NOAEL derived from a subchronic study (instead of a chronic study) is used to develop the RfD, and when a LOAEL is used instead of a NOAEL. In addition, EPA reserves the use of a modifying

factor of up to 10 for professional judgment of uncertainties in the database not already accounted for. The default value of the modifying factor is 1.

The RfD incorporates the surety of the evidence for chronic human health effects. Even if applicable human data exist, the RfD (as diminished by the uncertainty factor) still maintains a margin of safety so that chronic human health effects are not underestimated. Thus, the RfD is an acceptable guideline for evaluation of noncarcinogenic risk, although the associated uncertainties preclude its use for precise risk quantitation.

Noncancer hazards are considered to be associated with particular target organs or critical effects, but are not additive across multiple chemicals except when the same target organ is affected. Target organ data have been extracted from IRIS (EPA, 2016g), HEAST (EPA, 2016h), or other applicable sources. Only the target organs that are affected in the applicable study in which the RfD was derived have been included in Appendix G, Part 2, RAGS D Tables 5.1 and 5.2.

Appendix G, Part 2, Table 5.1 lists the oral RfDs, primary target organs, uncertainty/modifying factors, and sources for selected COPCs. Appendix G, Part 2, Table 5.2 lists the Inhalation reference concentrations (RfCs) (mg/m^3), primary target organs, uncertainty/modifying factors, and sources for selected COPCs.

Noncarcinogenic risks for lead were not quantified and compared to RfDs because EPA has implemented an approach to evaluating lead risks that does not provide a single-point estimate output. Instead, potential lead exposures are evaluated using a biokinetic model to estimate expected blood-lead increases.

5.2 Cancer Slope Factors

CSFs are applicable for estimating the lifetime probability (assumed 70-year lifespan) of human receptors developing cancer as a result of exposure to known or potential carcinogens. The slope factor is generally reported in units of $(mg/kg/day)^{-1}$, and for most substances is derived through an assumed low-dosage linear relationship extrapolated from high to low dose responses, typically based on animal studies. The value used in reporting the slope factor is the upper 95 percent confidence limit.

Oral and dermal CSFs, weight of evidence, and sources for selected COPCs in groundwater are provided in Appendix G, Part 2, Table 6.1. Inhalation Unit Risks (IURs), weight of evidence, and toxicity data sources for selected COPCs are provided in Appendix G, Part 2, Table 6.2.

5.3 EPA Weight of Evidence

A weight-of-evidence approach is used to classify the likelihood that a substance is a carcinogen. This qualitative information is important to consider when using CSFs to estimate potential risk. Each substance is assigned a weight-of-evidence for carcinogenicity. EPA has revised their weight-of-evidence classifications. The updated categories are listed as follows (EPA, 2005a):

WEIGHT OF EVIDENCE CATEGORY	DEFINITION
Carcinogenic to Humans	There is strong evidence of human carcinogenicity
Likely to be Carcinogenic to Humans	The weight-of-evidence is adequate to demonstrate carcinogenic potential to humans, but does not reach the weight of evidence for the classification of "Carcinogenic to Humans"
Suggestive Evidence of Carcinogenic Potential	The weight of evidence is suggestive of carcinogenicity; a concern for potential carcinogenic effects in humans is raised, but the data are judged not sufficient for a stronger conclusion
Inadequate Information to Assess Carcinogenic Potential	Available data are judged inadequate for applying one of the other classifications
Not Likely to be Carcinogenic to Humans	The available data are considered robust enough for deciding that there is no basis for human health hazard

Weight-of-evidence classifications have not yet been updated for many substances. In these instances, it is appropriate to still list the old weight-of-evidence classifications (EPA, 1986b). The older weight-of-evidence categories were used on RAGS D Tables 6.1 and 6.2, and are listed as follows:

- Group A – Human Carcinogen (Sufficient evidence from epidemiological studies to support a causal association between exposure and cancer).
- Group B1 – Probable Human Carcinogen (Limited evidence of carcinogenicity in humans from epidemiological studies; sufficient evidence in animals).
- Group B2 – Probable Human Carcinogen (Sufficient evidence of carcinogenicity in animals and no or inadequate evidence in humans).
- Group C – Possible Human Carcinogen (Limited evidence of carcinogenicity in animals).
- Group D – Not Classified (Inadequate evidence of carcinogenicity in animals).
- Group E – No Evidence of Carcinogenicity (No evidence of carcinogenicity in at least two adequate animal tests or in both epidemiological and animal studies).

5.4 Adjustment of Dose-Response Parameters for Dermal Exposure

Risks associated with dermal exposures were evaluated using toxicity values that are specific to absorbed dermal doses. Most oral toxicity values are based on administered doses rather than absorbed doses. Therefore, in accordance with EPA guidance (2004), the toxicity values based on administered doses were adjusted before they were used for evaluating absorbed doses.

Dermal RfDs and CSFs were obtained from oral RfDs and CSFs via the following relationships:

$$\mathrm{Rfd}_{\mathrm{Adjusted}} = \mathrm{RfD}_{\mathrm{Oral}} \times \mathrm{GI}_{\mathrm{Oral}}$$

$$\mathrm{CSF}_{\mathrm{Adjusted}} = \mathrm{CSF}_{\mathrm{Oral}} \,/\, \mathrm{GI}_{\mathrm{Oral}}$$

where:

GI_{Oral}	=	Gastrointestinal (GI) Absorption Efficiency
RfD_{Oral}	=	Oral Reference Dose
CSF_{Oral}	=	Oral Cancer Slope Factor

Dermally adjusted RfDs and CSFs for COPCs are presented in Appendix G in Tables 5.1 and 6.1, respectively. In addition, chemical-specific dermal absorption factors from soil are shown on these tables.

5.5 Toxicity Criteria for Chromium

Chromium was selected as a COPC in groundwater. Toxicity factors for hexavalent chromium (Cr^{+6}) were used to evaluate risks associated with chromium because hexavalent chromium was not analyzed for, and hexavalent chromium is considered to be more toxic than trivalent chromium. Therefore, this assumption is conservative in nature.

5.6 Toxicity Criteria for Mercury

The methyl mercury RfD was used to evaluate noncancer risks from exposures to mercury in groundwater. Methyl mercury is considered more toxic than inorganic mercury. Therefore, this assumption is conservative in nature.

5.7 Carcinogenicity of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects of exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by EPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using toxicity equivalency factors (TEFs) based on the potency of each compound relative to that of benzo(a)pyrene, as presented in current EPA guidance (EPA, 1993b). The equivalent oral CSF for a carcinogenic PAH other than benzo(a)pyrene was derived by multiplying the CSF for benzo(a)pyrene by the TEF recommended for that PAH. TEFs for the individual carcinogenic PAHs are as follows:

Compound	TEF
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

Carcinogenic PAHs potentially act via a mutagenic mode of action. EPA Guidelines for Carcinogen Risk Assessment (EPA, 2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (EPA, 2005b) specify the use of Age-Dependent Adjustment Factors (ADAFs) for carcinogens that act via a mutagenic mode of action. No chemical-specific ADAF is available for carcinogenic PAHs; therefore, EPA's default ADAFs are applied to the carcinogenic intakes for the carcinogenic PAHs. The following default ADAFs were applied: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for ages 16 to 70.

5.8 Toxicity Criteria for Trichloroethene

Toxicity factors for TCE were finalized by EPA in September 2011 (2011b). TCE has toxicity factors that address both carcinogenic and noncarcinogenic effects. Toxicological studies indicated that exposure to TCE increases the risk of kidney cancer, liver cancer, and non-Hodgkin's lymphoma. There is a sufficient weight of evidence to suggest that TCE induced kidney tumors are a result of a mutagenic mode of action. EPA Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. However, the ADAFs will only be applied to a portion of the cancer slope factor and inhalation unit risk that is attributable to kidney-induced tumors.

The oral CSF for TCE is $4.6x10^{-2}$ $(mg/kg\text{-}day)^{-1}$ and the IUR is $4.1x10^{-6}$ $(\mu g/m^3)^{-1}$. For the kidney mutagenic endpoint, the oral CSF is $9.3x10^{-3}$ $(mg/kg\text{-}day)^{-1}$ and the IUR is $1x10^{-6}$ $(\mu g/m^3)^{-1}$. There are no chemical-specific ADAFs for the kidney mutagenic endpoint; therefore, the EPA's default ADAFs are applied to the carcinogenic toxicity factors for the kidney-related component of TCE's carcinogenic toxicity factors. The following default ADAFs should be applied: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for ages 16 to 70. For the liver cancer and non-Hodgkin's lymphoma endpoints, the oral CSF is $3.7x10^{-2}$ $(mg/kg\text{-}day)^{-1}$ and the IUR is $3x10^{-6}$ $(\mu g/m^3)^{-1}$. No ADAFs are applied to these values.

Noncarcinogenic effects are evaluated like all noncarcinogens in accordance with EPA's risk assessment guidance (1989).

5.9 Carcinogenicity of Vinyl Chloride

EPA has categorized vinyl chloride as a mutagen having enhanced carcinogenic potency during early life periods of exposure, citing studies which show that vinyl chloride exposures were most effective at producing cancer when started early in life (EPA, 2000, 2005b). Until recently, the conventional approach for estimating cancer risks for any COPC was to assume a linear dose relationship cancer risk should be calculated by multiplying the potency, or risk from one day of exposure (risk per mg/kg/day), by the number of days of exposure and the mg of COPC ingested each day per kg of body weight. Risks calculated in this manner are prorated for the duration of exposure. Based on recent guidance (EPA, 2000), when early life exposures are considered for vinyl chloride, a second term should be incorporated into the risk calculation, which is not proportional to duration of exposure (non-prorated). This method yields a vinyl chloride risk that is above and beyond the risk that would have been generated by conventional calculations by an amount equal to the older method's cumulative risk for 70 years of continuous exposure.

5.10 Toxicity Criteria for Construction Workers

Under the guidelines established by the Superfund program, exposures to construction workers of one year or less are classified as subchronic exposures. Risks for noncarcinogenic effects associated with subchronic exposures should be based on toxicity values for subchronic and not chronic effects. Tables 5-1 and 5-2 in Appendix G, Part 2 display the available subchronic RfDs and RfCs used to evaluate construction worker risks. If subchronic RfDs and RfCs were not available, then chronic RfDs and RfCs were used.

5.11 Chemicals Without Toxicity Criteria

EPA has not developed toxicity values for all chemicals for use in quantitative risk characterization. These COPCs include acenaphthylene, benzo(g,h,i)perylene, and phenanthrene. Therefore, risks for these chemicals were evaluated using surrogates (similar PAHs). 1,4-Dichlorobenzene was selected as a surrogate for 1,3-dichlorobenzene, 1,3-dichloropropene was selected as a surrogate for cis-1,3-dichloropropene, acenaphthalene was selected as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was selected as a surrogate for alpha- and gamma-chlordane, endosulfan was selected as a surrogate for endosulfan I, endosulfan II, and endosulfan sulfate, and endrin was selected as a surrogate for endrin aldehyde and endrin ketone.

6.0 RISK CHARACTERIZATION

This section presents estimates of carcinogenic risks, noncarcinogenic risks, and lead risks for all applicable human receptors that may be exposed to COPCs present in various environmental media and at each site-related area of interest. The risk characterization quantitatively evaluates the potential for adverse health effects from exposure to COPC concentrations in environmental media by integrating information developed during the toxicity and exposure assessments.

6.1 Noncarcinogenic Risks

Noncarcinogenic risk was assessed using the concept of HQs and HIs. The HQ is defined as the ratio of the estimated intake and the RfD for a selected chemical of concern, as follows:

$$\mathrm{HQ} = \frac{\mathrm{Intake}}{\mathrm{RfD}}$$

HIs were generated by summing individual HQs for COPCs. If the value of the total HI exceeded unity (1.0), the potential for noncarcinogenic health risks associated with exposure to that particular chemical mixture cannot be ruled out (EPA, 1986b). In that case, a review of the target organ(s) affected by each chemical was performed, which indicates the most sensitive toxic endpoints used to develop the associated RfDs for each substance. A target organ-specific HI was calculated for the receptor by summing the HQs for similar target organs. Since (HIs) for different organs are not truly additive, if each target organ-specific HI is less than 1, then adverse effects are not anticipated. The HI is not defined as a mathematical prediction of the severity of toxic effects; it is simply a numerical indicator of exceedance of the acceptable threshold for noncarcinogenic effects. Above an HI of 1, toxic effects would not necessarily occur but can no longer be ruled out.

6.2 Carcinogenic Risks

ILCR estimates were generated for each exposure pathway using the estimated intakes and published CSFs, as follows:

$$\text{Risk} = \text{Intake} \times \text{CSF}$$

If the above equation results in a risk greater than 0.01, a modified equation should be used, as given below. However, because the modification results in a nonlinear scaling of estimated risks with increasing dose, the unmodified linear estimate is better suited for developing preliminary remediation goals, and so has been utilized in RAGS D, Table 9s and 10s.

$$\text{Risk} = 1 - e^{-(\text{Intake} \times \text{CSF})}$$

The risk determined using these equations is defined as a unitless expression of an individual's increased likelihood of developing cancer as a result of exposure to carcinogenic chemicals. An ILCR of $1x10^{-6}$ indicates that the exposed receptor has a one in one million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of 1,000,000 persons. The calculated cancer risks should be recognized as upper-limit estimates. CSFs are defined as the upper 95 percent confidence limit (UCL) of a dose-response curve generally derived from animal studies.

6.3 Comparison of Quantitative Risk Estimates to Benchmark Criteria

To interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates are compared to typical benchmarks. COPCs exhibiting an HQ above 1, or otherwise contributing to a noncancer HI greater than 1 based on a single target organ or effect, were considered contaminants of concern (COCs). However, remediation decisions are not made strictly based on HIs but are often modified by other regulatory requirements such as chemical-specific clean-up goals.

EPA has defined the range of $1x10^{-4}$ to $1x10^{-6}$ as the ILCR target range such that, when the sum of cancer risks for all COPCs in a given medium is greater than $1x10^{-4}$, this generally indicates EPA will require consideration of remediation options. ILCRs below $1x10^{-4}$ normally do not require remediation of remedial efforts for a given medium. Whenever the overall ILCR for a medium was greater than $1x10^{-4}$, individual chemicals were selected which contributed significantly to overall risk, typically those chemicals with an individual ILCR greater than $1x10^{-6}$.

Receptor risks were presented for each area and medium of concern in the form of RAGS D Table 9s (showing all COPCs) and Table 10s (showing only risk drivers). In each risk table where HQs were reported as N/A, the HQs were not calculable because no RfD has been established. Usually in such cases, carcinogenicity is considered to be more important, since carcinogenicity will generally be seen at lower doses than noncarcinogenic effects. Cancer risks that are reported as "N/A" generally indicate that the chemical is not carcinogenic or that a CSF has not yet been developed.

Site-specific noncarcinogenic and carcinogenic risks were estimated for potential receptors at the site and are discussed below. If the RME HI did not exceed 1 for any target organ group and the RME cumulative cancer risk was below $1x10^{-4}$, then the CTE cancer and noncancer risks were not calculated for that medium and that receptor. Supporting data for chemical-specific cancer and non-cancer risks, receptor dose (chemical intake per day), CSFs, RfDs, and EPCs for each COPC are presented in Appendix G, Part 2, for all receptors and areas of interest according to RAGS D Table 7 format. Chemical-specific cancer risks, noncancer HQs, associated target organs, and the cumulative HI for each target organ are presented in Appendix G, Part 2 in RAGS D Table 9s, with a summary of risk drivers in RAGS D Table 10s. Sample calculations showing how the cancer risks and HIs were calculated are presented in Appendix G, Part 10. Exposures to pore water were handled differently than groundwater due to the intermittent nature of exposure to pore water. Risk from exposures to pore water are discussed in Section 6.8. Risk calculations for exposures to pore water are presented in Appendix G, Part 12.

6.4 Groundwater Noncancer Risks

Groundwater exposure was evaluated for hypothetical future construction workers, industrial workers, and child and adult residents. Noncancer hazards are shown in Appendix G, Part 2, on RAGS D Tables 9.1 through 9.14, and on Figures 6-1 and 6-2.

6.4.1 Inside Landfill

For construction workers exposed to groundwater, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 62. Cyanide (HQ = 58) and 2,3,7,8-TCDD TEQs (HQ = 4) were the only COPCs with an HQ greater than 1. Dioxin-like PCBs (HQ = 0.7) which affect the reproductive, developmental, and endocrine systems and TCE (HI = 0.2) which affect the immune and developmental systems also contributed to target organ-specific HIs that exceeded 1.

For Industrial workers exposed to groundwater, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 65. 2,3,7,8-TCDD TEQs (HQ = 4) and cyanide (HQ = 60) were the only COPCs with a HQs greater than 1. Additional COPCs contributed to target organ-specific HIs that

exceeded 1, but individually were associated with HQ contributions of less than or equal to 1 including dioxin-like PCBs (HQ = 0.8) which affect reproductive, developmental, and endocrine systems and TCE (HI = 0.2) which affect the immune and developmental systems.

For a future hypothetical child resident exposed to groundwater through tap water, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 205. The COPCs exhibiting HQs greater than 1 for the child resident include: 2,3,7,8-TCDD TEQs (HQ = 178), dioxin-like PCBs (HQ = 18), antimony (HQ = 4), arsenic (HQ = 4), cadmium (HQ = 2), chromium (HQ = 3), cobalt (HQ = 2), cyanide (HQ = 9), iron (HQ of 4), manganese (HQ = 11), mercury (HQ = 4), and thallium (HQ = 15). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including zinc (HQ = 0.3) which affects the hematological system; aluminum (HQ = 0.6) which affects the nervous system; TCE (HQ = 0.3), PFOA (HQ = 0.7), PFOS (HQ = 1), and boron (HQ = 0.6) which affect the development; beryllium (HQ = 0.3) and copper (HQ = 0.4) which affect the gastrointestinal system; silver (HQ = 0.3) and vanadium (HQ = 1) which effects the skin; 1,4-dioxane (HQ = 0.2), barium (HQ = 0.3) which affects the urinary system.

For a future hypothetical adult resident exposed to groundwater through tap water, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 141. The COPCs exhibiting HQs greater than 1 for the adult resident include: 2,3,7,8-TCDD TEQs (HQ = 108), dioxin-like PCBs (HQ = 11), antimony (HQ = 2), arsenic (HQ = 3), chromium (HQ = 2), cyanide (HQ = 28), iron (HQ of 2), manganese (HQ = 7), mercury (HQ = 2), and thallium (HQ = 9). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including zinc (HQ = 0.2) which affects hematological system; aluminum (HQ = 0.3) which affects the nervous system; PFOA (HQ = 0.4), PFOS (HQ = 0.8), and boron (HQ = 0.4) which affect the development; beryllium (HQ = 0.2), vanadium (HQ = 0.7) which affect dermal, and copper (HQ = 0.2) which affect the gastrointestinal system; and silver (HQ = 0.2) which affects the skin.

Estimated CTE HIs for construction workers exposed to groundwater exceeded 1 for several target organs. The maximum target organ HI was 31. Cyanide (HQ = 29) and 2,3,7,8-TCDD TEQs (HQ = 2) were the only COPCs with an HQ greater than 1. Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than or equal to 1, included dioxin-like PCBs (HQ = 0.4) which affect the reproductive, developmental, and endocrine systems.

Estimated CTE HIs for industrial workers exposed to groundwater exceeded 1 for several target organs. The maximum target organ HI was 33. 2,3,7,8-TCDD TEQs (HQ = 2) and cyanide (HQ = 30) was the only COPCs with a HQs greater than 1. Additional COPCs contributed to target organ-specific HIs that

exceeded 1, but individually were associated with HQ contributions of less than or equal to 1 including dioxin-like PCBs (HQ = 0.4) which affect reproductive, developmental, and endocrine systems.

Estimated CTE HIs for a future hypothetical child resident exposed to groundwater through tap water exceeded 1 for several target organs. The maximum target organ HI was 79. The COPCs exhibiting HQs greater than 1 for the child resident include: 2,3,7,8-TCDD TEQs (HQ = 69), dioxin-like PCBs (HQ = 7), antimony (HQ = 1), arsenic (HQ = 2), cyanide (HQ = 3), manganese (HQ = 4), mercury (HQ = 2), and thallium (HQ = 6). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including aluminum (HQ = 0.2) which affects the nervous system; PFOA (HQ = 0.3), PFOS (HQ = 0.5), and boron (HQ = 0.2) which affect the developmental system; silver (HQ = 0.1) and vanadium (HQ = 0.4) which affect the skin.

Estimated CTE HIs for a future hypothetical adult resident exposed to tap water contact with groundwater exceeded 1 for several target organs. The maximum target organ HI was 40. The COPCs exhibiting HQs greater than 1 for the adult resident include: 2,3,7,8-TCDD TEQs (HQ = 34), dioxin-like PCBs (HQ = 3), cyanide (HQ = 3), manganese (HQ = 2), and thallium (HQ = 3). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including mercury (HQ = 0.8) which affects the nervous system; and PFOS (HQ = 0.3) which affects the developmental system.

Uncertainty is associated with the EPCs estimated for TCE, antimony, beryllium, cadmium, mercury, silver, and thallium, which are based on the maximum detected concentration because there were an insufficient number of detected concentrations to calculate reliable statistics. These concerns are discussed in more detail in Section 7.0, Uncertainty Analysis.

6.4.2 Outside Landfill – Shallow Wells

For construction workers (HQ = 9) exposed to groundwater in shallow wells outside of the landfill, the estimated RME HIs when grouped by target organs exceeded 1 for the endocrine system. Cyanide was the major contributor to this exceedance.

For industrial workers exposed to groundwater in shallow wells outside of the landfill, the estimated RME HIs when grouped by target organs exceeded 1 for endocrine system and the nervous system. Cyanide (HQ = 9) was the major contributor to the exceedance for the endocrine system and manganese (HQ = 3) was the major contributor to the nervous system.

For a future hypothetical child resident exposed to shallow groundwater outside of the landfill through tap water, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 25. The COPCs exhibiting HQs greater than 1 for the child resident include 2,6-dinitrotoluene (HQ = 2), PFOA (HQ = 5), arsenic (HQ = 3), cobalt (HQ = 2), iron (HQ = 3), manganese (HQ = 25), and thallium (HQ = 20). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including aluminum (HQ = 0.4) which affects the nervous system; TCE (HQ = 0.7), PFOS (HQ = 0.6), 2,3,7,8-TCDD TEQs (HQ = 0.2), and boron (HQ = 0.2) which affect the developmental system; cis-1,2-dichloroethene (HQ=1) and cadmium (HQ = 0.2, which affect the urinary system, cyanide (HQ = 1), which affects the reproductive system, and silver (HQ = 0.3) which affects the skin.

For a future hypothetical adult resident exposed to shallow groundwater outside of the landfill through tap water, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 16. The COPCs exhibiting HQs greater than 1 for the adult resident include PFOA (HQ = 3), arsenic (HQ = 2), cyanide (HQ = 4), iron (HQ =2), manganese (HQ = 15), and thallium (HQ = 12). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including aluminum (HQ = 0.2) which affects the nervous system; TCE (HQ = 0.7) and PFOS (HQ = 0.4) which affect the developmental system; and silver (HQ = 0.2) which affects the skin.

Estimated CTE HIs for construction workers exposed to groundwater in shallow wells outside of the landfill exceeded 1 only for the endocrine system (HI = 4). Cyanide was the major contributor to this exceedance.

Estimated CTE HIs for industrial workers exposed to groundwater exceeded 1 for several target organs. The maximum target organ HI was 5. Cyanide (HQ = 5) was the only COPC with an HQ greater than 1. Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than or equal to 1, including manganese (HQ = 1) which affects the nervous systems.

Estimated CTE HIs for a future hypothetical child resident exposed to shallow groundwater outside of the landfill through tap water exceeded 1 for several target organs. The maximum target organ HI was 10. The COPCs exhibiting HQs greater than 1 for the child resident include PFOA (HQ = 2), arsenic (HQ = 1), manganese (HQ = 10), and thallium (HQ = 8). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including aluminum (HQ = 0.2) which affects the nervous system; and PFOS (HQ = 0.3) which affects the developmental system.

Estimated CTE HIs for a future hypothetical adult resident exposed to shallow groundwater outside of the landfill through tap water exceeded 1 for several target organs. The maximum target organ HI was 5. The COPCs exhibiting HQs greater than 1 for the adult resident include manganese (HQ = 5), and thallium (HQ = 4).

Uncertainty is associated with the EPCs estimated for cyanide, silver, and thallium, which are based on the maximum detected concentration because there were an insufficient number of detected concentrations top calculate reliable statistics. These concerns are discussed in Section 7.0.

6.4.3 Outside Landfill – Deep Wells

Construction workers are not exposed to deep groundwater outside of the landfill. For Industrial workers exposed to deep groundwater outside, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 4. TCE (HQ = 4) and cis-1,2-dichloroethene (HQ = 3) were the only COPCs with a HQs greater than 1.

For a future hypothetical child resident exposed to deep groundwater outside of the landfill through tap water, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 56. The COPCs exhibiting HQs greater than 1 for the child resident include cis-1,2-dichloroethene (HQ = 55), TCE (HQ = 38), aluminum (HQ = 2), cobalt (HQ = 5), iron (HQ = 3), and manganese (HQ = 8). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including 2,3,7,8-TCDD TEQs (HQ = 0.2), arsenic (HQ = 0.8), and cadmium (HQ = 0.2).

For a future hypothetical adult resident exposed to deep groundwater outside of the landfill through tap water, the estimated RME HIs exceeded 1 for several target organs. The maximum target organ HI was 36. The COPCs exhibiting HQs greater than 1 for the adult resident include cis-1,2-dichloroethene (HQ = 33), TCE (HQ = 36), cobalt (HQ = 3), cyanide (HQ = 3), iron (HQ =2), and manganese (HQ = 5). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, including aluminum (HQ = 0.9) which affects the nervous system and arsenic (HQ = 0.5) which affects the skin and the cardiovascular system.

Estimated CTE HIs for industrial workers exposed to deep groundwater outside of the landfill exceeded 1 for several target organs. The maximum target organ HI was 2. TCE (HQ = 2) and cis-1,2-dichloroethene (HQ = 1) were the only COPCs with a HQs greater than 1.

Estimated CTE HIs for a future hypothetical child resident exposed to deep groundwater outside of the landfill through tap water exceeded 1 for several target organs. The maximum target organ HI was 22. The COPCs exhibiting HQs greater than 1 for the child resident include cis-1,2-dichloroethene (HQ = 22), TCE (HQ = 15) cobalt (HQ = 2), and manganese (HQ = 3). An additional COPC that contributed to a target organ-specific HIs exceeding 1, but had an HQ of less than or equal to 1 was aluminum (HQ = 0.6) which affect the nervous system.

Estimated CTE HIs for a future hypothetical adult resident exposed to deep groundwater outside of the landfill through tap water exceeded 1 for several target organs. The maximum target organ HI was 11. The COPCs exhibiting HQs greater than 1 for the adult resident include cis-1,2-dichloroethene (HQ = 11) and TCE (HQ = 8). Additional COPCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than or equal to 1, including aluminum (HQ = 0.3) and manganese (HQ = 1) which affects the nervous system.

Uncertainty is associated with the EPCs estimated for TCE, which is based on the maximum detected concentration because there were an insufficient number of detected concentrations to calculate reliable statistics. These concerns are discussed in Section 7.0.

6.5 Groundwater Cancer Risks

Groundwater exposure was evaluated for hypothetical future construction workers, industrial workers, and child, adult residents, and lifelong residents. Groundwater cancer risks are shown in Appendix G, Part 2, on RAGS D Tables 9.1 to 9.14, and on Figures 6-3 and 6.4.

6.5.1 Inside Landfill

The ILCR of $1x10^{-4}$ for construction workers exposed to groundwater within the landfill under the RME scenario is equal to the upper bound of EPA's target risk range of $1x10^{-4}$ to $1x10^{-6}$. The ILCR of $6x10^{-5}$ under the CTE scenario is within EPA's target risk range.

The ILCR of $4x10^{-3}$ for industrial workers exposed to groundwater within the landfill under the RME scenario exceeds EPA's target risk range. 2,3,7,8-TCDD TEQs (ILCR = $2x10^{-3}$), dioxin-like PCBs (ILCR = $4x10^{-4}$), nondioxin-like PCBs (ILCR = $6x10^{-4}$), and chromium (ILCR = $3x10^{-4}$) were the major contributors to the ILCR. The ILCR of $5x10^{-4}$ under the CTE scenario also exceeds EPA's target risk range with the same chemicals being the major contributors to the ILCR.

To estimate the lifetime cancer risk for a resident exposed to groundwater, the estimated RME ILCRs for the child and adult residents were added together to yield a lifetime ILCR of $1x10^{-2}$, which exceeds EPA's target risk range. The major contributors to the ILCR were 2,3,7,8-TCDD TEQs (ILCR = $4x10^{-3}$), chromium (ILCR = $4x10^{-3}$), nondioxin-like PCBs (ILCR = $7x10^{-4}$), dioxin-like PCBs (ILCR = $5x10^{-4}$), arsenic (ILCR = $5x10^{-4}$), benzo(a)pyrene (ILCR = $3x10^{-5}$), 1,4-dioxane (ILCR = $1x10^{-4}$), benzo(b)fluoranthene (ILCR = $6x10^{-6}$), dibenzo(a,h)anthracene (ILCR = $2x10^{-6}$), indeno(1,2,3-cd)pyrene (ILCR = $2x10^{-6}$), Aldrin (ILCR = $1x10^{-5}$), Dieldrin (ILCR = $1x10^{-5}$), benzo(a)anthracene (ILCR = $2x10^{-6}$), delta-BHC (ILCR = $5x10^{-6}$), pentachlorophenol (ILCR = $5x10^{-6}$), bis(2-ethylhexyl)phthalate (ILCR = $2x10^{-6}$), beta-BHC (ILCR = $2x10^{-6}$),and heptachlor (ILCR = $2x10^{-6}$).

For the lifetime resident, the estimated CTE ILCR was $2x10^{-3}$, which also exceeds EPA's target risk range. For CTE risks, many of the same substances contributed to cancer risks as for RME risks.

Uncertainty is associated with the EPCs estimated for benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, delta-BHC, and dieldrin which are based on the maximum detected concentration because there were an insufficient number of detected concentrations top calculate reliable statistics. These concerns are discussed in more detail in Section 7.0.

6.5.2 Outside Landfill – Shallow Wells

The ILCR of $4x10^{-6}$ for construction workers exposed to shallow groundwater outside of the landfill under the RME scenario is within EPA's target risk range. The ILCR of $1x10^{-4}$ for industrial workers exposed to shallow groundwater outside of the landfill under the RME scenario is equal to the upper bound of EPA's target risk range.

The estimated RME ILCR for the lifelong (child and adult) residents of ILCR of $1x10^{-3}$ exceeds EPA's target risk range. The major contributors to the ILCR were arsenic (ILCR = $4x10^{-4}$), vinyl chloride (ILCR = $2x10^{-4}$), 2,6-dinitrotoluene (ILCR = $2x10^{-4}$), chromium (ILCR = $2x10^{-4}$), 1,4-dioxane (ILCR = $7x10^{-5}$), benzo(a)pyrene (ILCR = $5x10^{-6}$), 1,2-dibromo-3-chloropropane (ILCR = $3x10^{-5}$), bis(2-chloroethyl)ether (ILCR = $2x10^{-5}$), pentachlorophenol (ILCR = $1x10^{-5}$), dieldrin (ILCR = $1x10^{-5}$), trichloroethene ($7x10^{-6}$), 2,3,7,8-TCDD TEQs (ILCR = $4x10^{-6}$), naphthalene (ILCR = $4x10^{-6}$), benzene (ILCR = $6x10^{-6}$), dioxin-like PCBs (ILCR = $3x10^{-6}$), and 1,2-dichloroethane (ILCR = $2x10^{-6}$.

For the lifetime resident, the estimated CTE ILCR was $3x10^{-4}$, which also exceeds EPA's target risk range. For CTE risks, many of the same substances contributed to cancer risks as for RME risks. Uncertainty is associated with the EPCs estimated for 1,2-dibromo-3-chloropropane, vinyl chloride, 2,6-Dinitrotoluene, benzo(a)pyrene, benzene, benzo(a)anthracene, bis(2-chloroethyl)ether, naphthalene, and

pentachlorophenol which are based on the maximum detected concentration because there were an insufficient number of detected concentrations top calculate reliable statistics. These concerns are discussed in Section 7.0.

6.5.3 Outside Landfill – Deep Wells

Construction workers are not exposed to deep groundwater outside of the landfill. The ILCR of $8x10^{-5}$ for industrial workers exposed to deep groundwater outside of the landfill under the RME scenario is within EPA's target risk range.

The estimated RME ILCR for the lifelong (child and adult) residents of ILCR of $2x10^{-3}$ exceeds EPA's target risk range. The major contributors to the ILCR were chromium (ILCR = $7x10^{-4}$), vinyl chloride (ILCR = $5x10^{-4}$), TCE (ILCR = $4x10^{-4}$), arsenic (ILCR = $9x10^{-5}$), 1,4-dioxane (ILCR = $3x10^{-5}$), benzo(a)pyrene (ILCR = $3x10^{-6}$), indeno(1,2,3-cd)pyrene (ILCR = $2x10^{-6}$), 2,3,7,8-TCDD TEQs (ILCR = $5x10^{-6}$), delta-BHC (ILCR = $2x10^{-6}$), and dibenzo(a,h)anthracene (ILCR = $1x10^{-5}$).

For the lifetime resident, the estimated CTE ILCR was $5x10^{-4}$, which also exceeds EPA's target risk range. For CTE risks, many of the same substances contributed to cancer risks as for RME risks. Uncertainty is associated with the EPCs estimated for TCE, vinyl chloride, 1,4-dioxane, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and delta-BHC which are based on the maximum detected concentration because there were an insufficient number of detected concentrations top calculate reliable statistics. These concerns are discussed in Section 7.0.

6.6 Risks from Vapor Intrusion

Risks from exposures via vapor intrusion from groundwater into a hypothetical building was evaluated for future industrial workers and hypothetical residents using EPA's VISL Calculator, May 2018. Outputs from the VISL calculator are included in Appendix G, Part 11.

The cumulative HI for industrial workers exposed via vapor intrusion in a building inside the landfill (HI = 2) exceeded 1, while the cumulative HI for industrial workers exposed via vapor intrusion in a building outside the landfill (HI = 0.4) was less than 1. Mercury (HI = 2) was the major contributor to the HI for a building inside the landfill.

The cumulative HI for residents exposed via vapor intrusion in a building inside the landfill (HI = 10) exceeded 1. Mercury (HI = 9) was the major contributor to the HI for a building inside the landfill. The

cumulative HI for residents exposed via vapor intrusion in a building outside the landfill (HI = 2) exceeded 1 but the HIs on a target organ basis were less than or equal to 1.

ILCRs for industrial workers exposed via vapor intrusion in a building inside the landfill (ILCR = $2x10^{-5}$) and outside of the landfill (ILCR = $4x10^{-6}$) were with EPA's target risk range.

ILCRs for residents exposed via vapor intrusion in a building inside the landfill (ILCR = $8x10^{-5}$) and outside of the landfill (ILCR = $5x10^{-5}$) were with EPA's target risk range.

6.7 Lead Risks

Lead was identified as a COPC in groundwater. The maximum detected concentration in groundwater inside the landfill (4,470 µg/L) and shallow (2,400 µg/L) and deep (41.4 µg/L) groundwater outside of the landfill exceeded the action level of 15 µg/L promulgated under the Safe Drinking Water Act.

Hypothetical future residential exposures to lead in groundwater were evaluated using the most recent version of the IEUBK model. As recommended in the IEUBK model documentation, the average lead concentration in groundwater was used as the EPC. Default values were used for the remaining model input parameters. IEUBK model outputs are included in Appendix G, Part 9. The results of the modeling are shown below:

Exposure Unit	Groundwater Concentration (µg/L)	Blood-Lead Geometric Mean Concentration (µg/dL)	Percent of Receptors Exceeding 10 µg/dL
Inside Landfill	226	15.3	81.6
Outside Landfill – Shallow Groundwater	87.6	8.31	34.7
Outside Landfill – Deep Groundwater	3.65	2.70	0.27

The results for groundwater inside the landfill and shallow groundwater outside of the landfill exceed the EPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 10 µg/dL blood-lead level, as described in the 1994 OSWER Directive. The results for deep groundwater outside of the landfill are within the EPA goal.

6.8 Pore Water Risks

In the Lower Darby Creek Area, receptors are potentially exposed to the surface water from Darby Creek, Cobbs Creek, and Tinicum Marsh. The presence of surface water in these areas is intermittent. Any

"surface water" that is present during these low volume periods is from pore water discharge. Therefore, site-specific, receptor-specific RSLs for pore water were developed to focus the risk evaluation of surface water. The pore water RSLs were then used to estimate risks from exposures to pore water.

6.8.1 Development of Pore Water Regional Screening Levels

The risk assessment presented in the Lower Darby Creek Area Site Remedial Investigation (RI) Report for Operable Unit 1 (OU-1) (Tetra Tech, 2011) forms the basis for the development of site-specific, receptor-specific pore water RSLs. The RI defined two receptors being exposed to surface water: recreational users and construction workers.

Recreational users were evaluated as a child, adult, and lifetime with lifetime recreational user being a combination of the child and adult exposures. Recreational users are potentially exposed to surface water contaminants through incidental ingestion and dermal contact. Construction workers are similarly exposed to surface water contaminants. For the most part, the exposure assumptions used to derive the pore water RSLs were those defined in the OU-1 RI Report. For a recreational receptor, exposures were assumed to occur for a 2-hour event duration on 2 days per week during the warmest 6 months of the year (52 days per year). Due to shallow water depths (1 foot or less), it was assumed that the skin surface area exposed to surface water for the adult would be limited to feet, lower legs, and hands. For the child, skins surface area exposed to surface water would be limited to hands, forearms, lower legs, and feet. The recreational receptors were assumed to ingest 0.01 L/hr of surface water, which is one-fifth the amount that is estimated to be ingested while swimming. The recreational child is defined as a between the ages of 0 and 6; the recreational adult is assumed to be exposed for 12 years between the ages of 6 and 18.

For a construction worker, exposures were assumed to occur for 10 minutes per day (0.16 hour), once per week during the warmest 6 months of the year (26 days per year). The ingestion rate for the construction worker is the same as that for the recreational user, 0.01 L/hour. The construction worker was assumed to be exposed to the site over a one-year period.

Since the OU-1 RI Report was completed, EPA has updated its standard default exposure assumptions (EPA, 2014d) based on EPA's 2011 Exposure Factors Handbook. The adult body weight has increased from 70 kg to 80 kg. In addition, with the updates in the Exposure Factors Handbook (EPA, 2011a), skin surface areas for all receptors were adjusted. Spreadsheets were developed for calculating carcinogenic and noncarcinogenic RSLs and are presented in Appendix G, Part 12. The spreadsheets identify the equations used for calculating the carcinogenic and noncarcinogenic RSLs in combination with the relevant intake equations for the ingestion and dermal pathways. The exposure assumptions are also defined. All toxicity factors and chemical properties used in the spreadsheets were taken from EPA's RSL calculator.

6.8.2 Risk Characterization

HIs and ILCRs estimates for exposures to pore water were calculated using site-specific RSLs, EPCs, and a simple risk-ratio equation. Risk estimates were developed using the following equation, which calculates an HI or ILCR for a particular chemical based on the EPC and RBC for that same chemical:

$$\text{HI or ILCR} = \frac{\text{EPC x Target HI of 1 or Target ILCR of } 1\text{x}10^{-6}}{\text{Pore Water RSL}}$$

This simple risk-ratio approach is possible because all equations used to estimate exposure and risk are linear equations. Therefore, if the RSL is the concentration associated with a one-in-one million excess probability of developing cancer (or, alternatively, a HI of 1), one may simply scale off that known relationship to predict risks for other concentrations detected or predicted in an environmental medium. This approach is presented in Section 5.15.2 of the EPA's RSL User Guide.

Pore water samples were collected during three sampling events: (September 2013, May 2013, and February 2016). Pore water samples collected in May 2013 were analyzed for VOCs, SVOCs, PAHs, dioxins/furans, pesticides, PCBs, and total metals. Pore water samples collected in September 2013 were analyzed for SVOCs, pesticides, PCBs, and total metals. Pore water samples collected in February 2016 were analyzed for total and dissolved metals. HIs and ILCRs were calculated for each individual pore water sample using the risk-ratio approached presented above. The pore water data and resulting risks are presented in Appendix G, Part 12 and are summarized below.

Summary of Cancer Risks and Non-Cancer Hazard Indices

Receptor	May 2013		September 2013		February 2016	
	ILCR	HI	ILCR	HI	ILCR	HI
Construction Worker(1)	$1x10^{-8}$	0.007	$1x10^{-8}$	0.004	$2x10^{-8}$	0.006
Recreational User(1)	$3x10^{-5}$	0.3	$2x10^{-5}$	0.3	$4x10^{-5}$	0.3

1 – Maximum ILCR and HI presented.

ILCRs and HIs for construction workers, child recreational users, and adult recreational users exposed to pore water were within EPA acceptable levels at all sampling points for all three sampling events.

7.0 UNCERTAINTY ANALYSIS

This section discusses the general and site-specific uncertainties associated with the estimated risks, exposure models, and assumptions utilized in the human health risk assessment. The goal of the uncertainty analysis is to identify important uncertainties and limitations associated with the risk

assessment. As discussed in EPA (1989), the measures used in risk assessments are not fully probabilistic estimates of risk but rather are conditional estimates based on a considerable number of assumptions about exposure and toxicity. There are uncertainties associated with each aspect of risk assessment, from environmental data collection through risk characterization.

7.1 Uncertainties Associated with Locations and Numbers of Samples

The areal extent of the samples (including the number collected and location of the sampling points) in a particular area or medium of interest impacts the selection of COPCs, the calculation of EPCs, and consequently the risks estimated for a site. Generally, sample collection at each area of interest should reflect actual site conditions and should include areas that contain the most significant contamination or exposure problems.

7.2 Uncertainties Regarding the Estimation of the Exposure Point Concentration

Other uncertainties exist regarding estimation of an analyte concentration for input into the quantitative risk assessment. The calculated EPC is generally regarded as a conservative estimate since it is based on the 95% UCL on the arithmetic mean (based on a normal, lognormal, gamma, or nonparametric data distribution). As discussed in Section 6.4, ProUCL Version 5.1.002 (EPA, 2016e) was employed to select the optimal type of 95% UCL for any given chemical data set. The goal of this decision scheme was to consider the individual characteristics of each data set, particularly the distributional shape, and select the type of UCL calculation that is expected to represent the minimum of the UCL values generated by different calculation methods, but which still has a high confidence (at least 95% chance) of being greater than the population's true mean. This approach lowers the chances of underestimation of the actual risk present in a pathway at a particular area of interest to a potential receptor.

The ability (power) of distributional analysis tests to be able to correctly identify genuine differences between the shape of a sample population versus a reference normal, lognormal, or gamma population is reduced when too few samples are collected. If an incorrect distributional assumption is made based on this test, this could lead to an over- or underestimate of the upper 95% concentration, which in turn would create some additional uncertainty as to whether the calculated risk is a reasonable approximation of high-end exposure. If fewer than four detected results were available, the distributional tests were not considered significant and the exposure point concentration was selected as the maximum value.

Uncertainties are associated with the trace (near detection limit) concentrations and low frequencies of detection for certain COPCs. Trace level positive results that are less than the Contract Required Quantitation or Detection Limit are considered usable data points when estimating the UCL for a data set,

but such results have a greater variance due to effects such as instrument calibration noise. The 95% UCL estimates are considered to have greater uncertainty when there were many nondetects in a data set. For groundwater inside the landfill, several risk drivers exhibited very low frequencies of detection, including TCE (1/20), antimony (1/20), beryllium (3/20), cadmium (3/20), mercury (1/20), silver (1/20), thallium (1/20), benzo(a)pyrene (1/14), benzo(b)fluoranthene (2/17), dibenzo(a,h)anthracene (1/17), indeno(1,2,3-cd)pyrene (1/13), delta-BHC (2/20), and dieldrin (2/20).

For shallow groundwater outside the landfill, risk drivers exhibiting very low frequency of detections include cyanide (2/5), silver (3/28), thallium (1/27), 1,2-dibromo-3-chloropropane (1/29), vinyl chloride (2/30), 2,6-Dinitrotoluene (1/11), benzo(a)pyrene (2/11), benzene (1/15), benzo(a)anthracene (1/11), bis(2-chloroethyl)ether (1/29), naphthalene (2/18), and pentachlorophenol (3/11).

For deep groundwater outside the landfill risk drivers exhibiting very low frequency of detections include TCE (3/9), vinyl chloride (3/14), 1,4-dioxane (3/14), benzo(a)pyrene (1/9), dibenzo(a,h)anthracene (1/14), indeno(1,2,3-cd)pyrene (1/14), delta-BHC (1/14). Use of the maximum concentration tends to overestimate potential risks for some COPCs because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period. While the use of maximum detected concentrations may result in an overestimation of risk, they do not affect the conclusions of the risk assessment because the EPCs for the majority of the COPCs were based on 95% UCLs.

7.3 Uncertainties in Laboratory Data Quality

Validated laboratory data were used to calculate EPCs for groundwater, soil, surface water, and sediment. Established data validation procedures were applied to define analytical uncertainties in terms of qualifying data as inaccurate or imprecise and to eliminate data points that are unusable for risk assessment. This treatment does not eliminate all uncertainty but focuses attention on potential areas of concern regarding accuracy, precision, and data gaps.

7.4 Uncertainties in Risk-Based Screening Levels

The use of risk-based screening values based on conservative land-use scenarios (i.e., residential land use for soil and ingestion of tap water for groundwater) corresponding to ILCRs of 10^{-6} and HIs of 0.1 ensured that all the significant contributors to risk from the site were evaluated. The elimination of chemicals present at concentrations that correspond to ILCRs less than 10^{-6} and HIs less than 0.1 should not affect the final conclusions of the risk assessment because those chemicals are not expected to cause a potential health concern at the detected concentrations.

7.5 Uncertainties Associated with Exposure Assessment

The likelihood of the occurrence of the defined exposure scenarios is a source of uncertainty. The future anticipated land use near the site is expected to remain as industrial and possibly recreational. Receptors evaluated in this HHRA included construction workers, industrial workers, recreational users, and hypothetical residents to provide a comprehensive assessment of potential current and future risks from exposures to groundwater.

There are limitations to using various models and equations to estimate exposure doses or contaminant concentrations. For example, the VDEQ groundwater volatilization model for a utility trench (VRP Table 3.8) was used to estimate the fixed mass flux emission rate of VOC vapors from groundwater within a narrow trench, taking into account an extremely conservative assumption for only 2 air exchanges within the trench per hour, which is the default recommended by VDEQ. This may be overprotective for typical outdoor trench exposures.

Exposure assumptions can add uncertainty into the risk assessment process based on input values selected for each exposure route. For example, not all people weigh 70 kilograms, drink 2.5 liters of water per day, and live at the same residence for 30 years. The rationale for each assumption was provided in each table of input parameters. Receptor characteristics, such as age and body weight, were based on published values. Conservative values (based on reasonable maximum exposure data or professional judgment) were used in combination with average values.

7.6 Uncertainties Associated with Toxicity Assessment

There is uncertainty associated with the RfDs and CSFs. The uncertainty results from the extrapolation of animal data to humans, the extrapolation of carcinogenic effects from the laboratory high-dose to the environmental low-dose scenarios, and interspecies and intraspecies variations in toxicological endpoints caused by chemical exposure. The use of EPA RfD values is generally considered to be conservative because the doses are based on no-effect or lowest-observed-effect levels and then further reduced with uncertainty factors to increase the margin of safety by a factor in the neighborhood of 10 to 1,000 fold.

There are uncertainties regarding non-threshold (carcinogenic) effects extrapolation, from the high doses administered to laboratory animals to the low doses received under more common human exposure scenarios. Uncertainties due to short-time toxicological study predictions of long-term effects are also present. Additionally, there is considerable interspecies variation in toxicological endpoints used in characterizing potential health effects resulting from exposure to a chemical, and there is considerable variability in sensitivity among individuals of any particular species.

The RfDs and CSFs of some chemicals have not been established, and therefore toxicity could not be quantitatively assessed. In most cases, where RfDs were unavailable for carcinogens, the carcinogenic risk is considered to be much more significant since carcinogenic effects usually occur at much lower doses.

The uncertainty associated with the dermal exposure is high because of the derivation of the dermal slope factor and reference dose. The dermal toxicity factors are based on default oral absorption factors. This can result in an overestimation of the toxicity factors.

As discussed in Section 5.0, established RfDs have an inherent amount of uncertainty. Uncertainty factors for RfDs, RfCs, CSFs, and IURs used in this risk assessment are presented in Appendix G, Part 2 on Tables 5.1, 5.2, 6.1, and 6.2. Some chemical-specific uncertainties should be noted as follows:

Although the accepted basis for evaluating risk associated with exposure to arsenic is to assume it is a carcinogen, there is uncertainty whether carcinogenic effects are the primary health effects expected to be manifested upon exposure to arsenic. There is some scientific information to indicate that humans are capable of metabolizing arsenic to expedite its elimination from the body (ATSDR, 2007). Specifically, the body methylates the arsenic to form monomethyl arsenic and dimethyl arsenic. There is a limited capacity for the body to metabolize methylate arsenic, but this limit is generally reached when the body's intake of arsenic approximately exceeds 500 µg/day. Generally, concentrations of arsenic at the areas and media of interest at the site would be expected to correspond to levels that are well within the body's ability to metabolize arsenic. On the other hand, arsenic has been associated with a variety of cancers in epidemiological studies. This adds to the uncertainty regarding carcinogenic risks associated with arsenic exposure.

In nature, trivalent chromium predominates over hexavalent chromium (Langård and Norseth, 1986). Little hexavalent chromium exists in biological materials, except shortly after exposure, because reduction to trivalent chromium occurs rapidly. Hexavalent chromium can also be transformed to trivalent chromium. However, hexavalent chromium is more soluble, and chromium in water samples is often found to be hexavalent. Chromium speciation was not performed on groundwater or pore water samples so it was conservatively assumed that chromium was present as hexavalent chromium. Chromium was retained as a COC in groundwater inside the landfill and shallow and deep groundwater outside of the landfill. Chromium would not have been retained as a COC if it had been assumed to be present as trivalent chromium.

An ADAF was applied as a default safety factor to risk calculations when evaluating cancer risk associated with exposure by children between the ages of birth to 16 years to chemicals that are carcinogenic via a

mutagenic mode of action. EPA's *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposures to Carcinogens* (EPA, 2005b) states the ADAF should be used when chemical-specific data to evaluate differences between adults and children are unavailable.

Inherent with the use of ADAFs is uncertainty in the evaluation of risk. Specifically, the default ADAFs were derived from studies where exposures were much higher than those typically observed in the environment. Hence, the mutagenic potential of a chemical at typical environmental concentrations may be much less and may be offset by deoxyribonucleic acid (commonly known as DNA) repair mechanisms. Moreover, the default ADAFs were based on results of repeated exposure studies because the lifetime study design had less ability to distinguish potential increased susceptibility from early-life exposures. Finally, cell replication can vary for different tissues, thus making the window of susceptibility different for individual chemicals, depending on target tissues. Hence, using the same ADAF for all chemicals may clearly misrepresent the level of risk associated with exposure.

7.7 Uncertainties Associated with Risk Characterization

Major uncertainties associated with risk characterization are as follows.

- ILCRs and HIs are summed for all potential COPCs and for all applicable routes of exposure. Summing the risks implies that no antagonistic or synergistic effects exist between chemicals. It also assumes that similar mechanisms of action and metabolism are prevalent. Therefore, the use of this approach may either underestimate or overestimate the risks, depending on the chemical-specific interactions, which cannot be predicted. The direction of the uncertainty cannot be defined, but the methodology used is based on current EPA guidance.

- The IEUBK model accounts for the multimedia nature of lead exposure, incorporates absorption and pharmacokinetic information, and allows the risk manager to consider the potential distributions of exposure and risk likely to occur at a site (the model goes beyond providing a single point estimate output). Although uncertainties are associated with blood-lead modeling using this model, the uncertainties are considered lower than those that conceivably would result from similar lead evaluations performed using a traditional toxicity slope-based approach. Important uncertainties and limitations in the use of the IEUBK model are listed below.

    - Child blood-lead level predictions obtained using the IEUBK model reflect only the contributions of sources entered into the model and do not take into account any existing body burden that may be the result of prior exposures or any exposures that may have taken place at alternate locations away from the household or neighborhood level, such as parks or daycare centers.

- Blood-lead variability is characterized by a single number, the geometric standard deviation, which is set to a default value of 1.6 in the IEUBK model. This value represents the aggregate uncertainty in all sources of population variability, including biological, uptake, exposure, sampling, and analytical components.

- The EPA Technical Review Workgroup adult lead model does not currently incorporate an algorithm to predict fetal blood lead concentration increases resulting from water ingestion by pregnant adults. Instead, a qualitative approach was applied to evaluate lead risks from incidental ingestion of surface water during recreation or construction work. The approach involved estimating the volume of surface water ingested as an averaged daily intake of 0.004 liters per day of incidental water ingestion (based on groundwater ingestion of 0.05 L per day).

- The estimated daily intake volume of groundwater is 625 times smaller than the default daily intake of tap water consumed by a resident (2.5 liters per day). Consequently, the maximum lead concentration in groundwater (4,470 µg/L - inside landfill) can be divided by 625 to yield an estimated lead tap water concentration that would achieve the equivalent total daily intake of lead or 7.2 µg/L. A 7.2 µg/L equivalent tap water concentration would not be construed as likely to result in unacceptable blood lead concentrations for a residential child, which is considered the most sensitive receptor.

8.0 SUMMARY AND CONCLUSIONS

8.1 Procedure for Selecting Candidate Chemicals of Potential Concern

The initial steps of the risk assessment involved screening the data to determine a list of COPCs, after which COPCs were carried through quantitative risk calculations to determine HIs for non-carcinogenic risks, ILCRs for carcinogenic substances, and modeled blood lead concentrations for characterization of lead risks. Receptor risks were presented for each area in the form of RAGS D Table 9s (showing all COPCs) and Table 10s (showing only risk drivers). In the last step of the risk assessment, a short list of chemicals, called candidate COCs, was developed for each area of interest, which consists of substances that are potentially site-related and that are associated with human health risks above the target acceptable risk range, including those chemicals that contribute to the majority of additive risks.

To summarize the criteria for evaluating significant human health risks, an HI exceeding unity (1) indicates that there may be potential noncarcinogenic health risks associated with exposure. If an HI exceeded 1, target organ effects from individual COPCs contributing to the risk were considered. Only those chemicals that impact the same target organ(s) or exhibit similar critical effect(s) were regarded as truly additive.

Thus, COPCs contributing to an HI greater than 1 on the basis of a single target organ or effect were considered to be candidate COCs, as well as any COPCs having an individual HQ exceeding 1 in cases where critical effects could not be identified (such as with a NOAEL). In addition, when a target organ HI exceeded 1, any COPCs that contributed greater than an HQ of 0.1 towards that target organ HI were considered candidate COCs.

For cancer risks, when cumulative ILCRs exceeded $1x10^{-4}$ within one area of interest, potential risks were considered to be above the acceptable range. A candidate list of COCs was then developed comprised of all substances exhibiting an ILCR greater than $1x10^{-6}$ within the particular exposure pathway that exceeded the $1x10^{-4}$ cancer risk benchmark level.

For the evaluation of lead risks, a predicted blood lead level above 10 µg/dL in less than 5% of the receptor population is considered protective, so lead was considered a candidate COC within an area of interest whenever the blood lead level was predicted to exceed this benchmark for more than 5% of the receptor population.

All candidate carcinogenic COCs and noncarcinogenic COCs are included in Appendix G, Part 2, on RAGS D Table 10s.

Tables 8-1 and 8-2 identify for each area of interest, whether cancer risks or noncancer hazards for the RME and CTE scenarios, respectively. Table 8-1 also identifies whether predicted blood lead levels for each receptor were greater than the protective risk level benchmarks. If blood lead concentrations were predicted to exceed 10 µg/dL in greater than 5% of an exposed population, then the estimated percentage of individuals in the population with blood lead levels above 10 µg/dL is noted. In addition, all candidate COCs that are considered major contributors to any of these categories of risk are listed.

8.2 Summary of Groundwater Risks

8.2.1 Inside Landfill

As shown in Table 8-1 under the RME scenario, exposure to groundwater inside the landfill was associated with estimated cancer risks that exceeded the acceptable risk range for residents and industrial workers, but not for construction workers. For the lifetime resident, numerous candidate COCs contributed to cancer risks. As shown in Appendix G, Part 2, RAGS D Tables 10.1.RME to 10.5.RME, the major cancer risk drivers with ILCRs greater than $1x10^{-5}$ were 2,3,7,8-TCDD TEQs, chromium, dioxin-like PCBs, nondioxin-like PCBs, arsenic, benzo(a)pyrene, and 1,4-dioxane. Additional cancer risk drivers displaying risks between $1x10^{-6}$ and $1x10^{-5}$ were indeno(1,2,3-cd)pyrene, aldrin, dieldrin, benzo(a)anthracene,

benzo(b)fluoranthene, dibenzo(a,h)anthracene, delta-BHC, pentachlorophenol, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, beta-BHC, and heptachlor. For the industrial worker exposed to groundwater, cancer risks exceeded $1x10^{-4}$, with individual contributions from 2,3,7,8-TCDD TEQs, dioxin-like PCBs, nondioxin-like PCBs, and chromium.

For the child resident, adult resident, construction worker, and industrial worker, the maximum of the estimated target organ HIs exceeded 1. For the child resident, the COCs exhibiting HQs greater than 1 include: 2,3,7,8-TCDD TEQs, dioxin-like PCBs, antimony, arsenic, cadmium, chromium, cobalt, cyanide, iron, manganese, mercury, and thallium. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include zinc, aluminum, TCE, PFOA, PFOS, boron, beryllium, copper, silver, vanadium, 1,4-dioxane, and barium. For the adult residents, the COCs exhibiting HQs greater than 1 include: 2,3,7,8-TCDD TEQs, dioxin-like PCBs, antimony, arsenic, chromium, cyanide, iron, manganese, mercury, and thallium. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include zinc, aluminum, PFOA, PFOS, and boron, beryllium, copper, and silver. For the construction workers, the COCs exhibiting HQs greater than 1 include cyanide and 2,3,7,8-TCDD TEQs, while dioxin-like PCBs contributed to target organ-specific HIs that exceeded 1. For the industrial worker, cyanide and 2,3,7,8-TCDD were the only COCs exhibiting an HQ greater than 1. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include dioxin-like PCBs and TCE.

Blood lead concentrations were predicted to exceed 10 µg/dL in more than 5 percent of an exposed population of child residents. Blood lead predictions were not able to be generated for construction workers, but a qualitative evaluation suggests that blood lead levels would not be unacceptable for a construction worker potentially exposed to incidental ingestion of groundwater in an excavation trench.

HIs for industrial workers and residents exposed via vapor intrusion in a building inside the landfill exceeded 1. Mercury was the major contributor to the HIs for a building inside the landfill. ILCRs for industrial workers and residents exposed via vapor intrusion in a building inside the landfill were within EPA's target risk range.

As shown in Table 8-2 under the CTE scenario, exposure to groundwater inside the landfill was associated with estimated cancer risks that exceeded the acceptable risk range for residents and industrial workers, but not for construction workers. For the lifetime resident, numerous candidate COCs contributed to cancer risks. As shown in Appendix G, Part 2, RAGS D Tables 10.1.CTE to 10.5.CTE, the major cancer risk drivers with ILCRs greater than $1x10^{-5}$ were 2,3,7,8-TCDD equivalents, dioxin-like PCBs, chromium, nondioxin-like PCBs, and arsenic. Additional cancer risk drivers displaying risks between $1x10^{-6}$ and $1x10^{-5}$ were 1,4-dioxane and benzo(a)pyrene. For the industrial worker exposed to groundwater, cancer risks exceeded

$1x10^{-4}$, with individual contributions from 2,3,7,8-TCDD equivalents, dioxin-like PCBs, nondioxin-like PCBs, and chromium.

For the child resident, adult resident, construction worker, and industrial worker, the maximum of the estimated target organ HIs exceeded 1. For the child resident, the COCs exhibiting HQs greater than 1 include: 2,3,7,8-TCDD TEQs, dioxin-like PCBs, antimony, arsenic, cyanide, manganese, mercury, and thallium. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include aluminum, PFOA, PFOS, boron, silver, and vanadium. For the adult residents, the COCs exhibiting HQs greater than 1 include: 2,3,7,8-TCDD TEQs, dioxin-like PCBs, cyanide, manganese, and thallium. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include mercury and PFOS. For the construction workers, the COCs exhibiting HQs greater than 1 include cyanide and 2,3,7,8-TCDD TEQs, while dioxin-like PCBs contributed to target organ-specific HIs that exceeded 1. For the industrial worker, 2,3,7,8-TCDD and cyanide were the only COCs exhibiting an HQ greater than 1. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include dioxin-like PCBs.

8.2.2 Outside Landfill – Shallow Wells

As shown in Table 8-1 under the RME scenario, exposure to shallow groundwater outside the landfill was associated with estimated cancer risks that exceeded the acceptable risk range for residents, but not for construction workers and industrial workers. For the lifetime resident, numerous candidate COCs contributed to cancer risks. As shown in Appendix G, Part 2, RAGS D Tables 10.6.RME to 10.10.RME the major cancer risk drivers with ILCRs greater than $1x10^{-5}$ were vinyl chloride, 2,6-dinitrotoluene, arsenic, chromium, 1,2-dibromo-3-chloropropane, 1,4-dioxane, bis(2-chloroethyl)ether. Additional cancer risk drivers displaying risks between $1x10^{-6}$ and $1x10^{-5}$ were 1,2-dichloroethane, benzene, TCE, benzo(a)pyrene, naphthalene, pentachlorophenol, 2,3,7,8-TCDD equivalents, dieldrin, dioxin-Like PCBs.

For the child resident, adult resident, and construction worker, the maximum of the estimated target organ HIs exceeded 1. For the child resident, the COCs exhibiting HQs greater than 1 include 2,6-dinitrotoluene, PFOA, arsenic, cobalt, iron, manganese, and thallium. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include cis-1,2-DCE, aluminum, TCE, PFOS, 2,3,7,8-TCDD TEQs, boron, cadmium, cyanide, and silver. For the residential adult, the COCs exhibiting HQs greater than 1 include PFOA, arsenic, iron, manganese, thallium, and cyanide. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include aluminum, TCE, PFOS, and silver. For the construction workers and industrial workers, cyanide was the only COC exhibiting an HQ greater than 1.

Blood lead concentrations were predicted to exceed 10 µg/dL in more than 5 percent of an exposed population of child residents. Blood lead predictions were not able to be generated for construction workers, but a qualitative evaluation suggests that blood lead levels would not be unacceptable for a construction worker potentially exposed to incidental ingestion of groundwater in an excavation trench.

HIs for industrial workers and residents exposed via vapor intrusion in a building located the landfill were less than or equal to 1. ILCRs for industrial workers and residents exposed via vapor intrusion in a building outside the landfill were within EPA's target risk range.

As shown in Table 8-2 under the CTE scenario, estimated cancer risks for exposure to shallow groundwater outside the landfill were within the acceptable risk range for residents, construction workers, and industrial workers. For the child resident, adult resident, and construction worker, the maximum of the estimated target organ HIs exceeded 1. For the child resident, the COCs exhibiting HQs greater than 1 include PFOA, manganese, and thallium. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include aluminum and PFOS. For the residential adult, the COCs exhibiting HQs greater than 1 include manganese and thallium. For the construction workers and industrial workers, cyanide was the only COC exhibiting an HQ greater than 1.

8.2.3 Outside Landfill – Deep Wells

As shown in Table 8-1 for the RME scenario, exposure to deep groundwater outside the landfill was associated with estimated cancer risks that exceeded the acceptable risk range for residents, but not for industrial workers. Construction workers were assumed not to be exposed to deep groundwater. For the lifetime resident, numerous candidate COCs contributed to cancer risks. As shown in Appendix G, Part 2, RAGS D Tables 10.7.RME to 10.14.RME, the major cancer risk drivers with ILCRs greater than $1x10^{-5}$ were chromium, vinyl chloride, TCE, arsenic, and 1,4-dioxane. Additional cancer risk drivers displaying risks between $1x10^{-6}$ and $1x10^{-5}$ were indeno(1,2,3-cd)pyrene, benzo(a)pyrene, dioxin-like PCBs, 2,3,7,8-TCDD TEQs, delta-BHC, and dibenzo(a,h)anthracene.

For the child resident and adult resident, the maximum of the estimated target organ HIs exceeded 1. For the child resident, the COCs exhibiting HQs greater than 1 include cis-1,2-dichloroethene, TCE, aluminum, iron, and manganese. For the residential adult, the COCs exhibiting HQs greater than 1 include cis-1,2-dichloroethene, TCE, cobalt, iron, manganese, and cyanide. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include aluminum, arsenic, and dioxin-like PCBs.

Blood lead concentrations were predicted to be less than 10 µg/dL in more than 5% of an exposed population of child residents. Blood lead predictions were not able to be generated for construction workers, but a qualitative evaluation suggests that blood lead levels would not be unacceptable for a construction worker potentially exposed to incidental ingestion of groundwater in an excavation trench.

As shown in Table 8-2 for the CTE scenario, exposure to deep groundwater outside the landfill was associated with estimated cancer risks that exceeded the acceptable risk range for residents, but not for industrial workers. Construction workers were assumed not to be exposed to deep groundwater. For the lifetime resident, numerous candidate COCs contributed to cancer risks. As shown in Appendix G, Part 2, RAGS D Tables 10.7.CTE to 10.14.CTE, the major cancer risk drivers with ILCRs greater than $1x10^{-5}$ were chromium, vinyl chloride, TCE, and arsenic. Additional cancer risk drivers displaying risks between $1x10^{-6}$ and $1x10^{-5}$ were 1,4-dioxane, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dioxin-like PCBs.

For the child resident and adult resident, the maximum of the estimated target organ HIs exceeded 1. For the child resident, the COCs exhibiting HQs greater than 1 include cis-1,2-dichloroethene, TCE, cobalt, and manganese. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include aluminum. For the residential adult, the COCs exhibiting HQs greater than 1 include cis-1,2-dichloroethene and TCE. Additional COCs contributed to target organ-specific HIs that exceeded 1, but individually were associated with HQ contributions of less than 1, include aluminum, and manganese.

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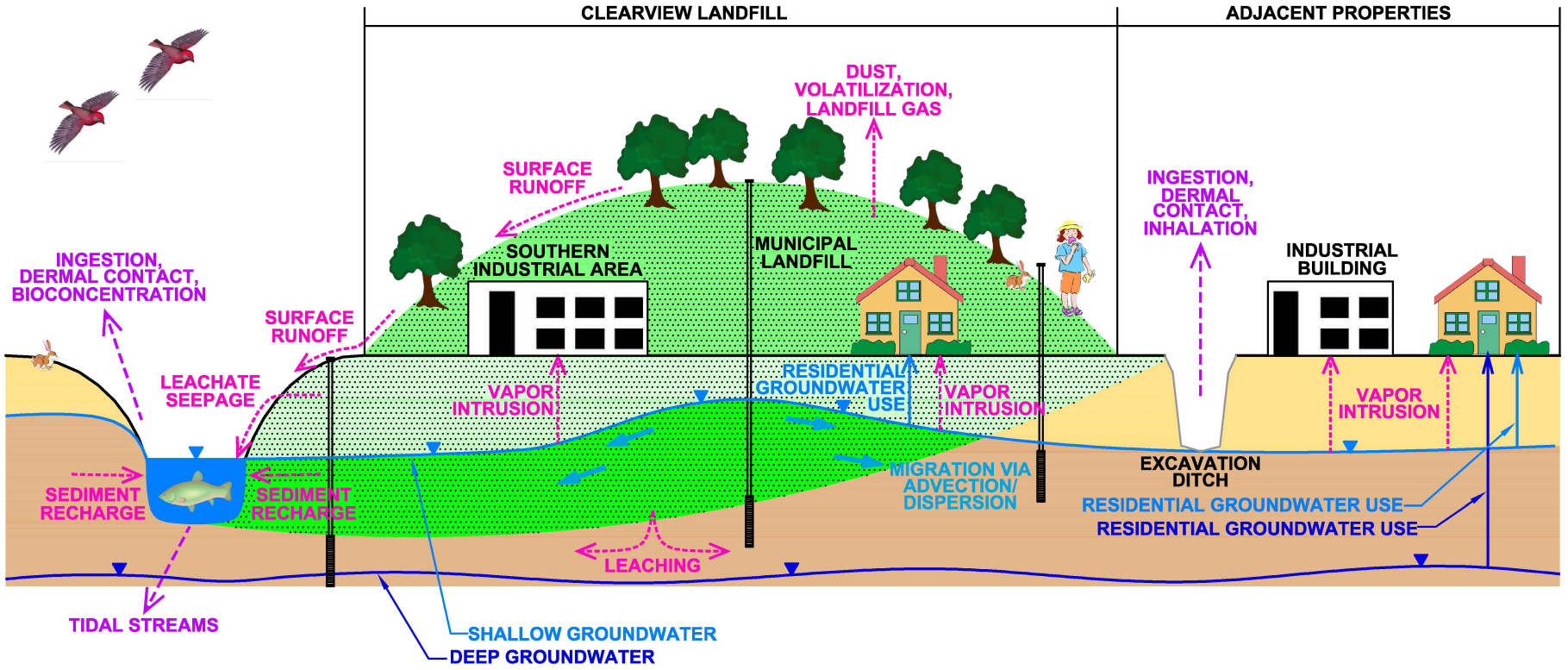

LEGEND

- SHALLOW GROUNDWATER LEVEL
- DEEP GROUNDWATER LEVEL
- GROUNDWATER FLOW DIRECTION
- RELEASE MECHANISM
- EXPOSURE ROUTE
- LANDFILL CONTENTS ABOVE LOCAL SURFACE ELEVATION
- LANDFILL CONTENTS BELOW LOCAL SURFACE ELEVATION
- LANDFILL CONTENTS BELOW LOCAL GROUNDWATER LEVEL

TETRA TECH

CONCEPTUAL SITE MODEL
LOWER DARBY CREEK AREA (LDCA) SITE
OPERABLE UNIT 3 (OU-3)
PHILADELPHIA AND DELAWARE COUNTIES, PENNSYLVANIA

SCALE	AS NOTED
FILE	112G01067GCSM02
REV	0
DATE	6/21/18
FIGURE NUMBER	FIGURE 1-1

FIGURE 1-2
CONCEPTUAL SITE MODEL FOR HUMAN HEALTH RISK EXPOSURE PATHWAYS
LOWER DARBY CREEK AREA RI/FS

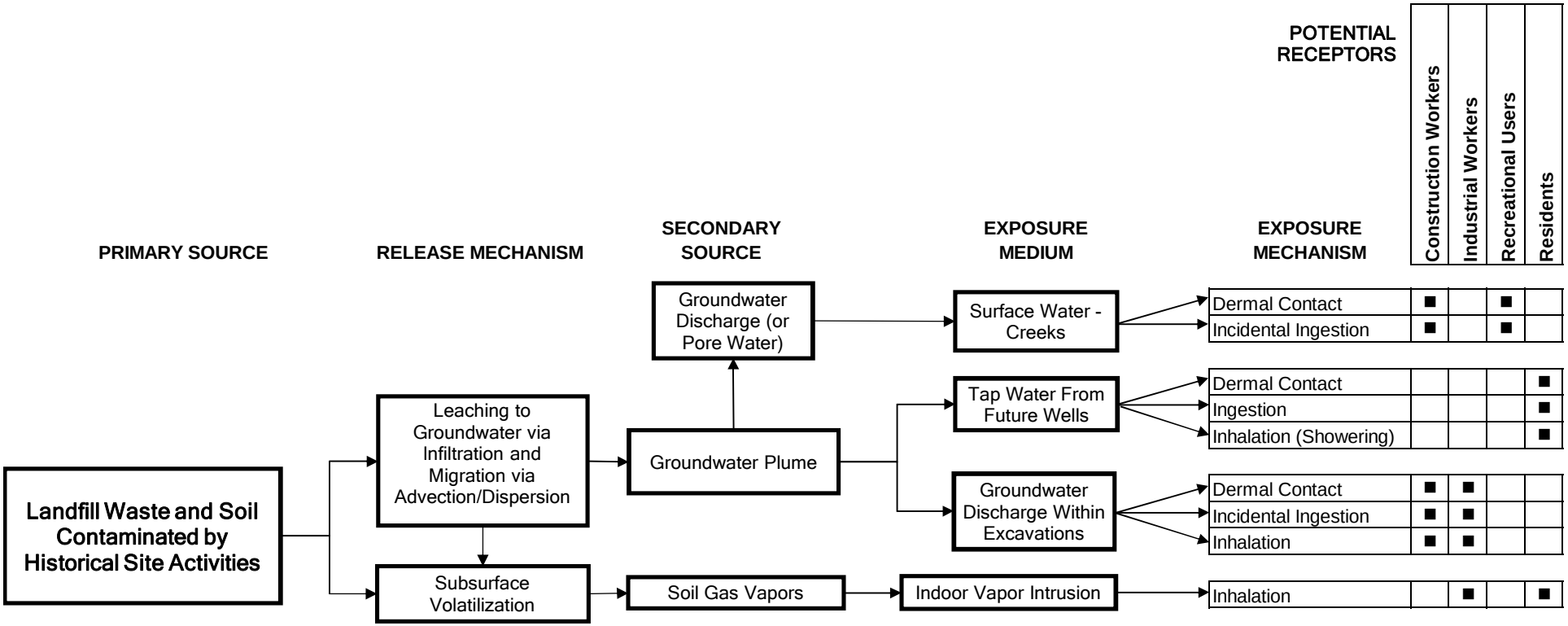

FIGURE 6-1
SUMMARY OF HAZARD INDICES - REASONABLE MAXIMUM EXPOSURES
LOWER DARBY CREEK AREA

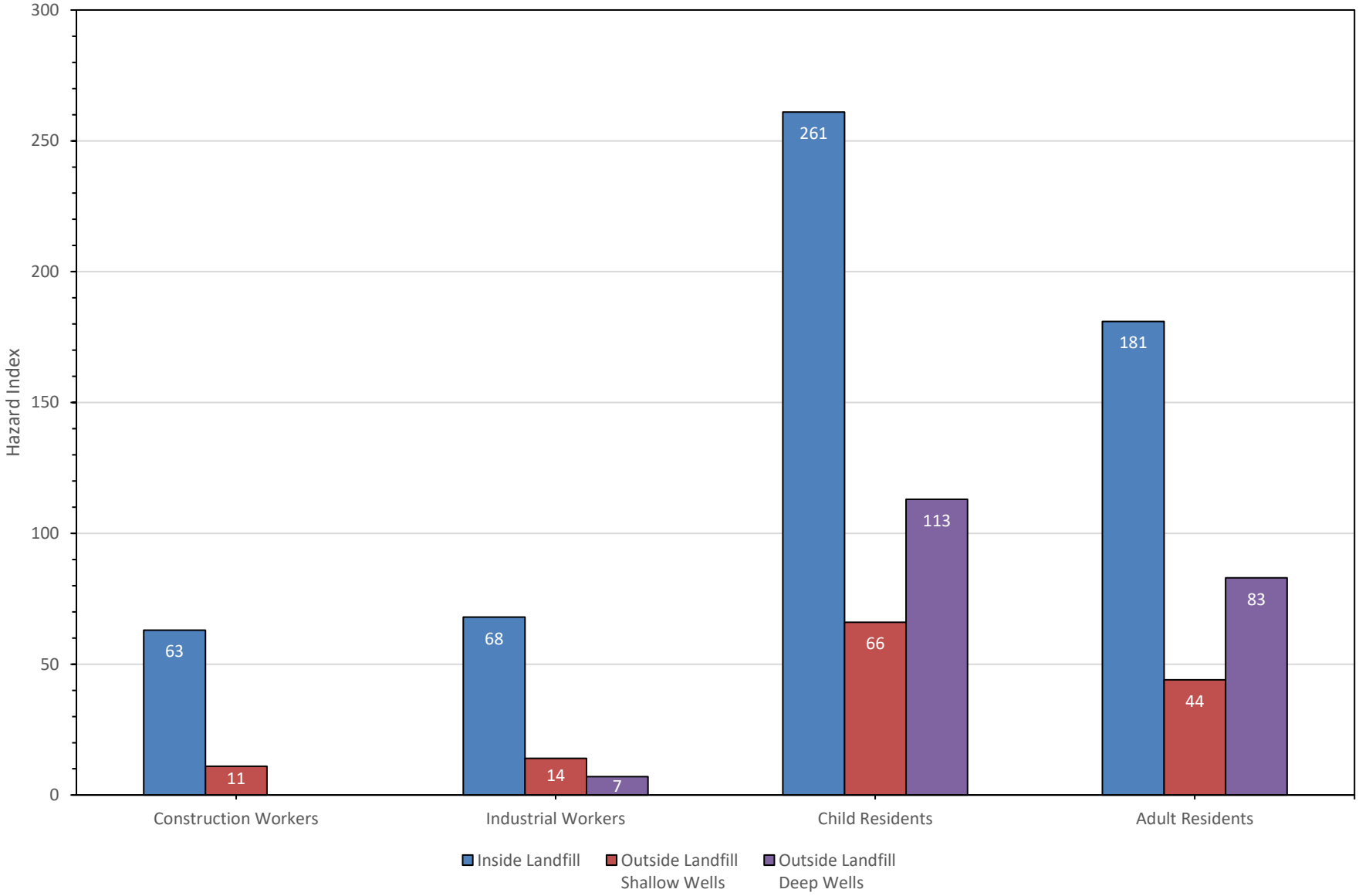

FIGURE 6-2
SUMMARY OF HAZARD INDICES - CENTRAL TENDENCY EXPOSURES
LOWER DARBY CREEK AREA

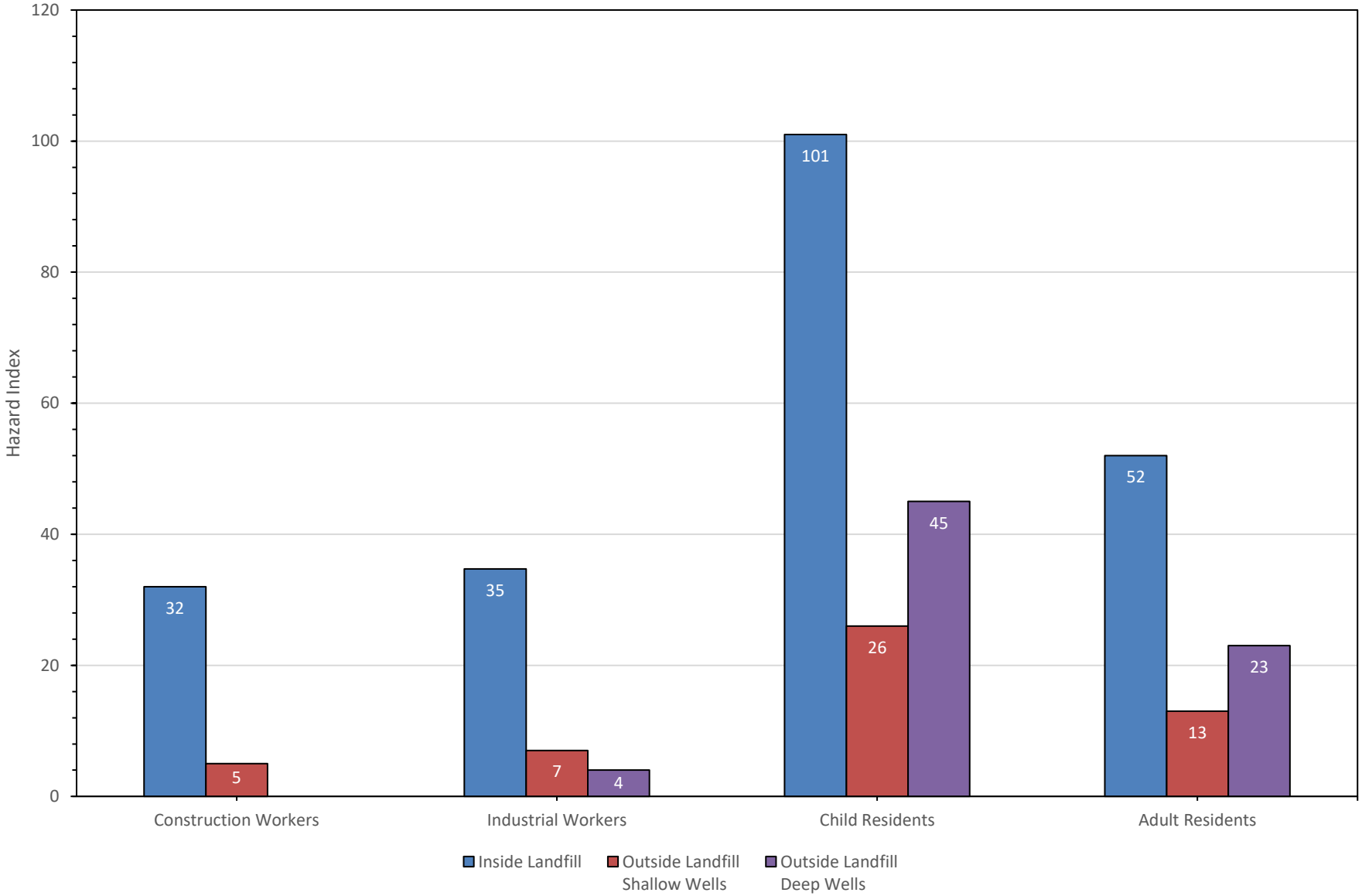

FIGURE 6-3
SUMMARY OF CANCER RISKS - REASONABLE MAXIMUM EXPOSURES
LOWER DARBY CREEK AREA

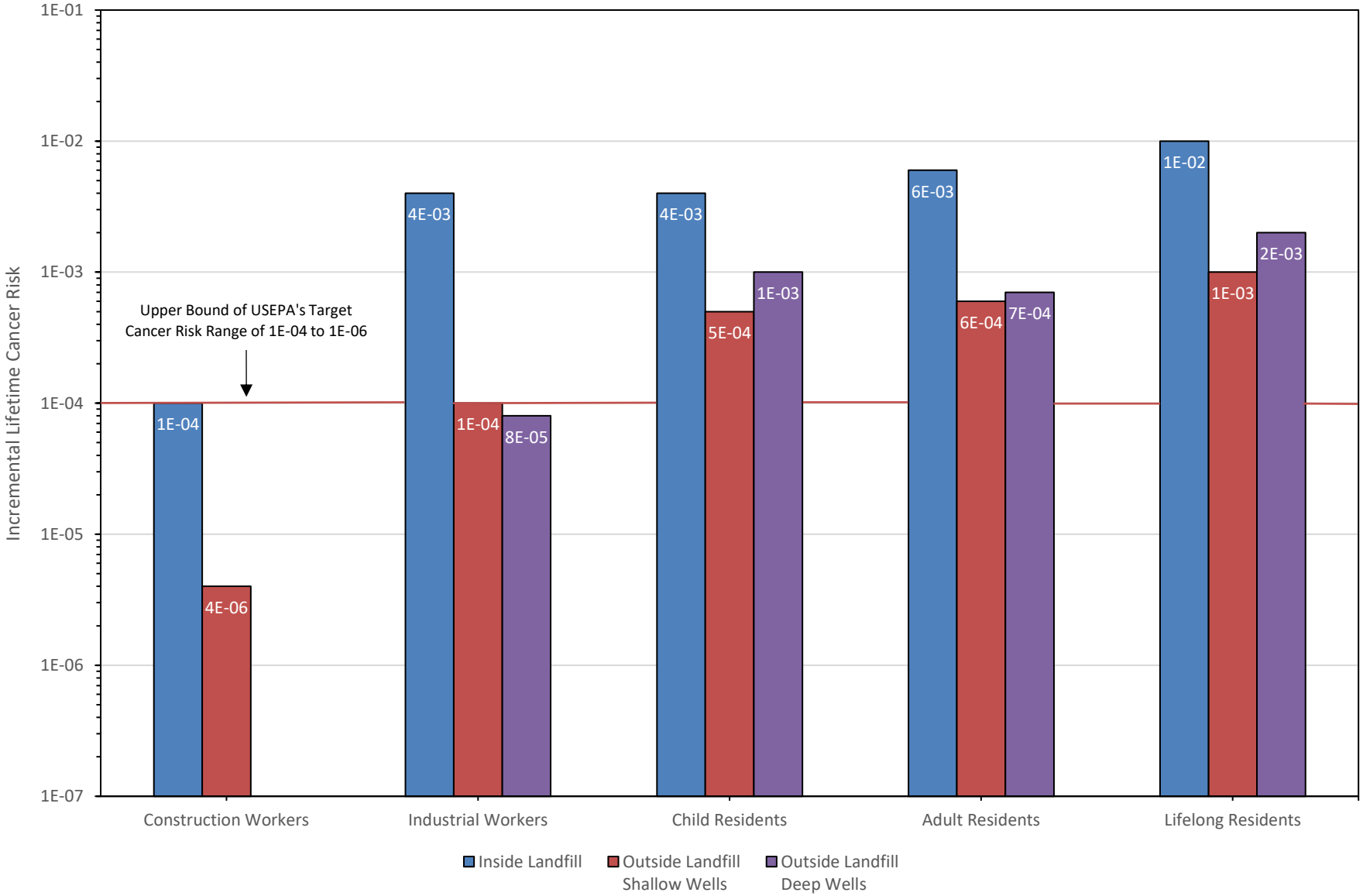

FIGURE 6-4
SUMMARY OF CANCER RISKS - CENTRAL TENDENCY EXPOSURES
LOWER DARBY CREEK AREA

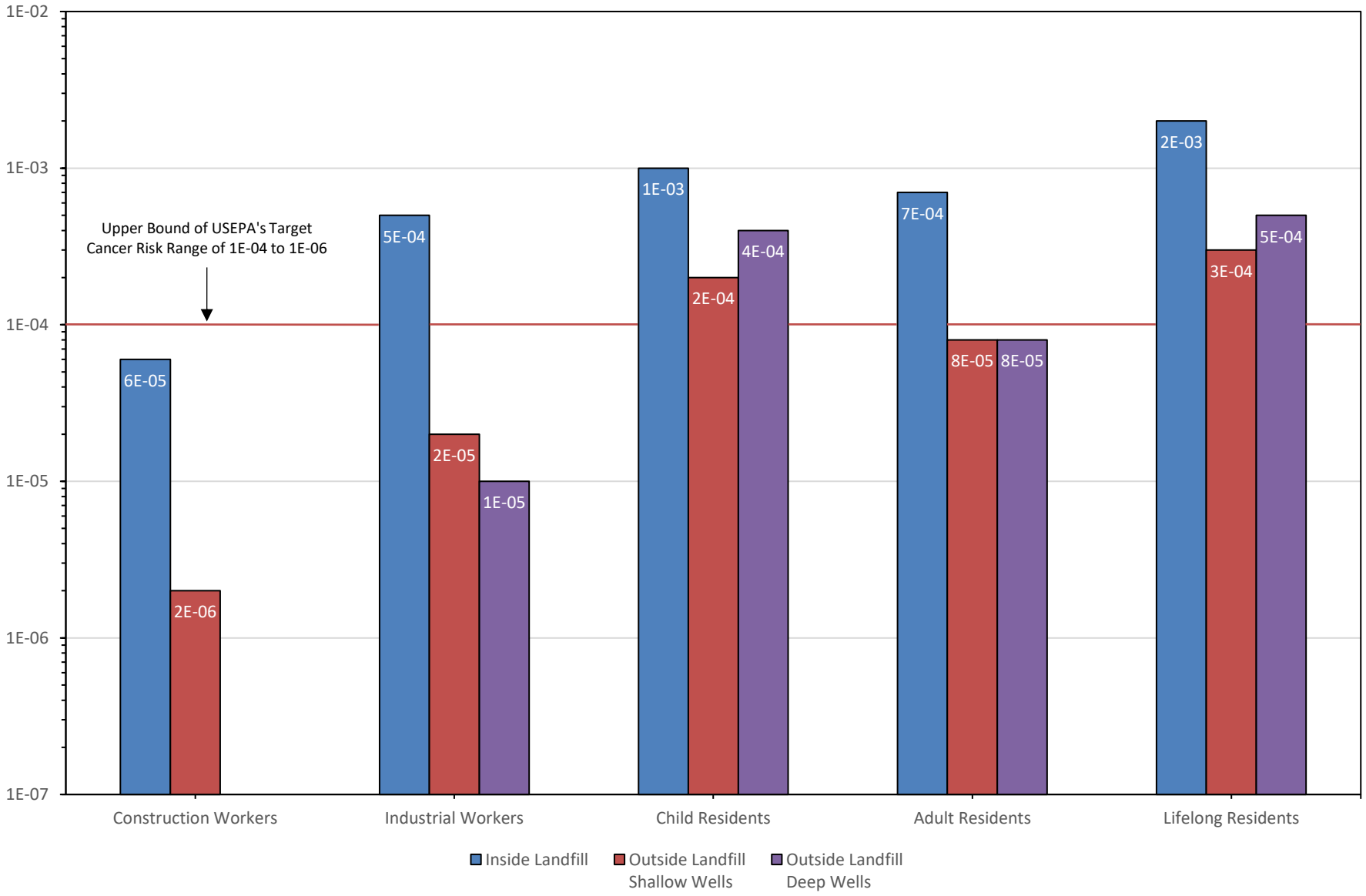

Table 8-1
Summary of Human Health Risks for Lower Darby Creek Area
Reasonable Maximum Exposures
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Receptor	Cumulative Cancer Risk	Maximum Target Organ HI	Population % Lead > 10 ug/dL	Contributors to unacceptable risk if cancer risk >1E-6, noncancer HQ > 0.1, or blood lead level > 10 ug/dL for > 5% of population. Lifetime receptor -- only cancer risk COCs; child or adult -- only noncancer risk COCs.
GROUNDWATER INSIDE LANDFILL				
Lifetime Resident (Direct Contact)	1E-02	--	--	2,3,7,8-TCDD TEQs, Trichloroethene, Benzene, Chromium, Dioxin-like PCBs, Nondioxin-like PCBs, Arsenic, Benzo(a)pyrene, 1,4-Dioxane, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Aldrin, Dieldrin, Benzo(a)anthracene, delta-BHC, Pentachlorophenol, Benzo(k)fluoranthene, Bis(2-ethylhexyl)phthalate, beta-BHC, Heptachlor
Lifetime Resident (Vapor Intrusion)	8E-05	9	--	Mercury
Child Resident	(see lifetime)	205	82% > 10 ug/dL	Antimony, Zinc, Aluminum, Manganese, Mercury, Trichloroethene, Arsenic, 2,3,7,8-TCDD Equivalents, Pentadecafluorooctanoic Acid, Perfluorooctane Sulfonic Acid, Dioxin-Like PCBs, Boron, Beryllium, Copper, Iron, Thallium, Cyanide, Silver, Vanadium, Cobalt, 1,4-Dioxane, Barium, Cadmium, Chromium, Lead
Adult Resident	(see lifetime)	141	--	Antimony, Zinc, Aluminum, Manganese, Mercury, Trichloroethene, Arsenic, 2,3,7,8-TCDD Equivalents, Pentadecafluorooctanoic Acid, Perfluorooctane Sulfonic Acid, Dioxin-Like PCBs, Boron, Cyanide, Beryllium, Copper, Iron, Thallium, Silver, Vanadium, Chromium
Construction Worker	1E-04	62	--	2,3,7,8-TCDD Equivalents, Dioxin-Like PCBs, Trichloroethene, Cyanide
Industrial Worker	4E-03	65	--	2,3,7,8-TCDD Equivalents, Dioxin-Like PCBs, Nondioxin-Like PCBs, Dieldrin, Arsenic, Chromium, Cyanide, 1,4-Dioxane, Naphthalene, Aldrin
Industrial Worker (Vapor Intrusion)	2E-05	2	--	Mercury
GROUNDWATER OUTSIDE LANDFILL - SHALLOW WELLS				
Lifetime Resident	1E-03	--	--	Arsenic, Vinyl Chloride, 2,6-Dinitroluene, Chromium, 1,4-Dioxane, Benzo(a)pyrene, 1,2-Dibromo-3-Chloropropane, Bis(2-chloroethyl)ether, Pentachlorophenol, Dieldrin, 2,3,7,8-TCDD TEQs, Benzene, Dioxin-like PCBs, 1,2-Dichloroethane, Trichloroethene, Naphthalene
Lifetime Resident (Vapor Intrusion)	5E-05	1	--	None
Child Resident	(see lifetime)	25	35% > 10 ug/dL	Aluminum, Manganese, Trichloroethene, Arsenic, Pentadecafluorooctanoic Acid, Perfluorooctane Sulfonic Acid, 2,3,7,8-TCDD Equivalents, cis-1,2-Dichloroethene, Boron, Iron, Thallium, Silver, Cobalt, 2,6-Dinitrotoluene, Cyanide, Cadmium, Lead
Adult Resident	(see lifetime)	16	--	Aluminum, Manganese, Trichloroethene, Arsenic, Pentadecafluorooctanoic Acid, Perfluorooctane Sulfonic Acid, Cyanide, Iron, Thallium, Silver
Construction Worker	4E-06	9	--	Cyanide
Industrial Worker	1E-04	9	--	Vinyl Chloride, 2,6-Dinitrotoluene, Pentachlorophenol, Cyanide, Dieldrin, Chromium, Manganese, 1,2-Dibromo-3-Chloropropane, 1,2-Dichloroethane, Benzene, Trichloroethene, 1,4-Dioxane, Bis(2-Chloroethyl)Ether, Naphthalene, 2,3,7,8-TCDD TEQs, Dioxin-Like PCBs, Arsenic
Industrial Worker (Vapor Intrusion)	4E-06	0.3	--	None
GROUNDWATER OUTSIDE LANDFILL - DEEP WELLS				
Lifetime Resident	2E-03	--	--	Chromium, Vinyl Chloride, Trichloroethene, Arsenic, 1,4-Dioxane, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, 2,3,7,8-TCDD TEQs, delta-BHC, Dibenzo(a,h)anthracene.
Child Resident	(see lifetime)	56	0.27% > 10 ug/dL	Aluminum, Manganese, Trichloroethene, Iron, cis-1,2-Dichloroethene, 2,3,7,8-TCDD, Arsenic, Cadmium, Cobalt, Lead
Adult Resident	(see lifetime)	36	--	Aluminum, Manganese, Trichloroethene, Arsenic, Cyanide, Iron, Cobalt, cis-1,2-Dichloroethene
Industrial Worker	8E-05	4	--	cis-1,2-Dichloroethene, Trichloroethene
PORE WATER				
Construction Worker	2E-08	0.007	--	No COCs
Recreational User	4E-05	0.3	--	No COCs

Table 8-2
Summary of Human Health Risks for Lower Darby Creek Area
Central Tendency Exposures
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Receptor	Cumulative Cancer Risk	Maximum Target Organ HI	Contributors to unacceptable risk if cancer risk >1E-6, noncancer HQ > 0.1, or blood lead level > 10 ug/dL for > 5% of population. Lifetime receptor -- only cancer risk COCs; child or adult -- only noncancer risk COCs.
GROUNDWATER INSIDE LANDFILL			
Lifetime Resident (Direct Contact)	2E-03	--	2,3,7,8-TCDD Equivalents, Dioxin-Like PCBs, Chromium, 1,4-Dioxane, Benzo(a)pyrene, Nondioxin-Like PCBs, Arsenic, Aldrin, Dieldrin
Child Resident	(see lifetime)	79	2,3,7,8-TCDD Equivalents, Pentadecafluorooctanoic Acid, Perfluorooctane Sulfonic Acid, Dioxin-Like PCBs, Aluminum, Antimony, Manganese, Mercury, Arsenic, Boron, Thallium, Cyanide, Vanadium
Adult Resident	(see lifetime)	40	2,3,7,8-TCDD Equivalents, Perfluorooctane Sulfonic Acid, Dioxin-Like PCBs, Cyanide, Manganese, Mercury, Thallium
Construction Worker	6E-05	31	2,3,7,8-TCDD Equivalents, Dioxin-Like PCBs, Nondioxin-Like PCBs, Cyanide
Industrial Worker	5E-04	33	2,3,7,8-TCDD Equivalents, Dioxin-Like PCBs, Nondioxin-Like PCBs, Chromium, Cyanide
GROUNDWATER OUTSIDE LANDFILL - SHALLOW WELLS			
Lifetime Resident	3E-04	--	1,2-Dibromo-3-Chloropropane, Vinyl Chloride, 2,6-Dinitrotoluene, Arsenic, Chromium, 1,4-Dioxane, Bis(2-Chloroethyl)Ether, Pentachlorophenol, Dieldrin
Child Resident	(see lifetime)	10	Aluminum, Arsenic, Manganese, Pentadecafluorooctanoic Acid, Perfluorooctane Sulfonic Acid, Thallium, Trichloroethene
Adult Resident	(see lifetime)	5	Manganese, Thallium
Construction Worker	2E-06	4	Cyanide
Industrial Worker	2E-05	5	1,2-Dibromo-3-Chloropropane, Chromium, Manganese, Naphthalene, Cyanide
GROUNDWATER OUTSIDE LANDFILL - DEEP WELLS			
Lifetime Resident	5E-04	--	Vinyl Chloride, Trichloroethene, Arsenic, Chromium, 1,4-Dioxane, Dibenzo(a,h)anthracene
Child Resident	(see lifetime)	22	cis-1,2-Dichloroethene, Aluminum, Arsenic, Cobalt, Manganese, Trichloroethene
Adult Resident	(see lifetime)	11	Trichloroethene, cis-1,2-Dichloroethene, Aluminum, Manganese
Industrial Worker	1E-05	2	Trichloroethene, Chromium

APPENDIX G-2

PART 2 - RAGS PART D TABLES 1 THROUGH 10

RAGS Part D Table 1

Selection of Exposure Pathways

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
LOWER DARBY CREEK AREA
PAGE 1 OF 2

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Clearview Landfill	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with groundwater during excavation activities.
				Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Industrial workers may be exposed to groundwater while performing activities such as lawn irrigation, utility digging, and/or showering at work site using groundwater.
				Residents	Child	Ingestion Dermal	Quant Quant	Hypothetical resident may install private well in the event of future on-site residential development.
					Adult	Ingestion Dermal	Quant Quant	
		Air (Vapors from groundwater)	Clearview Landfill	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Industrial Workers	Adult	Inhalation	Quant	Industrial workers may be exposed to COPCs that have volatilized from groundwater while performing activities such as lawn irrigation, utility digging, and/or showering at work site using groundwater.
		Air (Vapors from showerhead)	Clearview Landfill	Residents	Child	Inhalation	None	Hypothetical children, ages 0-6, are not expected to take showers.
					Adult	Inhalation	Quant	Hypothetical adult resident may be exposed to COPCs that have volatilized from groundwater while showering.
		Groundwater	Outside Landfill Shallow Groudwater	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with groundwater during excavation activities.
				Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Industrial workers may be exposed to groundwater while performing activities such as lawn irrigation, utility digging, and/or showering at work site using groundwater.
				Residents	Child	Ingestion Dermal	Quant Quant	Hypothetical resident may install private well in the event of future on-site residential development.
					Adult	Ingestion Dermal	Quant Quant	
		Air (Vapors from groundwater)	Outside Landfill Shallow Groudwater	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Industrial Workers	Adult	Inhalation	Quant	Industrial workers may be exposed to COPCs that have volatilized from groundwater while performing activities such as lawn irrigation, utility digging, and/or showering at work site using groundwater.
		Air (Vapors from showerhead)	Outside Landfill Shallow Groudwater	Residents	Child	Inhalation	None	Hypothetical children, ages 0-6, are not expected to take showers.
					Adult	Inhalation	Quant	Hypothetical adult resident may be exposed to COPCs that have volatilized from groundwater while showering.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
LOWER DARBY CREEK AREA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Outside Landfill Deep Groudwater	Construction Workers	Adult	Ingestion Dermal	None None	Construction workers are not expected to be exposed to deep groundwater.
				Industrial Workers	Adult	Ingestion Dermal	None None	Industrial workers are not expected to be exposed to deep groundwater.
				Residents	Child	Ingestion Dermal	None None	Hypothetical resident may install private well in the event of future on-site residential development.
					Adult	Ingestion Dermal	None None	
		Air (Vapors from groundwater)	Outside Landfill Deep Groudwater	Construction Workers	Adult	Inhalation	None	Construction workers are not expected to be exposed to deep groundwater.
				Industrial Workers	Adult	Inhalation	None	Industrial workers are not expected to be exposed to deep groundwater.
		Air (Vapors from showerhead)	Outside Landfill Deep Groudwater	Residents	Child	Inhalation	None	Hypothetical children, ages 0-6, are not expected to take showers.
					Adult	Inhalation	Quant	Hypothetical adult resident may be exposed to COPCs that have volatilized from groundwater while showering.
	Porewater	Surface Water	Darby Creek, Cobbs Creek and Tinicum Marsh	Construction Workers[(1)]	Adult	Ingestion Dermal	Quant Quant	Construction workers may be exposed to porewater that has discharged to surface water in Darby Creek, Cobbs Creek, and Tinicum Marsh.
				Recreational Users[(1)]	Child	Ingestion Dermal	Quant Quant	Recreational users may be exposed to porewater that has discharged to surface water in Darby Creek, Cobbs Creek, and Tinicum Marsh.
					Adult	Ingestion Dermal	Quant Quant	

Definitions:
COPC = Chemical of potential concern.
Quant = Quantitative.
Construction worker is defined as the worker who is involved with earth moving activities such as plumbing pipe repairs, cable line installations, and building construction activities.
Industrial worker is defined as the worker who maintains the grounds (groundskeeper), lawn mower, and other light industrial activities.
1 - Risk for exposures to pore water discharging to surface water are included in Appendix G-12 and are not included as part of the RAGS Part D Tables in Appendix G-2.

RAGS Part D Table 2

Occurrence, Distribution and Selection

Of Chemicals of Potential Concern

LIST OF TABLES

RAGS PART D TABLE 2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Table No.	
2.1	Inside Landfill - Direct Contact - Event 1
2.2	Inside Landfill - Direct Contact - Event 2
2.3	Inside Landfill - Direct Contact - Event 3
2.4	Outside Landfill - Shallow Wells - Direct Contact - Event 1
2.5	Outside Landfill - Shallow Wells - Direct Contact - Event 2
2.6	Outside Landfill - Shallow Wells - Direct Contact - Event 3
2.7	Outside Landfill - Shallow Wells - Direct Contact - Event 4
2.8	Outside Landfill - Deep Wells - Direct Contact - Event 1
2.9	Outside Landfill - Deep Wells - Direct Contact - Event 2
2.1	Outside Landfill - Deep Wells - Direct Contact - Event 3
2.11	Outside Landfill - Deep Wells - Direct Contact - Event 4
2.12	Inside Landfill - Vapor Intrusion - All Events
2.13	Outside Landfill - Shallow Wells - Vapor Intrusion - All Events

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 1	**SEMIVOLATILE ORGANICS - SIM**														
	91-57-6	2-METHYLNAPHTHALENE	0.097 J	0.18	UG/L	LDCA-MW12-0314	4/13	0.1 - 0.1	0.18	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.86	0.86	UG/L	LDCA-MW34S-0314	1/9	0.1 - 0.1	0.86	NA	53 N	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.09 J	0.88	UG/L	LDCA-MW11-0314	5/13	0.1 - 0.1	0.88	NA	180 N	NA	NA	No	BSL
	50-32-8	**BENZO(A)PYRENE**	0.83	0.83	UG/L	LDCA-MW11-0314	1/14	0.1 - 0.1	0.83	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	191-24-2	BENZO(G,H,I)PERYLENE	0.57 J	0.57 J	UG/L	LDCA-MW11-0314	1/12	0.1 - 0.1	0.57	NA	12 N[7]	NA	NA	No	BSL
	207-08-9	**BENZO(K)FLUORANTHENE**	0.53	0.53	UG/L	LDCA-MW11-0314	1/10	0.1 - 0.1	0.53	NA	**0.34 C**	NA	NA	**Yes**	ASL
	206-44-0	FLUORANTHENE	0.091 J	0.37	UG/L	LDCA-MW01S-0314	3/12	0.1 - 0.1	0.37	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.16	2.4	UG/L	LDCA-MW05S-0314	4/9	0.1 - 0.1	2.4	NA	29 N	NA	NA	No	BSL
	193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.48	0.48	UG/L	LDCA-MW11-0314	1/13	0.1 - 0.1	0.48	NA	**0.034 C**	NA	NA	**Yes**	ASL
	85-01-8	PHENANTHRENE	0.09 J	0.51	UG/L	LDCA-MW04-0314	5/10	0.1 - 0.1	0.51	NA	12 N[7]	NA	NA	No	BSL
	129-00-0	PYRENE	0.21	0.51	UG/L	LDCA-MW12-0314	3/13	0.1 - 0.1	0.51	NA	12 N	NA	NA	No	BSL
	DIOXIN/FURANS														
	3268-87-9	**1,2,3,4,6,7,8,9-OCDD**	99	870,000	PG/L	LDCA-MW11-0314	7/19	0.105 - 1.47	870,000	NA	**400 C[8]**	NA	NA	**Yes**	ASL
	39001-02-0	**1,2,3,4,6,7,8,9-OCDF**	5,400	5,400	PG/L	LDCA-MW11-0314	1/19	--	5,400	NA	**400 C[8]**	NA	NA	**Yes**	ASL
	35822-46-9	**1,2,3,4,6,7,8-HPCDD**	57	190,000	PG/L	LDCA-MW11-0314	3/19	0.0958 - 0.818	190,000	NA	**12 C[8]**	NA	NA	**Yes**	ASL
	67562-39-4	**1,2,3,4,6,7,8-HPCDF**	3,200	3,200	PG/L	LDCA-MW11-0314	1/19	0.0981 - 0.956	3,200	NA	**12 C[8]**	NA	NA	**Yes**	ASL
	55673-89-7	**1,2,3,4,7,8,9-HPCDF**	300	300	PG/L	LDCA-MW11-0314	1/19	0.129 - 0.878	300	NA	**12 C[8]**	NA	NA	**Yes**	ASL
	39227-28-6	**1,2,3,4,7,8-HXCDD**	730	730	PG/L	LDCA-MW11-0314	1/19	0.124 - 0.856	730	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	70648-26-9	**1,2,3,4,7,8-HXCDF**	340	340	PG/L	LDCA-MW11-0314	1/19	0.0895 - 0.745	340	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	57653-85-7	**1,2,3,6,7,8-HXCDD**	4,900	4,900	PG/L	LDCA-MW11-0314	1/19	0.125 - 0.844	4,900	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	57117-44-9	**1,2,3,6,7,8-HXCDF**	210	210	PG/L	LDCA-MW11-0314	1/19	0.0796 - 0.716	210	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	19408-74-3	**1,2,3,7,8,9-HXCDD**	5,800	5,800	PG/L	LDCA-MW11-0314	1/19	0.133 - 0.861	5,800	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	40321-76-4	**1,2,3,7,8-PECDD**	540	540	PG/L	LDCA-MW11-0314	1/19	0.128 - 0.73	540	NA	**0.12 C[8]**	NA	NA	**Yes**	ASL
	57117-41-6	**1,2,3,7,8-PECDF**	84	84	PG/L	LDCA-MW11-0314	1/19	0.154 - 0.676	84	NA	**4 C[8]**	NA	NA	**Yes**	ASL
	60851-34-5	**2,3,4,6,7,8-HXCDF**	110	110	PG/L	LDCA-MW11-0314	1/19	0.0872 - 1.22	110	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	57117-31-4	**2,3,4,7,8-PECDF**	110	110	PG/L	LDCA-MW11-0314	1/19	0.146 - 0.612	110	NA	**0.4 C[8]**	NA	NA	**Yes**	ASL
	1746-01-6	**2,3,7,8-TCDD**	110	110	PG/L	LDCA-MW11-0314	1/19	0.128 - 0.702	110	NA	**0.12 C**	NA	NA	**Yes**	ASL
	51207-31-9	**2,3,7,8-TCDF**	190 J	190 J	PG/L	LDCA-MW11-0314	1/19	0.1 - 0.401	190	NA	**1.2 C[8]**	NA	NA	**Yes**	ASL
	--	**2,3,7,8-TCDD TEQ**	0.030	4,111	PG/L	LDCA-MW11-0314	7/19	0.128 - 0.299	4,111	NA	**0.12 C[8]**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	**ALUMINUM**	24.6	30,500	UG/L	LDCA-MW11-0314	11/20	20 - 20	30,500	NA	**2000 N**	NA	NA	**Yes**	ASL
	7440-36-0	**ANTIMONY**	27.8	27.8	UG/L	LDCA-MW11-0314	1/20	2 - 2	27.8	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.56 J	51.9	UG/L	LDCA-MW11-0314	15/20	1 - 1	51.9	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	24.2	3,960	UG/L	LDCA-MW11-0314	20/20	--	3,960	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.83 J	1.4	UG/L	LDCA-MW11-0314	2/20	1 - 1	1.4	NA	2.5 N	NA	NA	No	BSL
	7440-42-8	**BORON**	27.3	4,080	UG/L	LDCA-MW05S-0314	20/20	--	4,080	NA	**400 N**	NA	NA	**Yes**	ASL
	7440-43-9	**CADMIUM**	0.099 J	21.9	UG/L	LDCA-MW11-0314	3/20	1 - 1	21.9	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	13,200	164,000 J	UG/L	LDCA-MW34S-0314	20/20	--	164,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	1.6 J	399	UG/L	LDCA-MW11-0314	19/20	2 - 2	399	NA	**0.035 C[9]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.71 J	50.2	UG/L	LDCA-MW11-0314	20/20	--	50.2	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	**COPPER**	2.2	753	UG/L	LDCA-MW11-0314	17/20	2 - 4.3	753	NA	**80 N**	NA	NA	**Yes**	ASL
	57-12-5	**CYANIDE**	3.9 J	367	UG/L	LDCA-MW11-0314	8/20	10 - 10	367	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	489 J	157,000 J	UG/L	LDCA-MW11-0314	20/20	--	157,000	NA	**1400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	0.51 J	4,470	UG/L	LDCA-MW11-0314	18/20	1 - 1	4,470	NA	**15**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	752	129,000	UG/L	LDCA-MW05S-0314	20/20	--	129,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	28.1	12,800 J	UG/L	LDCA-MW34D-0314	20/20	--	12,800	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	**MERCURY**	8.2	8.2	UG/L	LDCA-MW11-0314	1/20	0.2 - 0.2	8.2	NA	**0.2 N[10]**	NA	NA	**Yes**	ASL
	7440-02-0	**NICKEL**	1.8 J	464	UG/L	LDCA-MW11-0314	20/20	--	464	NA	**39 N**	NA	NA	**Yes**	ASL
	7440-09-7	POTASSIUM	2,940	91,900	UG/L	LDCA-MW20S-0314	20/20	--	91,900	NA	NA N	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.32 J	6.1	UG/L	LDCA-MW01D-0314	7/20	5 - 5	6.1	NA	10 N	NA	NA	No	BSL
	7440-22-4	**SILVER**	26.3	26.3	UG/L	LDCA-MW11-0314	1/20	1 - 1	26.3	NA	**9.4 N**	NA	NA	**Yes**	ASL
	7440-23-5	SODIUM	4,670	2,060,000	UG/L	LDCA-MW20D-0314-DUP	20/20	--	7,190,000	NA	NA	NA	NA	No	NUT
	7440-62-2	**VANADIUM**	0.15 J	327 J	UG/L	LDCA-MW11-0314	12/20	5 - 5	327	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	**ZINC**	4.6	5,660	UG/L	LDCA-MW11-0314	19/20	4.4 - 4.4	5,660	NA	**600 N**	NA	NA	**Yes**	ASL
	FILTERED METALS														
	7429-90-5	ALUMINUM	21.3	516	UG/L	LDCA-MW20S-0314	3/20	20 - 20	516	NA	2,000 N	NA	NA	No	BSL
	7440-38-2	**ARSENIC**	1.1	26.7	UG/L	LDCA-MW07S-0314	16/20	1 - 1	26.7	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	22.6	1,870	UG/L	LDCA-MW04-0314	20/20	--	1,870	NA	**380 N**	NA	NA	**Yes**	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 1	**FILTERED METALS**														
	7440-42-8	**BORON**	24.1	3,950	UG/L	LDCA-MW05S-0314	20/20	--	3,950	NA	**400 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	8,010	156,000	UG/L	LDCA-MW34S-0314	20/20	--	156,000	NA	--	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	1.4 J	30.2	UG/L	LDCA-MW04-0314	20/20	--	30.2	NA	**0.035 C[9]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.4 J	15.9	UG/L	LDCA-MW01D-0314	18/20	1 - 1	15.9	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	2.4	22.1	UG/L	LDCA-MW37-0314	18/20	2 - 2	22.1	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	1,280	76,200	UG/L	LDCA-MW34D-0314	19/20	200 - 200	76,200	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.38 J	12.6	UG/L	LDCA-MW01D-0314	16/20	1 - 1	12.6	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	7,640	124,000	UG/L	LDCA-MW05S-0314	19/20	500 - 500	124,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	3 J	12,200 J	UG/L	LDCA-MW34D-0314	20/20	--	12,200	NA	**43 N**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	3.5	24.4	UG/L	LDCA-MW04-0314	20/20	--	24.4	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	3,220	87,300	UG/L	LDCA-MW11-0314	20/20	--	87,300	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.77 J	6.4	UG/L	LDCA-MW01D-0314	3/20	5 - 5	6.4	NA	10 N	NA	NA	No	BSL
	7440-22-4	SILVER	0.076 J	0.076 J	UG/L	LDCA-MW07D-0314	1/20	1 - 1	0.076	NA	9.4 N	NA	NA	No	BSL
	7440-23-5	SODIUM	4,390	456,000	UG/L	LDCA-MW37-0314	20/20	--	456,000	NA	NA	NA	NA	No	NUT
	7440-62-2	**VANADIUM**	1.2 J	11.7	UG/L	LDCA-MW37-0314	6/20	5 - 5	11.7	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	**ZINC**	2.9	981 J	UG/L	LDCA-MW12-0314	20/20	--	981	NA	**600 N**	NA	NA	**Yes**	ASL
	PESTICIDES														
	50-29-3	4,4'-DDT	0.03 J	0.03 J	UG/L	LDCA-MW04-0314	1/20	0.1 - 0.1	0.03	NA	0.23 C	NA	NA	No	BSL
	309-00-2	**ALDRIN**	0.039 J	0.047 J	UG/L	LDCA-MW12-0314	2/20	0.05 - 0.05	0.047	NA	**0.00092 C**	NA	NA	**Yes**	ASL
	5103-71-9	ALPHA-CHLORDANE	0.017 J	0.017 J	UG/L	LDCA-MW04-0314	1/20	0.05 - 0.05	0.017	NA	0.045 C[11]	NA	NA	No	BSL
	319-85-7	**BETA-BHC**	0.022 J	0.081 J	UG/L	LDCA-MW12-0314	6/20	0.05 - 0.05	0.081	NA	**0.025 C**	NA	NA	**Yes**	ASL
	319-86-8	**DELTA-BHC**	0.015 J	0.034 J	UG/L	LDCA-MW07D-0314	2/20	0.05 - 0.05	0.034	NA	**0.0072 C[12]**	NA	NA	**Yes**	ASL
	60-57-1	**DIELDRIN**	0.019 J	0.022 J	UG/L	LDCA-MW07S-0314	2/20	0.1 - 0.1	0.022	NA	**0.0018 C**	NA	NA	**Yes**	ASL
	33213-65-9	ENDOSULFAN II	0.025 J	0.025 J	UG/L	LDCA-MW04-0314, LDCA-MW07D-0314	2/20	0.1 - 0.1	0.025	NA	10 N[13]	NA	NA	No	BSL
	72-20-8	ENDRIN	0.024 J	0.058 J	UG/L	LDCA-MW04-0314	3/20	0.1 - 0.1	0.058	NA	0.23 N	NA	NA	No	BSL
	7421-93-4	ENDRIN ALDEHYDE	0.039 J	0.039 J	UG/L	LDCA-MW04-0314	1/20	0.1 - 0.1	0.039	NA	0.23 N[14]	NA	NA	No	BSL
	58-89-9	**GAMMA-BHC (LINDANE)**	0.044 J	0.044 J	UG/L	LDCA-MW12-0314	1/20	0.05 - 0.05	0.044	NA	**0.042 C**	NA	NA	**Yes**	ASL
	5103-74-2	GAMMA-CHLORDANE	0.014 J	0.035 J	UG/L	LDCA-MW04-0314	2/20	0.05 - 0.05	0.035	NA	0.045 C[11]	NA	NA	No	BSL
	72-43-5	METHOXYCHLOR	0.079 J	0.079 J	UG/L	LDCA-MW07S-0314	1/20	0.5 - 0.5	0.079	NA	3.7 N	NA	NA	No	BSL
	SEMIVOLATILES														
	123-91-1	**1,4-DIOXANE**	2.3	110	UG/L	LDCA-MW01D-0314	18/20	2 - 2	110	NA	**0.46 C**	NA	NA	**Yes**	ASL
	91-57-6	2-METHYLNAPHTHALENE	1.3	1.3	UG/L	LDCA-MW11-0314	1/7	5 - 5	1.3	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	1.4	4.3 J	UG/L	LDCA-MW11-0314	6/11	5 - 5	4.3	NA	53 N	NA	NA	No	BSL
	98-86-2	ACETOPHENONE	4.2 J	4.2 J	UG/L	LDCA-MW07S-0314	1/20	5 - 5	4.2	NA	190 N	NA	NA	No	BSL
	117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	2.4 J	48	UG/L	LDCA-MW11-0314	5/20	5 - 5	48	NA	**5.6 C**	NA	NA	**Yes**	ASL
	84-66-2	DIETHYL PHTHALATE	3.2 J	4 J	UG/L	LDCA-MW06-0314	2/20	5 - 5	4	NA	1500 N	NA	NA	No	BSL
	206-44-0	FLUORANTHENE	6.8	6.8	UG/L	LDCA-MW11-0314	1/8	5 - 5	6.8	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	1.3	3.7 J	UG/L	LDCA-MW11-0314	4/12	5 - 5	3.7	NA	29 N	NA	NA	No	BSL
	86-30-6	N-NITROSODIPHENYLAMINE	3.1 J	3.1 J	UG/L	LDCA-MW11-0314	1/20	5 - 5	3.1	NA	12 C	NA	NA	No	BSL
	85-01-8	PHENANTHRENE	2.4 J	8.6	UG/L	LDCA-MW11-0314	3/10	5 - 5	8.6	NA	12 N[7]	NA	NA	No	BSL
	129-00-0	PYRENE	5.2	5.2	UG/L	LDCA-MW11-0314	1/8	5 - 5	5.2	NA	12 N	NA	NA	No	BSL
	VOLATILES														
	87-61-6	1,2,3-TRICHLOROBENZENE	0.33 J	0.33 J	UG/L	LDCA-MW12-0314	1/20	0.5 - 5	0.33	NA	0.7 N	NA	NA	No	BSL
	120-82-1	1,2,4-TRICHLOROBENZENE	0.27 J	0.27 J	UG/L	LDCA-MW12-0314	1/20	0.5 - 5	0.27	NA	0.4 N	NA	NA	No	BSL
	541-73-1	**1,3-DICHLOROBENZENE**	0.6	0.77	UG/L	LDCA-MW12-0314	2/20	0.5 - 5	0.77	NA	**0.48 C[15]**	NA	NA	**Yes**	ASL
	106-46-7	**1,4-DICHLOROBENZENE**	1.2	3.1	UG/L	LDCA-MW07D-0314	7/20	0.5 - 5	3.1	NA	**0.48 C**	NA	NA	**Yes**	ASL
	67-64-1	ACETONE	11	11	UG/L	LDCA-MW11-0314	1/20	5 - 10	11	NA	1,400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	1.5	1.6	UG/L	LDCA-MW20D-0314, LDCA-MW20D-0314-DUP	2/20	0.5 - 5	1.6	NA	**0.46 C**	NA	NA	**Yes**	ASL
	108-90-7	**CHLOROBENZENE**	1.9	63	UG/L	LDCA-MW12-0314	10/20	0.5 - 5	63	NA	**7.8 N**	NA	NA	**Yes**	ASL
	110-82-7	CYCLOHEXANE	0.23 J	0.51	UG/L	LDCA-MW34S-0314	2/20	0.5 - 5	0.51	NA	1,300 N	NA	NA	No	BSL
	98-82-8	ISOPROPYLBENZENE	1.1	6.4	UG/L	LDCA-MW04-0314	5/20	0.5 - 5	6.4	NA	45 N	NA	NA	No	BSL
	--	M+P-XYLENES	0.18 J	0.24 J	UG/L	LDCA-MW12-0314	2/20	0.5 - 5	0.24	NA	19 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.2 J	0.43 J	UG/L	LDCA-MW37-0314	4/20	0.5 - 5	0.43	NA	NA	NA	NA	No	NA
	1634-04-4	METHYL TERT-BUTYL ETHER	0.19 J	3.2	UG/L	LDCA-MW37-0314	4/20	0.5 - 5	3.2	NA	14 C	NA	NA	No	BSL
	75-09-2	METHYLENE CHLORIDE	0.3 J	1.8 J	UG/L	LDCA-MW01S-0314	3/20	0.5 - 5	1.8	NA	11 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.2 J	0.32 J	UG/L	LDCA-MW37-0314	4/20	0.5 - 5	0.32	NA	19 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.17 J	1.6 J	UG/L	LDCA-MW20I-0314	7/20	0.5 - 5	1.6	NA	110 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	2.3 J	2.3 J	UG/L	LDCA-MW06-0314	1/20	0.5 - 5	2.3	NA	**0.28 N**	NA	NA	**Yes**	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 1	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	62	2,400,000	PG/L	LDCA-MW11-0314	15/15	--	2,400,000	NA	NA	NA	NA	No	NA
	33146-45-1	PCB-10	34	180,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	180,000	NA	NA	NA	NA	No	NA
	--	PCB-103	23	140,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	140,000	NA	NA	NA	NA	No	NA
	--	PCB-104	45	28,000	PG/L	LDCA-MW11-0314	4/15	19 - 21	28,000	NA	NA	NA	NA	No	NA
	32598-14-4	**PCB-105**	25	690,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	690,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	70424-68-9	PCB-107	22	180,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	180,000	NA	NA	NA	NA	No	NA
	--	PCB-108/124	56	65,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	65,000	NA	NA	NA	NA	No	NA
	2050-67-1	PCB-11	20	180,000	PG/L	LDCA-MW11-0314	8/15	20 - 21	180,000	NA	NA	NA	NA	No	NA
	--	PCB-110/115	21	3,100,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	3,100,000	NA	NA	NA	NA	No	NA
	39635-32-0	PCB-111	67	67	PG/L	LDCA-MW12-0314	1/15	19 - 15000	67	NA	NA	NA	NA	No	NA
	74472-37-0	**PCB-114**	42	42,000	PG/L	LDCA-MW11-0314	2/15	19 - 21	42,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	31508-00-6	**PCB-118**	26	1,700,000	PG/L	LDCA-MW11-0314	10/15	19 - 21	1,700,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	--	PCB-12/13	28	1,400,000	PG/L	LDCA-MW11-0314	11/15	20 - 21	1,400,000	NA	NA	NA	NA	No	NA
	68194-12-7	PCB-120	58	15,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	15,000	NA	NA	NA	NA	No	NA
	56558-18-0	PCB-121	21	25,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	25,000	NA	NA	NA	NA	No	NA
	76842-07-4	PCB-122	26	17,000	PG/L	LDCA-MW11-0314	2/15	19 - 21	17,000	NA	NA	NA	NA	No	NA
	65510-44-3	**PCB-123**	37	34,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	34,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	--	PCB-128/166	27	510,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	510,000	NA	NA	NA	NA	No	NA
	--	PCB-129/138/163	28	4,600,000	PG/L	LDCA-MW11-0314	12/15	19 - 21	4,600,000	NA	NA	NA	NA	No	NA
	52663-66-8	PCB-130	25	220,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	220,000	NA	NA	NA	NA	No	NA
	61798-70-7	PCB-131	41	38,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	38,000	NA	NA	NA	NA	No	NA
	38380-05-1	PCB-132	22	1,300,000	PG/L	LDCA-MW11-0314	10/15	19 - 21	1,300,000	NA	NA	NA	NA	No	NA
	35694-04-3	PCB-133	37	69,000	PG/L	LDCA-MW11-0314	4/15	19 - 21	69,000	NA	NA	NA	NA	No	NA
	--	PCB-134/143	22	190,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	190,000	NA	NA	NA	NA	No	NA
	--	PCB-135/151/154	20	2,200,000	PG/L	LDCA-MW11-0314	12/15	19 - 21	2,200,000	NA	NA	NA	NA	No	NA
	38411-22-2	PCB-136	30	770,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	770,000	NA	NA	NA	NA	No	NA
	35694-06-5	PCB-137	290	110,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	110,000	NA	NA	NA	NA	No	NA
	--	PCB-139/140	180	54,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	54,000	NA	NA	NA	NA	No	NA
	52712-04-6	PCB-141	36	1,100,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	1,100,000	NA	NA	NA	NA	No	NA
	68194-14-9	PCB-144	25	280,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	280,000	NA	NA	NA	NA	No	NA
	51908-16-8	PCB-146	22	810,000	PG/L	LDCA-MW11-0314	10/15	19 - 21	810,000	NA	NA	NA	NA	No	NA
	--	PCB-147/149	53	4,600,000	PG/L	LDCA-MW11-0314	12/15	19 - 21	4,600,000	NA	NA	NA	NA	No	NA
	74472-41-6	PCB-148	23	600	PG/L	LDCA-MW12-0314	3/15	19 - 15000	600	NA	NA	NA	NA	No	NA
	2050-68-2	PCB-15	22	4,800,000	PG/L	LDCA-MW11-0314	14/15	21 - 21	4,800,000	NA	NA	NA	NA	No	NA
	68194-08-1	PCB-150	120	20,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	20,000	NA	NA	NA	NA	No	NA
	68194-09-2	PCB-152	96	450	PG/L	LDCA-MW12-0314	2/15	19 - 15000	450	NA	NA	NA	NA	No	NA
	--	PCB-153/168	55	5,000,000	PG/L	LDCA-MW11-0314	12/15	19 - 21	5,000,000	NA	NA	NA	NA	No	NA
	33979-03-2	PCB-155	200	200	PG/L	LDCA-MW12-0314	1/15	19 - 21	200	NA	NA	NA	NA	No	NA
	--	**PCB-156/157**	48	330,000	PG/L	LDCA-MW11-0314	4/15	39 - 43	330,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	74472-42-7	PCB-158	32	460,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	460,000	NA	NA	NA	NA	No	NA
	39635-35-3	PCB-159	170	110,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	110,000	NA	NA	NA	NA	No	NA
	38444-78-9	PCB-16	53	2,400,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	2,400,000	NA	NA	NA	NA	No	NA
	39635-34-2	PCB-162	22	22	PG/L	LDCA-MW04-0314	1/15	19 - 15000	22	NA	NA	NA	NA	No	NA
	74472-45-0	PCB-164	24	340,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	340,000	NA	NA	NA	NA	No	NA
	74472-46-1	PCB-165	92	92	PG/L	LDCA-MW12-0314	1/15	19 - 15000	92	NA	NA	NA	NA	No	NA
	52663-72-6	**PCB-167**	140	120,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	120,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	37680-66-3	PCB-17	39	5,300,000	PG/L	LDCA-MW11-0314	14/15	21 - 21	5,300,000	NA	NA	NA	NA	No	NA
	35065-30-6	PCB-170	38	1,800,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	1,800,000	NA	NA	NA	NA	No	NA
	--	PCB-171/173	23	640,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	640,000	NA	NA	NA	NA	No	NA
	52663-74-8	PCB-172	46	360,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	360,000	NA	NA	NA	NA	No	NA
	38411-25-5	PCB-174	38	2,500,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	2,500,000	NA	NA	NA	NA	No	NA
	40186-70-7	PCB-175	170	110,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	110,000	NA	NA	NA	NA	No	NA
	52663-65-7	PCB-176	37	340,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	340,000	NA	NA	NA	NA	No	NA
	52663-70-4	PCB-177	21	1,300,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	1,300,000	NA	NA	NA	NA	No	NA
	52663-67-9	PCB-178	23	530,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	530,000	NA	NA	NA	NA	No	NA
	52663-64-6	PCB-179	34	1,200,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	1,200,000	NA	NA	NA	NA	No	NA
	--	PCB-18/30	23	7,400,000	PG/L	LDCA-MW11-0314	15/15	--	7,400,000	NA	NA	NA	NA	No	NA
	--	PCB-180/193	23	4,800,000	PG/L	LDCA-MW11-0314	11/15	19 - 21	4,800,000	NA	NA	NA	NA	No	NA
	74472-47-2	PCB-181	38	87	PG/L	LDCA-MW12-0314	2/15	19 - 15000	87	NA	NA	NA	NA	No	NA
	60145-23-5	PCB-182	42	80	PG/L	LDCA-MW12-0314	2/15	19 - 15000	80	NA	NA	NA	NA	No	NA
	--	PCB-183/185	56	1,800,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	1,800,000	NA	NA	NA	NA	No	NA
	52663-68-0	PCB-187	29 J	3,200,000	PG/L	LDCA-MW11-0314	11/15	19 - 21	3,200,000	NA	NA	NA	NA	No	NA

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 1	--	PCB-188	28	86	PG/L	LDCA-MW12-0314	2/15	19 - 15000	86	NA	NA	NA	NA	No	NA
	39635-31-9	**PCB-189**	97	64,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	64,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	38444-73-4	PCB-19	26	2,000,000	PG/L	LDCA-MW11-0314	14/15	22 - 22	2,000,000	NA	NA	NA	NA	No	NA
	41411-64-7	PCB-190	38	410,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	410,000	NA	NA	NA	NA	No	NA
	74472-50-7	PCB-191	130	95,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	95,000	NA	NA	NA	NA	No	NA
	35694-08-7	PCB-194	31	1,200,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	1,200,000	NA	NA	NA	NA	No	NA
	52663-78-2	PCB-195	22	480,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	480,000	NA	NA	NA	NA	No	NA
	42740-50-1	PCB-196	22	770,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	770,000	NA	NA	NA	NA	No	NA
	--	PCB-197/200	30 J	250,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	250,000	NA	NA	NA	NA	No	NA
	--	PCB-198/199	35	1,600,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	1,600,000	NA	NA	NA	NA	No	NA
	2051-61-8	PCB-2	23	170,000	PG/L	LDCA-MW11-0314	10/15	20 - 21	170,000	NA	NA	NA	NA	No	NA
	--	PCB-20/28	95	7,200,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	7,200,000	NA	NA	NA	NA	No	NA
	40186-71-8	PCB-201	22	210,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	210,000	NA	NA	NA	NA	No	NA
	2136-99-4	PCB-202	31	290,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	290,000	NA	NA	NA	NA	No	NA
	52663-76-0	PCB-203	22	980,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	980,000	NA	NA	NA	NA	No	NA
	74472-53-0	PCB-205	120	65,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	65,000	NA	NA	NA	NA	No	NA
	40186-72-9	PCB-206	46	510,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	510,000	NA	NA	NA	NA	No	NA
	52663-79-3	PCB-207	140	60,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	60,000	NA	NA	NA	NA	No	NA
	52663-77-1	PCB-208	26	150,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	150,000	NA	NA	NA	NA	No	NA
	2051-24-3	PCB-209	20	390,000	PG/L	LDCA-MW11-0314	7/15	19 - 21	390,000	NA	NA	NA	NA	No	NA
	--	PCB-21/33	42	2,300,000	PG/L	LDCA-MW11-0314	11/15	20 - 21	2,300,000	NA	NA	NA	NA	No	NA
	38444-85-8	PCB-22	31	2,100,000	PG/L	LDCA-MW11-0314	11/15	20 - 21	2,100,000	NA	NA	NA	NA	No	NA
	55702-45-9	PCB-24	53	87,000	PG/L	LDCA-MW11-0314	6/15	20 - 520	87,000	NA	NA	NA	NA	No	NA
	55712-37-3	PCB-25	34	1,400,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	1,400,000	NA	NA	NA	NA	No	NA
	--	PCB-26/29	23	2,200,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	2,200,000	NA	NA	NA	NA	No	NA
	38444-76-7	PCB-27	21	1,300,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	1,300,000	NA	NA	NA	NA	No	NA
	2051-62-9	PCB-3	65	960,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	960,000	NA	NA	NA	NA	No	NA
	16606-02-3	PCB-31	91	6,700,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	6,700,000	NA	NA	NA	NA	No	NA
	38444-77-8	PCB-32	21	3,200,000	PG/L	LDCA-MW11-0314	14/15	21	3,200,000	NA	NA	NA	NA	No	NA
	--	PCB-34	22	88,000	PG/L	LDCA-MW11-0314	6/15	20 - 520	88,000	NA	NA	NA	NA	No	NA
	37680-69-6	PCB-35	24	40,000	PG/L	LDCA-MW11-0314	3/15	19 - 520	40,000	NA	NA	NA	NA	No	NA
	38444-87-0	PCB-36	31	31	PG/L	LDCA-MW04-0314	1/15	19 - 15000	31	NA	NA	NA	NA	No	NA
	38444-90-5	PCB-37	27	700,000	PG/L	LDCA-MW11-0314	7/15	20	700,000	NA	NA	NA	NA	No	NA
	38444-88-1	PCB-39	27	58,000	PG/L	LDCA-MW11-0314	3/15	19 - 520	58,000	NA	NA	NA	NA	No	NA
	--	PCB-4	80	6,400,000	PG/L	LDCA-MW11-0314	15/15	--	6,400,000	NA	NA	NA	NA	No	NA
	--	PCB-41/40/71	34	3,100,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	3,100,000	NA	NA	NA	NA	No	NA
	36559-22-5	PCB-42	38	1,500,000	PG/L	LDCA-MW11-0314	11/15	20 - 21	1,500,000	NA	NA	NA	NA	No	NA
	70362-46-8	PCB-43	23	240,000	PG/L	LDCA-MW11-0314	6/15	20 - 21	240,000	NA	NA	NA	NA	No	NA
	--	PCB-44/47/65	20	6,800,000	PG/L	LDCA-MW11-0314	15/15	--	6,800,000	NA	NA	NA	NA	No	NA
	--	PCB-45/51	32	2,200,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	2,200,000	NA	NA	NA	NA	No	NA
	41464-47-5	PCB-46	41	580,000	PG/L	LDCA-MW11-0314	11/15	20 - 21	580,000	NA	NA	NA	NA	No	NA
	70362-47-9	PCB-48	33	910,000	PG/L	LDCA-MW11-0314	8/15	20 - 21	910,000	NA	NA	NA	NA	No	NA
	--	PCB-49/69	43	4,800,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	4,800,000	NA	NA	NA	NA	No	NA
	16605-91-7	PCB-5	150	80,000	PG/L	LDCA-MW11-0314	6/15	20 - 520	80,000	NA	NA	NA	NA	No	NA
	--	PCB-50/53	22	2,200,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	2,200,000	NA	NA	NA	NA	No	NA
	35693-99-3	PCB-52	63	5,500,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	5,500,000	NA	NA	NA	NA	No	NA
	15968-05-5	PCB-54	37	300,000	PG/L	LDCA-MW11-0314	10/15	19 - 21	300,000	NA	NA	NA	NA	No	NA
	74338-24-2	PCB-55	24	24	PG/L	LDCA-MW04-0314	1/15	19 - 15000	24	NA	NA	NA	NA	No	NA
	41464-43-1	PCB-56	22	1,200,000	PG/L	LDCA-MW11-0314	9/15	20 - 21	1,200,000	NA	NA	NA	NA	No	NA
	70424-67-8	PCB-57	23	27,000	PG/L	LDCA-MW11-0314	4/15	19 - 21	27,000	NA	NA	NA	NA	No	NA
	41464-49-7	PCB-58	30	24,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	24,000	NA	NA	NA	NA	No	NA
	--	PCB-59/62/75	23	490,000	PG/L	LDCA-MW11-0314	9/15	20 - 21	490,000	NA	NA	NA	NA	No	NA
	25569-80-6	PCB-6	35	3,700,000	PG/L	LDCA-MW11-0314	14/15	21	3,700,000	NA	NA	NA	NA	No	NA
	33025-41-1	PCB-60	93	540,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	540,000	NA	NA	NA	NA	No	NA
	--	PCB-61/70/74/76	55	5,300,000	PG/L	LDCA-MW11-0314	12/15	20	5,300,000	NA	NA	NA	NA	No	NA
	74472-34-7	PCB-63	21	140,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	140,000	NA	NA	NA	NA	No	NA
	52663-58-8	PCB-64	20	1,800,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	1,800,000	NA	NA	NA	NA	No	NA
	32598-10-0	PCB-66	26	3,000,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	3,000,000	NA	NA	NA	NA	No	NA
	73575-53-8	PCB-67	32 Z	110,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	110,000	NA	NA	NA	NA	No	NA
	73575-52-7	PCB-68	21	150,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	150,000	NA	NA	NA	NA	No	NA
	33284-50-3	PCB-7	65	170,000	PG/L	LDCA-MW11-0314	9/15	20 - 21	170,000	NA	NA	NA	NA	No	NA
	41464-42-0	PCB-72	20	95,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	95,000	NA	NA	NA	NA	No	NA
	74338-23-1	PCB-73	32	5,800	PG/L	LDCA-MW12-0314	5/15	19 - 15000	5,800	NA	NA	NA	NA	No	NA

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 1	32598-13-3	**PCB-77**	38	180,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	180,000	NA	**6,000 C**	NA	NA	**Yes**	ASL
	41464-48-6	PCB-79	53	40,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	40,000	NA	NA	NA	NA	No	NA
	34883-43-7	PCB-8	30	8,100,000	PG/L	LDCA-MW11-0314	15/15	--	8,100,000	NA	NA	NA	NA	No	NA
	70362-50-4	**PCB-81**	6000	6,000	PG/L	LDCA-MW11-0314	1/15	19 - 21	6,000	NA	**400 C**	NA	NA	**Yes**	ASL
	52663-62-4	PCB-82	37	280,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	280,000	NA	NA	NA	NA	No	NA
	--	PCB-83/99	21	1,900,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	1,900,000	NA	NA	NA	NA	No	NA
	52663-60-2	PCB-84	21	850,000	PG/L	LDCA-MW11-0314	10/15	19 - 21	850,000	NA	NA	NA	NA	No	NA
	--	PCB-85/116/117	37	440,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	440,000	NA	NA	NA	NA	No	NA
	--	PCB-86/87/97/109/119/125	21	1,800,000	PG/L	LDCA-MW11-0314	11/15	19 - 21	1,800,000	NA	NA	NA	NA	No	NA
	--	PCB-88/91	65	610,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	610,000	NA	NA	NA	NA	No	NA
	73575-57-2	PCB-89	26	46,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	46,000	NA	NA	NA	NA	No	NA
	34883-39-1	PCB-9	26	290,000	PG/L	LDCA-MW11-0314	11/15	20	290,000	NA	NA	NA	NA	No	NA
	--	PCB-90/101/113	26	3,300,000	PG/L	LDCA-MW11-0314	14/15	21	3,300,000	NA	NA	NA	NA	No	NA
	52663-61-3	PCB-92	41	680,000	PG/L	LDCA-MW11-0314	9/15	19 - 21	680,000	NA	NA	NA	NA	No	NA
	--	PCB-93/95/98/100/102	30	3,400,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	3,400,000	NA	NA	NA	NA	No	NA
	73575-55-0	PCB-94	21	83,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	83,000	NA	NA	NA	NA	No	NA
	73575-54-9	PCB-96	22	65,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	65,000	NA	NA	NA	NA	No	NA
	--	**DIOXIN-LIKE PCBS TEQ**	0.0008	109	PG/L	LDCA-MW11-0314	10/15	19 - 21	109	NA	**0.12 C[16]**	NA	NA	**Yes**	ASL
	--	**NONDIOXIN-LIKE PCBS**	318	180,194,000	PG/L	LDCA-MW11-0314	15/15	--	180,194,000	NA	**44,000 C[17]**	NA	NA	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for pyrene.
8 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
9 - Value is for hexavalent chromium.
10 - Value is for methyl mercury.
11 - Value is for chlordane.
12 - Value is for alpha-BHC.
13 - Value is for endosulfan.
14 - Value is for endrin.
15 - Value is for 1,4-dichlorobenzene.
16 - Value is for 2,3,7,8-TCDD.
17 - Value is for polychlorinated biphenyls (low risk).

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:

LDCA-MW01D-0314	LDCA-MW11-0314
LDCA-MW01S-0314	LDCA-MW12-0314
LDCA-MW02-0314	LDCA-MW20D-0314-DUP
LDCA-MW03-0314	LDCA-MW20D-0314
LDCA-MW04-0314	LDCA-MW20I-0314
LDCA-MW05D-0314	LDCA-MW20S-0314
LDCA-MW05S-0314	LDCA-MW34D-0314
LDCA-MW06-0314	LDCA-MW34S-0314
LDCA-MW07D-0314	LDCA-MW36-0314
LDCA-MW07S-0314	LDCA-MW37-0314
LDCA-MW09-0314	

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 2	**SEMIVOLATILE ORGANICS - SIM**														
	123-91-1	**1,4-DIOXANE**	1.7 J	220 J	UG/L	LDCA-MW01D-1014	19/20	0.5 - 0.5	220	NA	**0.46 C**	NA	NA	**Yes**	ASL
	91-57-6	2-METHYLNAPHTHALENE	0.011 J	0.6	UG/L	LDCA-MW11-1014	14/20	0.091 - 0.1	0.6	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.0055 J	12 J	UG/L	LDCA-MW37-1014	14/20	0.091 - 0.1	12	NA	53 N	NA	NA	No	BSL
	208-96-8	ACENAPHTHYLENE	0.0085 J	0.34	UG/L	LDCA-MW06-1014	17/20	0.1 - 0.1	0.34	NA	53 N[7]	NA	NA	No	NA
	120-12-7	ANTHRACENE	0.048 J	1.1	UG/L	LDCA-MW37-1014	13/20	0.1 - 0.1	1.1	NA	180 N	NA	NA	No	BSL
	56-55-3	**BENZO(A)ANTHRACENE**	0.015 J	0.23	UG/L	LDCA-MW11-1014	8/20	0.091 - 0.1	0.23	NA	**0.012 C**	NA	NA	**Yes**	ASL
	50-32-8	**BENZO(A)PYRENE**	0.022 J	0.12 J	UG/L	LDCA-MW11-1014	2/20	0.091 - 0.1	0.12	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	205-99-2	**BENZO(B)FLUORANTHENE**	0.0064 J	0.17 J	UG/L	LDCA-MW11-1014	4/20	0.091 - 0.1	0.17	NA	**0.034 C**	NA	NA	**Yes**	ASL
	191-24-2	BENZO(G,H,I)PERYLENE	0.0057 J	0.044 J	UG/L	LDCA-MW20I-1014	3/20	0.091 - 0.1	0.044	NA	12 N[8]	NA	NA	No	NA
	207-08-9	BENZO(K)FLUORANTHENE	0.0056 J	0.089 J	UG/L	LDCA-MW11-1014	4/20	0.091 - 0.1	0.089	NA	0.34 C	NA	NA	No	BSL
	218-01-9	CHRYSENE	0.0061 J	0.21	UG/L	LDCA-MW11-1014	4/20	0.091 - 0.1	0.21	NA	3.4 C	NA	NA	No	BSL
	53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.024 J	0.024 J	UG/L	LDCA-MW20I-1014	1/20	0.091 - 0.1	0.024	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	206-44-0	FLUORANTHENE	0.0066 J	1.3	UG/L	LDCA-MW11-1014	15/20	0.091 - 0.1	1.3	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.13	5.1	UG/L	LDCA-MW37-1014	11/20	0.091 - 0.1	5.1	NA	29 N	NA	NA	No	BSL
	193-39-5	INDENO(1,2,3-CD)PYRENE	0.013 J	0.028 J	UG/L	LDCA-MW20I-1014	2/20	0.091 - 0.1	0.028	NA	0.034 C	NA	NA	No	BSL
	91-20-3	**NAPHTHALENE**	0.019 J	0.47	UG/L	LDCA-MW20S-1014	10/20	0.1 - 0.1	0.47	NA	**0.17 C**	NA	NA	**Yes**	ASL
	85-01-8	PHENANTHRENE	0.0064 J	3.3	UG/L	LDCA-MW11-1014	12/20	0.091 - 0.1	3.3	NA	12 N[8]	NA	NA	No	NA
	129-00-0	PYRENE	0.019 J	0.66	UG/L	LDCA-MW11-1014	6/20	0.091 - 0.1	0.66	NA	12 N	NA	NA	No	BSL
	DIOXIN/FURANS														
	3268-87-9	**1,2,3,4,6,7,8,9-OCDD**	103	576,000	PG/L	LDCA-MW11-1014	10/19	0.551 - 2.22	576,000	NA	**400 C[9]**	NA	NA	**Yes**	NA
	39001-02-0	**1,2,3,4,6,7,8,9-OCDF**	0.916 Z	3,240	PG/L	LDCA-MW11-1014	5/19	0.501 - 3.06	3,240	NA	**400 C[9]**	NA	NA	**Yes**	NA
	35822-46-9	**1,2,3,4,6,7,8-HPCDD**	24.9 J	94,400	PG/L	LDCA-MW11-1014	3/19	0.706 - 4.05	94,400	NA	**12 C[9]**	NA	NA	**Yes**	NA
	67562-39-4	**1,2,3,4,6,7,8-HPCDF**	2.52 Z	1,200	PG/L	LDCA-MW11-1014	2/19	0.281 - 0.994	1,200	NA	**12 C[9]**	NA	NA	**Yes**	NA
	39227-28-6	**1,2,3,4,7,8-HXCDD**	0.716 Z	248	PG/L	LDCA-MW11-1014	5/19	0.255 - 2.51	248	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	70648-26-9	**1,2,3,4,7,8-HXCDF**	0.441 Z	3.25 Z	PG/L	LDCA-MW12-1014	8/19	0.233 - 18.6	3.25	NA	**1.2 C[9]**	NA	NA	**Yes**	NA
	57653-85-7	**1,2,3,6,7,8-HXCDD**	0.915 Z	1,920	PG/L	LDCA-MW11-1014	5/19	0.227 - 2.28	1,920	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	57117-44-9	**1,2,3,6,7,8-HXCDF**	0.366 Z	1.62 J	PG/L	LDCA-MW12-1014	6/19	0.208 - 16.4	1.62	NA	**1.2 C[9]**	NA	NA	**Yes**	NA
	19408-74-3	**1,2,3,7,8,9-HXCDD**	0.427 J	2,490	PG/L	LDCA-MW11-1014	7/19	0.211 - 1.99	2,490	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	72918-21-9	**1,2,3,7,8,9-HXCDF**	1.07 Z	1.4 J	PG/L	LDCA-MW03-1014	3/19	0.264 - 22.7	1.4	NA	**1.2 C[9]**	NA	NA	**Yes**	NA
	60851-34-5	**2,3,4,6,7,8-HXCDF**	0.724 Z	1.46 Z	PG/L	LDCA-MW12-1014	4/19	0.199 - 17	1.46	NA	**1.2 C[9]**	NA	NA	**Yes**	NA
	57117-31-4	**2,3,4,7,8-PECDF**	0.894 J	0.894 J	PG/L	LDCA-MW12-1014	1/19	0.22 - 17	0.894	NA	**0.4 C[9]**	NA	NA	**Yes**	NA
	1746-01-6	**2,3,7,8-TCDD**	1.22 Z	49.1	PG/L	LDCA-MW11-1014	2/19	0.354 - 3.27	49.1	NA	**0.12 C**	NA	NA	**Yes**	ASL
	51207-31-9	**2,3,7,8-TCDF**	100 J	100 J	PG/L	LDCA-MW11-1014	1/19	0.171 - 3.68	100	NA	**1.2 C[9]**	NA	NA	**Yes**	NA
	- -	**2,3,7,8-TCDD TEQ**	0.039	1,655	PG/L	LDCA-MW11-1014	16/19	0.364 - 0.811	1,655	NA	**0.12 C**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	**ALUMINUM**	29.3	24,600	UG/L	LDCA-MW20D-1014	8/20	20 - 1000	24,600	NA	**2,000 N**	NA	NA	**Yes**	ASL
	7440-36-0	**ANTIMONY**	0.19 J	12.8	UG/L	LDCA-MW11-1014	3/20	2 - 60	13	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.91	72.1	UG/L	LDCA-MW01S-1014	17/20	10 - 10	72.1	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	70.9 J	2,560	UG/L	LDCA-MW11-1014	20/20	--	2,560	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	**BERYLLIUM**	0.49 J	8	UG/L	LDCA-MW20D-1014-D	3/20	1 - 5	8	NA	**2.5 N**	NA	NA	**Yes**	ASL
	7440-42-8	**BORON**	20.5 J-	3,920	UG/L	LDCA-MW05S-1014	17/20	100 - 100	3,920	NA	**400 N**	NA	NA	**Yes**	ASL
	7440-43-9	**CADMIUM**	0.024 J	8.4	UG/L	LDCA-MW11-1014	3/20	1 - 5	8.4	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	20,300	183,000	UG/L	LDCA-MW34S-1014	20/20	--	183,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.51 J	183	UG/L	LDCA-MW11-1014	18/20	2 - 2	183	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.14 J	21.7	UG/L	LDCA-MW11-1014	11/20	1 - 50	21.7	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	**COPPER**	0.33 J	245	UG/L	LDCA-MW11-1014	11/20	2 - 25	245	NA	**80 N**	NA	NA	**Yes**	ASL
	57-12-5	**CYANIDE**	1.6 J-	227	UG/L	LDCA-MW05D-1014	10/20	10 - 10	227	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	4,980	96,100	UG/L	LDCA-MW05D-1014	19/20	200 - 200	96,100	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	1.5	2,330	UG/L	LDCA-MW11-1014	6/20	1 - 10	2,330	NA	**15 N**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	4,820 J	191,000	UG/L	LDCA-MW03-1014	19/20	500 - 500	191,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	4.3	12,700	UG/L	LDCA-MW34D-1014	20/20	--	12,700	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	**MERCURY**	0.016 J-	3.7	UG/L	LDCA-MW11-1014	14/20	0.2 - 0.2	3.7	NA	**0.2 N[11]**	NA	NA	**Yes**	ASL
	7440-02-0	**NICKEL**	0.64 J	152	UG/L	LDCA-MW11-1014	20/20	--	152	NA	**39 N**	NA	NA	**Yes**	ASL
	7440-09-7	POTASSIUM	3,540	100,000	UG/L	LDCA-MW06-1014	19/20	25000 - 25000	100,000	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.47 J	4.4 J	UG/L	LDCA-MW05D-1014	9/20	5 - 35	4.4	NA	10 N	NA	NA	No	BSL
	7440-22-4	**SILVER**	0.011 J	10.2	UG/L	LDCA-MW11-1014	2/20	1 - 10	10.2	NA	**9.4 N**	NA	NA	**Yes**	ASL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 2	7440-23-5	SODIUM	5,260	2,820,000	UG/L	LDCA-MW05D-1014	20/20	--	2,820,000	NA	NA	NA	NA	No	NUT
	7440-28-0	**THALLIUM**	2.9 J	2.9 J	UG/L	LDCA-MW20D-1014	1/20	1 - 25	2.9	NA	**0.02 N**	NA	NA	**Yes**	ASL
	7440-62-2	**VANADIUM**	0.36 J-	186	UG/L	LDCA-MW11-1014	20/20	--	186	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	**ZINC**	2.3	2,720 J	UG/L	LDCA-MW11-1014	12/20	2 - 60	2,720	NA	**600 N**	NA	NA	**Yes**	ASL
	FILTERED METALS														
	7429-90-5	ALUMINUM	13 J	90.1	UG/L	LDCA-MW20S-1014	2/20	20 - 200	90.1	NA	2000 N	NA	NA	No	BSL
	7440-36-0	**ANTIMONY**	3.6 J	3.6 J	UG/L	LDCA-MW05D-1014	1/20	2 - 60	4	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	1.1	34.9	UG/L	LDCA-MW07S-1014	20/20	--	34.9	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	44.3	1,800	UG/L	LDCA-MW04-1014	19/20	200 - 200	1,800	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	2,450	230,000	UG/L	LDCA-MW02-1014	20/20	--	230,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.64 J	18.8	UG/L	LDCA-MW06-1014	15/20	2 - 10	18.8	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.038 J	15.7 J	UG/L	LDCA-MW01D-1014	14/20	1 - 50	15.7	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.19 J	0.59 J-	UG/L	LDCA-MW34S-1014	5/20	2 - 25	0.59	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	2,470	102,000	UG/L	LDCA-MW05D-1014	19/20	200 - 200	102,000	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.22 J	1.2	UG/L	LDCA-MW11-1014	2/20	1 - 10	1.2	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	5,060	158,000	UG/L	LDCA-MW05S-1014	19/20	500 - 500	158,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	0.24 J	13,600	UG/L	LDCA-MW34D-1014	20/20	--	13,600	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	**MERCURY**	0.016 J	0.32	UG/L	LDCA-MW04-1014	19/20	0.2 - 0.2	0.32	NA	**0.2 N[11]**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	0.73 J	25 J	UG/L	LDCA-MW01D-1014	17/20	40 - 40	25	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	3,390	87,000	UG/L	LDCA-MW06-1014	20/20	--	87,000	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.42 J	0.94 J	UG/L	LDCA-MW02-1014	6/20	5 - 35	0.94	NA	10 N	NA	NA	No	BSL
	7440-23-5	SODIUM	4,570	540,000	UG/L	LDCA-MW06-1014	20/20	--	540,000	NA	NA	NA	NA	No	NUT
	7440-62-2	**VANADIUM**	0.27 J-	12.5	UG/L	LDCA-MW37-1014	18/20	2.6 - 50	12.5	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	ZINC	2	5.3 J	UG/L	LDCA-MW01D-1014, LDCA-MW34S-1014	11/20	2 - 60	5.3	NA	600 N	NA	NA	No	BSL
	PERFLUORINATED COMPOUNDS														
	335-67-1	**PENTADECAFLUOROOCTANOIC ACID**	0.026 J	0.56	UG/L	LDCA-MW05S-1014	19/20	0.02 - 0.02	0.56	NA	**0.04 N**	NA	NA	**Yes**	ASL
	375-85-9	PERFLUOROHEPTANOIC ACID	0.011 J	0.27 J	UG/L	LDCA-MW04-1014	18/20	0.01 - 0.1	0.27	NA	NA	NA	NA	No	NTX
	375-95-1	PERFLUORONONANOIC ACID	0.011 J	0.16 J	UG/L	LDCA-MW01S-1014	7/20	0.02 - 0.21	0.16	NA	NA	NA	NA	No	NTX
	355-46-4	PERFLUOROHEXANE SULFONIC ACID	0.022 J	0.2 J	UG/L	LDCA-MW04-1014	10/20	0.03 - 0.32	0.2	NA	NA	NA	NA	No	NTX
	1763-23-1	**PERFLUOROOCTANE SULFONIC ACID**	0.02 J	1.2	UG/L	LDCA-MW01S-1014	14/20	0.04 - 0.42	1.2	NA	**0.04 N**	NA	NA	**Yes**	ASL
	PESTICIDES														
	72-54-8	4,4'-DDD	0.00025 J	0.01 J	UG/L	LDCA-MW01S-1014	16/20	0.0097 - 0.01	0.01	NA	0.032 C	NA	NA	No	BSL
	72-55-9	**4,4'-DDE**	0.00017 J	0.063 J	UG/L	LDCA-MW11-1014	20/20	--	0.063	NA	**0.046 C**	NA	NA	**Yes**	ASL
	50-29-3	4,4'-DDT	0.00028 J	0.089 J	UG/L	LDCA-MW11-1014	6/20	0.0091 - 0.01	0.089	NA	0.23 C	NA	NA	No	BSL
	309-00-2	**ALDRIN**	0.00018 J	0.0047 J	UG/L	LDCA-MW34S-1014	18/20	0.0049 - 0.005	0.0047	NA	**0.00092 C**	NA	NA	**Yes**	ASL
	319-84-6	ALPHA-BHC	0.0001 J	0.0037 J	UG/L	LDCA-MW36-1014	20/20	--	0.0037	NA	0.0072 C	NA	NA	No	BSL
	5103-71-9	ALPHA-CHLORDANE	0.0001 J	0.02 J	UG/L	LDCA-MW04-1014	16/20	0.005 - 0.005	0.02	NA	0.045 C[12]	NA	NA	No	BSL
	319-85-7	BETA-BHC	0.0007 J,	0.012 J	UG/L	LDCA-MW37-1014	10/20	0.00093 - 0.001	0.012	NA	0.025 C	NA	NA	No	BSL
	319-86-8	**DELTA-BHC**	0.00015 J	0.016 J	UG/L	LDCA-MW11-1014	17/20	0.005 - 0.005	0.016	NA	**0.0072 C[13]**	NA	NA	**Yes**	ASL
	60-57-1	**DIELDRIN**	0.0001 J	0.053 J	UG/L	LDCA-MW11-1014	14/20	0.0019 - 0.002	0.053	NA	**0.0018 C**	NA	NA	**Yes**	ASL
	959-98-8	ENDOSULFAN I	0.00017 J	0.005 J	UG/L	LDCA-MW05D-1014	17/20	0.0045 - 0.005	0.005	NA	10 N[14]	NA	NA	No	BSL
	33213-65-9	ENDOSULFAN II	0.00026 J	0.0043 J	UG/L	LDCA-MW12-1014	8/20	0.0096 - 0.01	0.0043	NA	10 N	NA	NA	No	BSL
	1031-07-8	ENDOSULFAN SULFATE	0.00017 J	0.0017 J	UG/L	LDCA-MW37-1014	11/20	0.0091 - 0.01	0.0017	NA	10 N[14]	NA	NA	No	BSL
	72-20-8	ENDRIN	0.00016 J	0.0026 J	UG/L	LDCA-MW11-1014	13/20	0.0093 - 0.01	0.0026	NA	0.23 N	NA	NA	No	BSL
	7421-93-4	ENDRIN ALDEHYDE	0.00019 J	0.0028 J	UG/L	LDCA-MW07D-1014	10/20	0.0091 - 0.01	0.0028	NA	0.23 N[15]	NA	NA	No	BSL
	53494-70-5	ENDRIN KETONE	0.0001 J	0.021 J	UG/L	LDCA-MW11-1014	13/20	0.0091 - 0.01	0.021	NA	0.23 N[15]	NA	NA	No	BSL
	58-89-9	GAMMA-BHC (LINDANE)	0.00015 J	0.013 J	UG/L	LDCA-MW11-1014	19/20	0.0045 - 0.0045	0.013	NA	0.042 C	NA	NA	No	BSL
	5103-74-2	GAMMA-CHLORDANE	0.0002 J	0.014 J	UG/L	LDCA-MW11-1014	16/20	0.0049 - 0.005	0.014	NA	0.045 C[12]	NA	NA	No	BSL
	76-44-8	**HEPTACHLOR**	0.00023 J	0.01 J	UG/L	LDCA-MW06-1014	18/20	0.00097 - 0.001	0.01	NA	**0.0014 C**	NA	NA	**Yes**	ASL
	1024-57-3	**HEPTACHLOR EPOXIDE**	0.00018 J	0.0023 J	UG/L	LDCA-MW11-1014	12/20	0.0018 - 0.002	0.0023	NA	**0.0014 C**	NA	NA	**Yes**	ASL
	72-43-5	METHOXYCHLOR	0.0008 J	0.007 J	UG/L	LDCA-MW07D-1014	12/20	0.045 - 0.05	0.007	NA	3.7 N	NA	NA	No	BSL
	SEMIVOLATILES														
	105-67-9	2,4-DIMETHYLPHENOL	2.7 J	2.7 J	UG/L	LDCA-MW20S-1014	1/20	4.5 - 5	3	NA	36 N	NA	NA	No	BSL
	91-57-6	2-METHYLNAPHTHALENE	0.48 J	0.48 J	UG/L	LDCA-MW05S-1014	1/20	4.5 - 5	2.5	NA	3.6 N	NA	NA	No	BSL
	95-48-7	2-METHYLPHENOL	0.35 J	0.35 J	UG/L	LDCA-MW20S-1014	1/20	4.5 - 5	0.35	NA	93 N	NA	NA	No	BSL
	106-44-5	4-METHYLPHENOL	0.3 J	12	UG/L	LDCA-MW20S-1014	3/20	4.5 - 5	12	NA	190 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.7 J	11	UG/L	LDCA-MW37-1014	8/20	1.5 - 5	15	NA	53 N	NA	NA	No	BSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 2	98-86-2	ACETOPHENONE	0.36 J	0.67 J	UG/L	LDCA-MW20S-1014	2/20	4.5 - 5	4.2	NA	190 N	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.44 J	1.1 J	UG/L	LDCA-MW12-1014, LDCA-MW37-1014	6/20	0.44 - 5	2.8	NA	180 N	NA	NA	No	BSL
	100-52-7	BENZALDEHYDE	0.47 J	0.67 J	UG/L	LDCA-MW12-1014	2/20	4.5 - 5	1.2	NA	19 N	NA	NA	No	BSL
	117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	0.28 J	5.7	UG/L	LDCA-MW20D-1014-D	2/20	4.5 - 5	48	NA	**5.6 C**	NA	NA	**Yes**	ASL
	132-64-9	**DIBENZOFURAN**	0.41 J	5.1	UG/L	LDCA-MW37-1014	3/20	4.5 - 5	7	NA	**0.79 N**	NA	NA	**Yes**	ASL
	206-44-0	FLUORANTHENE	0.3 J	0.59 J	UG/L	LDCA-MW12-1014	2/20	4.5 - 5	12	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.35 J	5	UG/L	LDCA-MW37-1014	6/20	4.5 - 5	7	NA	29 N	NA	NA	No	BSL
	91-20-3	**NAPHTHALENE**	0.45 J	0.45 J	UG/L	LDCA-MW20S-1014	1/20	4.5 - 5	3	NA	**0.17 C**	NA	NA	**Yes**	ASL
	86-30-6	N-NITROSODIPHENYLAMINE	0.36 J	0.45 J	UG/L	LDCA-MW04-1014	3/20	4.5 - 5	3	NA	12 C	NA	NA	No	BSL
	85-01-8	**PHENANTHRENE**	1.3 J,	2.5 J	UG/L	LDCA-MW05S-1014	3/20	4.5 - 5	22	NA	**12 N[8]**	NA	NA	**Yes**	ASL
	108-95-2	PHENOL	61	61	UG/L	LDCA-MW20S-1014	1/20	4.5 - 5	61	NA	580 N	NA	NA	No	BSL
	129-00-0	PYRENE	0.49 J	0.49 J	UG/L	LDCA-MW12-1014	1/20	4.5 - 5	7.1	NA	12 N	NA	NA	No	BSL
	VOLATILES														
	75-35-4	1,1-DICHLOROETHENE	0.092 J	0.092 J	UG/L	LDCA-MW01D-1014	1/20	0.5 - 0.5	0.092	NA	28 N	NA	NA	No	BSL
	95-50-1	1,2-DICHLOROBENZENE	0.14 J	0.69	UG/L	LDCA-MW07D-1014	8/20	0.5 - 0.5	0.69	NA	30 N	NA	NA	No	BSL
	541-73-1	**1,3-DICHLOROBENZENE**	0.2 J	1	UG/L	LDCA-MW12-1014	5/20	0.5 - 0.5	1	NA	**0.48 C[16]**	NA	NA	**Yes**	ASL
	106-46-7	**1,4-DICHLOROBENZENE**	0.11 J	4.8	UG/L	LDCA-MW34S-1014	11/20	0.5 - 0.5	4.8	NA	**0.48 C**	NA	NA	**Yes**	ASL
	78-93-3	2-BUTANONE	2.9 J	6	UG/L	LDCA-MW20S-1014	2/20	5 - 5	6	NA	560 N	NA	NA	No	BSL
	67-64-1	ACETONE	4.9 J	47	UG/L	LDCA-MW20S-1014	8/20	5 - 5	47	NA	1400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.11 J	3	UG/L	LDCA-MW20S-1014	13/20	0.5 - 0.5	3	NA	**0.46 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.071 J	19	UG/L	LDCA-MW20S-1014	6/20	0.5 - 0.5	19	NA	81 N	NA	NA	No	BSL
	108-90-7	**CHLOROBENZENE**	0.24 J	93	UG/L	LDCA-MW12-1014	17/20	0.5 - 0.5	93	NA	**7.8 N**	NA	NA	**Yes**	ASL
	124-48-1	CHLORODIBROMOMETHANE	0.1 J	0.1 J	UG/L	LDCA-MW11-1014	1/20	0.5 - 0.5	0.1	NA	0.87 C	NA	NA	No	BSL
	156-59-2	CIS-1,2-DICHLOROETHENE	0.074 J	0.14 J	UG/L	LDCA-MW01D-1014	10/20	0.5 - 0.5	0.14	NA	3.6 N	NA	NA	No	BSL
	10061-01-5	CIS-1,3-DICHLOROPROPENE	0.23 J	0.23 J	UG/L	LDCA-MW11-1014	1/20	0.5 - 0.5	0.23	NA	0.47 C[17]	NA	NA	No	BSL
	110-82-7	CYCLOHEXANE	0.39 J	0.88	UG/L	LDCA-MW34S-1014	2/20	0.5 - 0.5	0.88	NA	1300 N	NA	NA	No	BSL
	100-41-4	ETHYLBENZENE	0.056 J	0.22 J	UG/L	LDCA-MW20S-1014	3/20	0.5 - 0.5	0.22	NA	1.5 C	NA	NA	No	BSL
	98-82-8	ISOPROPYLBENZENE	0.97 J	5 J	UG/L	LDCA-MW04-1014	6/20	0.5 - 0.5	5	NA	45 N	NA	NA	No	BSL
	--	M+P-XYLENES	0.16 J	0.36 J	UG/L	LDCA-MW11-1014	5/20	0.5 - 0.5	0.36	NA	19 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.077 J	0.54 J	UG/L	LDCA-MW11-1014	6/20	0.5 - 0.5	0.54	NA	NA	NA	NA	No	NA
	1634-04-4	METHYL TERT-BUTYL ETHER	0.061 J	3.8	UG/L	LDCA-MW37-1014	9/20	0.5 - 0.5	3.8	NA	14 C	NA	NA	No	BSL
	75-09-2	METHYLENE CHLORIDE	0.61	0.61	UG/L	LDCA-MW20S-1014	1/20	0.5 - 0.5	0.61	NA	11 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.14 J	0.39 J	UG/L	LDCA-MW11-1014	7/20	0.5 - 0.5	0.39	NA	19 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.062 J	0.31 J	UG/L	LDCA-MW20S-1014	13/20	0.5 - 0.5	0.31	NA	110 N	NA	NA	No	BSL
	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	140	480,000	PG/L	LDCA-MW11-1014	15/15	--	480,000	NA	NA	NA	NA	No	NA
	33146-45-1	PCB-10	110	48,000	PG/L	LDCA-MW11-1014	13/15	20 - 28	48,000	NA	NA	NA	NA	No	NA
	--	PCB-103	5.8 Z	8,700	PG/L	LDCA-MW12-1014	7/15	20 - 4400	8,700	NA	NA	NA	NA	No	NA
	--	PCB-104	6.6 J	6,000	PG/L	LDCA-MW12-1014	7/15	20 - 24	6,000	NA	NA	NA	NA	No	NA
	32598-14-4	**PCB-105**	4.6 Z	58,000	PG/L	LDCA-MW11-1014	7/15	20 - 230	58,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	--	PCB-107/124	5,200	5,200	PG/L	LDCA-MW11-1014	1/15	20 - 180	5,200	NA	NA	NA	NA	No	NA
	74472-35-8	PCB-109	14 J	12,000	PG/L	LDCA-MW11-1014	7/15	20 - 24	12,000	NA	NA	NA	NA	No	NA
	2050-67-1	PCB-11	160	1,400 J+	PG/L	LDCA-MW20D-1014	4/15	20 - 13000	1,400	NA	NA	NA	NA	No	NA
	--	PCB-110/115	7.4 J	230,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	230,000	NA	NA	NA	NA	No	NA
	31508-00-6	**PCB-118**	3.1 J	140,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	140,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	--	PCB-12/13	140	130,000	PG/L	LDCA-MW11-1014	8/15	20 - 660	130,000	NA	NA	NA	NA	No	NA
	68194-12-7	PCB-120	20	20	PG/L	LDCA-MW02-1014	1/15	20 - 3400	20	NA	NA	NA	NA	No	NA
	56558-18-0	PCB-121	500 Z	500 Z	PG/L	LDCA-MW12-1014	1/15	20 - 3300	500	NA	NA	NA	NA	No	NA
	--	PCB-128/166	8.3 J	38,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	38,000	NA	NA	NA	NA	No	NA
	--	PCB-129/138/163	3.6 Z	410,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	410,000	NA	NA	NA	NA	No	NA
	52663-66-8	PCB-130	7.9 Z	20,000	PG/L	LDCA-MW11-1014	6/15	20 - 99	20,000	NA	NA	NA	NA	No	NA
	38380-05-1	PCB-132	4.5 J	120,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	120,000	NA	NA	NA	NA	No	NA
	35694-04-3	PCB-133	22	5,200	PG/L	LDCA-MW11-1014	6/15	20 - 24	5,200	NA	NA	NA	NA	No	NA
	--	PCB-134/143	9 Z	18,000	PG/L	LDCA-MW11-1014	6/15	20 - 24	18,000	NA	NA	NA	NA	No	NA
	--	PCB-135/151	11 Z	200,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	200,000	NA	NA	NA	NA	No	NA
	38411-22-2	PCB-136	3.5 Z	66,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	66,000	NA	NA	NA	NA	No	NA
	35694-06-5	PCB-137	26	6,500	PG/L	LDCA-MW11-1014	3/15	20 - 99	6,500	NA	NA	NA	NA	No	NA
	--	PCB-139/140	360	4,000	PG/L	LDCA-MW11-1014	2/15	20 - 99	4,000	NA	NA	NA	NA	No	NA

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 2	52712-04-6	PCB-141	3.7 J	110,000	PG/L	LDCA-MW11-1014	10/15	20 - 20	110,000	NA	NA	NA	NA	No	NA
	68194-14-9	PCB-144	5.6 Z	430 Z	PG/L	LDCA-MW12-1014	6/15	20 - 2300	430	NA	NA	NA	NA	No	NA
	51908-16-8	PCB-146	3.8 Z	65,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	65,000	NA	NA	NA	NA	No	NA
	--	PCB-147/149	2.7 Z	430,000	PG/L	LDCA-MW11-1014	15/15	--	430,000	NA	NA	NA	NA	No	NA
	74472-41-6	PCB-148	23	1,000	PG/L	LDCA-MW12-1014	3/15	20 - 2300	1,000	NA	NA	NA	NA	No	NA
	2050-68-2	PCB-15	67 Z	490,000	PG/L	LDCA-MW11-1014	11/15	23 - 47	490,000	NA	NA	NA	NA	No	NA
	68194-08-1	PCB-150	16 J	780	PG/L	LDCA-MW12-1014	3/15	20 - 1600	780	NA	NA	NA	NA	No	NA
	68194-09-2	PCB-152	15 Z	760	PG/L	LDCA-MW12-1014	2/15	20 - 1700	760	NA	NA	NA	NA	No	NA
	--	PCB-153/168	3.2 Z	420,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	420,000	NA	NA	NA	NA	No	NA
	--	PCB-154	8.4 J	2,800	PG/L	LDCA-MW12-1014	6/15	20 - 2000	2,800	NA	NA	NA	NA	No	NA
	33979-03-2	PCB-155	30 Z	240	PG/L	LDCA-MW12-1014	2/15	20 - 1000	240	NA	NA	NA	NA	No	NA
	--	**PCB-156/157**	4.8 J	32,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	32,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	74472-42-7	PCB-158	4.4 Z	38,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	38,000	NA	NA	NA	NA	No	NA
	39635-35-3	PCB-159	9.3 J	190	PG/L	LDCA-MW12-1014	2/15	20 - 2000	190	NA	NA	NA	NA	No	NA
	38444-78-9	PCB-16	8.6 J	340,000	PG/L	LDCA-MW11-1014	12/15	20 - 24	340,000	NA	NA	NA	NA	No	NA
	41411-62-5	PCB-160	160	160	PG/L	LDCA-MW34S-1014	1/15	20 - 2000	160	NA	NA	NA	NA	No	NA
	39635-34-2	PCB-162	8.9 J	1,300	PG/L	LDCA-MW11-1014	4/15	20 - 99	1,300	NA	NA	NA	NA	No	NA
	74472-45-0	PCB-164	4.4 J	31,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	31,000	NA	NA	NA	NA	No	NA
	52663-72-6	**PCB-167**	5.6 Z	11,000	PG/L	LDCA-MW11-1014	5/15	20 - 99	11,000	NA	**4,000 C**	NA	NA	**Yes**	ASL
	37680-66-3	PCB-17	9.8 J	560,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	560,000	NA	NA	NA	NA	No	NA
	35065-30-6	PCB-170	4.4 Z	170,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	170,000	NA	NA	NA	NA	No	NA
	--	PCB-171/173	2.7 Z	57,000	PG/L	LDCA-MW11-1014	10/15	20 - 24	57,000	NA	NA	NA	NA	No	NA
	52663-74-8	PCB-172	5.1 Z	32,000	PG/L	LDCA-MW11-1014	8/15	20 - 99	32,000	NA	NA	NA	NA	No	NA
	38411-25-5	PCB-174	4.6 J	240,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	240,000	NA	NA	NA	NA	No	NA
	40186-70-7	PCB-175	16 J	8,700	PG/L	LDCA-MW11-1014	4/15	20 - 99	8,700	NA	NA	NA	NA	No	NA
	52663-65-7	PCB-176	4.4 J	26,000	PG/L	LDCA-MW11-1014	9/15	20 - 24	26,000	NA	NA	NA	NA	No	NA
	52663-70-4	PCB-177	3.8 J	120,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	120,000	NA	NA	NA	NA	No	NA
	52663-67-9	PCB-178	4.5 J	43,000	PG/L	LDCA-MW11-1014	10/15	20 - 24	43,000	NA	NA	NA	NA	No	NA
	52663-64-6	PCB-179	2.4 Z	98,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	98,000	NA	NA	NA	NA	No	NA
	--	PCB-18/30	9.9 J	900,000	PG/L	LDCA-MW11-1014	15/15	--	900,000	NA	NA	NA	NA	No	NA
	--	PCB-180/193	4.6 Z	440,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	440,000	NA	NA	NA	NA	No	NA
	74472-47-2	PCB-181	140	140	PG/L	LDCA-MW12-1014	1/15	20 - 300	140	NA	NA	NA	NA	No	NA
	52663-69-1	PCB-183	2 Z	110,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	110,000	NA	NA	NA	NA	No	NA
	52712-05-7	PCB-185	6.1 J	24,000	PG/L	LDCA-MW11-1014	7/15	20 - 99	24,000	NA	NA	NA	NA	No	NA
	52663-68-0	PCB-187	6.1 Z	260,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	260,000	NA	NA	NA	NA	No	NA
	--	PCB-188	2.8 Z	130	PG/L	LDCA-MW12-1014	3/15	20 - 99	130	NA	NA	NA	NA	No	NA
	39635-31-9	**PCB-189**	8.6 J	5,400	PG/L	LDCA-MW11-1014	4/15	20 - 99	5,400	NA	**4,000 C**	NA	NA	**Yes**	ASL
	38444-73-4	PCB-19	14 J	1,700,000	PG/L	LDCA-MW12-1014	15/15	--	1,700,000	NA	NA	NA	NA	No	NA
	41411-64-7	PCB-190	2.4 J	35,000	PG/L	LDCA-MW11-1014	7/15	20 - 99	35,000	NA	NA	NA	NA	No	NA
	74472-50-7	PCB-191	2.4 Z	8,500	PG/L	LDCA-MW11-1014	6/15	20 - 99	8,500	NA	NA	NA	NA	No	NA
	35694-08-7	PCB-194	9 Z	110,000	PG/L	LDCA-MW11-1014	10/15	20 - 24	110,000	NA	NA	NA	NA	No	NA
	52663-78-2	PCB-195	4 J	36,000	PG/L	LDCA-MW11-1014	7/15	20 - 99	36,000	NA	NA	NA	NA	No	NA
	42740-50-1	PCB-196	11 J	56,000	PG/L	LDCA-MW11-1014	9/15	20 - 24	56,000	NA	NA	NA	NA	No	NA
	--	PCB-197	6.7 J	3,400	PG/L	LDCA-MW11-1014	4/15	20 - 99	3,400	NA	NA	NA	NA	No	NA
	--	PCB-198/199	3.5 Z	120,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	120,000	NA	NA	NA	NA	No	NA
	2051-61-8	PCB-2	6.5 J	14,000	PG/L	LDCA-MW11-1014	7/15	20 - 810	14,000	NA	NA	NA	NA	No	NA
	--	PCB-20/28	14 Z	920,000	PG/L	LDCA-MW11-1014	13/15	20 - 23	920,000	NA	NA	NA	NA	No	NA
	52663-73-7	PCB-200	4.9 J	16,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	16,000	NA	NA	NA	NA	No	NA
	40186-71-8	PCB-201	3.5 Z	15,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	15,000	NA	NA	NA	NA	No	NA
	2136-99-4	PCB-202	7.1 Z	21,000	PG/L	LDCA-MW11-1014	9/15	20 - 24	21,000	NA	NA	NA	NA	No	NA
	52663-76-0	PCB-203	6.8 Z	70,000	PG/L	LDCA-MW11-1014	10/15	20 - 24	70,000	NA	NA	NA	NA	No	NA
	74472-53-0	PCB-205	10 Z	5,900	PG/L	LDCA-MW11-1014	4/15	20 - 99	5,900	NA	NA	NA	NA	No	NA
	40186-72-9	PCB-206	10 J	41,000	PG/L	LDCA-MW11-1014	9/15	20 - 24	41,000	NA	NA	NA	NA	No	NA
	52663-79-3	PCB-207	2.9 Z	4,700	PG/L	LDCA-MW11-1014	5/15	20 - 99	4,700	NA	NA	NA	NA	No	NA
	52663-77-1	PCB-208	4.1 J	11,000	PG/L	LDCA-MW11-1014	9/15	20 - 24	11,000	NA	NA	NA	NA	No	NA
	2051-24-3	PCB-209	4.3 J	36,000	PG/L	LDCA-MW11-1014	7/15	20 - 24	36,000	NA	NA	NA	NA	No	NA
	--	PCB-21/33	8.3 J	310,000	PG/L	LDCA-MW11-1014	12/15	20 - 24	310,000	NA	NA	NA	NA	No	NA
	38444-85-8	PCB-22	4.8 Z	290,000	PG/L	LDCA-MW11-1014	12/15	20 - 25	290,000	NA	NA	NA	NA	No	NA

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 2	55712-37-3	PCB-25	5.8 J	160,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	160,000	NA	NA	NA	NA	No	NA
	--	PCB-26/29	9.1 Z	240,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	240,000	NA	NA	NA	NA	No	NA
	38444-76-7	PCB-27	2.7 Z	140,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	140,000	NA	NA	NA	NA	No	NA
	2051-62-9	PCB-3	7.8 J	180,000	PG/L	LDCA-MW11-1014	15/15	--	180,000	NA	NA	NA	NA	No	NA
	16606-02-3	PCB-31	13 J	780,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	780,000	NA	NA	NA	NA	No	NA
	38444-77-8	PCB-32	4.7 J	310,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	310,000	NA	NA	NA	NA	No	NA
	37680-69-6	PCB-35	14 Z	14 Z	PG/L	LDCA-MW20D-1014	1/15	20 - 17000	14	NA	NA	NA	NA	No	NA
	38444-87-0	PCB-36	26	1,000	PG/L	LDCA-MW12-1014	3/15	20 - 16000	1,000	NA	NA	NA	NA	No	NA
	38444-90-5	PCB-37	21	110,000	PG/L	LDCA-MW11-1014	7/15	20 - 210	110,000	NA	NA	NA	NA	No	NA
	--	PCB-4	77 Z	3,400,000	PG/L	LDCA-MW12-1014	15/15	--	3,400,000	NA	NA	NA	NA	No	NA
	--	PCB-40/71	2.5 Z	260,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	260,000	NA	NA	NA	NA	No	NA
	52663-59-9	PCB-41	16 J	31,000	PG/L	LDCA-MW11-1014	3/15	20 - 480	31,000	NA	NA	NA	NA	No	NA
	36559-22-5	PCB-42	2.8 J	130,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	130,000	NA	NA	NA	NA	No	NA
	70362-46-8	PCB-43	18 J	24,000	PG/L	LDCA-MW11-1014	7/15	20 - 470	24,000	NA	NA	NA	NA	No	NA
	--	PCB-44/47/65	21	570,000	PG/L	LDCA-MW11-1014	15/15	--	570,000	NA	NA	NA	NA	No	NA
	70362-45-7	PCB-45	9.4 J	72,000	PG/L	LDCA-MW11-1014	8/15	20 - 470	72,000	NA	NA	NA	NA	No	NA
	41464-47-5	PCB-46	3.6 Z	52,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	52,000	NA	NA	NA	NA	No	NA
	70362-47-9	PCB-48	10 J	91,000	PG/L	LDCA-MW11-1014	8/15	20 - 390	91,000	NA	NA	NA	NA	No	NA
	--	PCB-49/69	3.9 J	420,000	PG/L	LDCA-MW11-1014	15/15	--	420,000	NA	NA	NA	NA	No	NA
	16605-91-7	PCB-5	72	38,000	PG/L	LDCA-MW11-1014	6/15	20 - 860	38,000	NA	NA	NA	NA	No	NA
	--	PCB-50/53	3.1 J	170,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	170,000	NA	NA	NA	NA	No	NA
	68194-04-7	PCB-51	11 J	220,000	PG/L	LDCA-MW12-1014	15/15	--	220,000	NA	NA	NA	NA	No	NA
	35693-99-3	PCB-52	8 J	610,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	610,000	NA	NA	NA	NA	No	NA
	15968-05-5	PCB-54	23	150,000	PG/L	LDCA-MW12-1014	12/15	20 - 20	150,000	NA	NA	NA	NA	No	NA
	41464-43-1	PCB-56	7.5 J, Z	130,000	PG/L	LDCA-MW11-1014	10/15	20 - 24	130,000	NA	NA	NA	NA	No	NA
	70424-67-8	PCB-57	4.7 J	130	PG/L	LDCA-MW12-1014	5/15	20 - 2800	130	NA	NA	NA	NA	No	NA
	41464-49-7	PCB-58	9.6 J	470	PG/L	LDCA-MW12-1014	3/15	20 - 2800	470	NA	NA	NA	NA	No	NA
	--	PCB-59/62/75	5.3 J	44,000	PG/L	LDCA-MW11-1014	11/15	20 - 24	44,000	NA	NA	NA	NA	No	NA
	25569-80-6	PCB-6	110	430,000	PG/L	LDCA-MW11-1014	13/15	20 - 34	430,000	NA	NA	NA	NA	No	NA
	33025-41-1	PCB-60	13 J	65,000	PG/L	LDCA-MW11-1014	5/15	20 - 24	65,000	NA	NA	NA	NA	No	NA
	--	PCB-61/70/74/76	4.5 Z	480,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	480,000	NA	NA	NA	NA	No	NA
	74472-34-7	PCB-63	9.9 J	14,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	14,000	NA	NA	NA	NA	No	NA
	52663-58-8	PCB-64	1.9 J	160,000	PG/L	LDCA-MW11-1014	12/15	20 - 270	160,000	NA	NA	NA	NA	No	NA
	32598-10-0	PCB-66	10 Z	340,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	340,000	NA	NA	NA	NA	No	NA
	73575-53-8	PCB-67	6.9 J	11,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	11,000	NA	NA	NA	NA	No	NA
	73575-52-7	PCB-68	4 J	9,100	PG/L	LDCA-MW11-1014	10/15	20 - 24	9,100	NA	NA	NA	NA	No	NA
	33284-50-3	PCB-7	76	2,200	PG/L	LDCA-MW07D-1014	7/15	20 - 11000	2,200	NA	NA	NA	NA	No	NA
	41464-42-0	PCB-72	4.6 J	740	PG/L	LDCA-MW12-1014	7/15	20 - 2700	740	NA	NA	NA	NA	No	NA
	74338-23-1	PCB-73	13 J	8,600	PG/L	LDCA-MW12-1014	6/15	20 - 94	8,600	NA	NA	NA	NA	No	NA
	32598-13-3	**PCB-77**	41	24,000	PG/L	LDCA-MW11-1014	5/15	20 - 24	24,000	NA	**6,000 C**	NA	NA	**Yes**	ASL
	34883-43-7	PCB-8	55 Z	980,000	PG/L	LDCA-MW11-1014	14/15	20 - 32	980,000	NA	NA	NA	NA	No	NA
	52663-62-4	PCB-82	35	26,000	PG/L	LDCA-MW11-1014	4/15	20 - 270	26,000	NA	NA	NA	NA	No	NA
	60145-20-2	PCB-83	18 J	54	PG/L	LDCA-MW04-1014	2/15	20 - 7700	54	NA	NA	NA	NA	No	NA
	52663-60-2	PCB-84	11 J	64,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	64,000	NA	NA	NA	NA	No	NA
	--	PCB-85/116/117	4.7 J	32,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	32,000	NA	NA	NA	NA	No	NA
	--	PCB-86/87/97/108/119/125	13 J	140,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	140,000	NA	NA	NA	NA	No	NA
	55215-17-3	PCB-88	9.5 J	42,000	PG/L	LDCA-MW11-1014	9/12	20 - 20	42,000	NA	NA	NA	NA	No	NA
	--	PCB-88/91	9.5 J	42,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	42,000	NA	NA	NA	NA	No	NA
	34883-39-1	PCB-9	32	27,000	PG/L	LDCA-MW11-1014	9/15	20 - 60	27,000	NA	NA	NA	NA	No	NA
	--	PCB-90/101/113	14 Z	260,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	260,000	NA	NA	NA	NA	No	NA
	68194-05-8	PCB-91	9.5 J	42,000	PG/L	LDCA-MW11-1014	9/12	20 - 20	42,000	NA	NA	NA	NA	No	NA
	52663-61-3	PCB-92	10 J	52,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	52,000	NA	NA	NA	NA	No	NA
	--	PCB-93/100	3.9 J	28,000	PG/L	LDCA-MW12-1014	8/15	20 - 22	28,000	NA	NA	NA	NA	No	NA
	73575-55-0	PCB-94	2.9 Z	8,600	PG/L	LDCA-MW12-1014	8/15	20 - 5000	8,600	NA	NA	NA	NA	No	NA
	38379-99-6	PCB-95	3.2 J	220,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	220,000	NA	NA	NA	NA	No	NA
	73575-54-9	PCB-96	1.4 Z	4,900	PG/L	LDCA-MW11-1014	10/15	20 - 24	4,900	NA	NA	NA	NA	No	NA
	--	PCB-98/102	5.4 J	18,000	PG/L	LDCA-MW11-1014	9/15	20 - 22	18,000	NA	NA	NA	NA	No	NA

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside	--	PCB-99	5.4 Z	120,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	120,000	NA	NA	NA	NA	No	NA
Landfill	--	**DIOXIN-LIKE PCBS TEQ**	0.00009	9.79	PG/L	LDCA-MW11-1014	13/15	20 - 20	9.79	NA	**0.12 C[18]**	NA	NA	**Yes**	ASL
Event 2	--	**NONDIOXIN-LIKE PCBS**	473	18,723,700	PG/L	LDCA-MW11-1014	15/15	--	18,723,700	NA	**44,000 C[18]**	NA	NA	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for acenaphthene.
8 - Value is for pyrene.
9 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
10 - Value is for hexavalent chromium.
11 - Value is for methyl mercury.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for endosulfan.
15 - Value is for endrin.
16 - Value is for 1,4-dichlorobenzene.
17 - Value is for 1,3-dichloropropene.
18 - Value is for 2,3,7,8-TCDD.
19 - Value is for polychlorinated biphenyls (low risk).
20 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 882-R-16-005.
21 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctane Sulfonate(PFOS), EPA 882-R-16-004.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:
LDCA-MW01D-1014
LDCA-MW01S-1014
LDCA-MW02-1014
LDCA-MW03-1014
LDCA-MW04-1014
LDCA-MW05D-1014
LDCA-MW05S-1014
LDCA-MW06-1014
LDCA-MW07D-1014
LDCA-MW07S-1014
LDCA-MW09-1014
LDCA-MW11-1014
LDCA-MW12-1014
LDCA-MW20D-1014-D
LDCA-MW20D-1014
LDCA-MW20I-1014
LDCA-MW20S-1014
LDCA-MW34D-1014
LDCA-MW34S-1014
LDCA-MW36-1014
LDCA-MW37-1014

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 3
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 3	**SEMIVOLATILE ORGANICS - SIM**														
	91-57-6	2-METHYLNAPHTHALENE	0.16	0.59	UG/L	LDCA-MW05S-0615	4/17	0.1 - 0.1	0.59	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.23	11	UG/L	LDCA-MW37-0615	10/17	0.1 - 0.1	11	NA	53 N	NA	NA	No	BSL
	208-96-8	ACENAPHTHYLENE	0.12	0.38	UG/L	LDCA-MW37-0615	3/17	0.1 - 0.1	0.38	NA	53 N[7]	NA	NA	No	NA
	120-12-7	ANTHRACENE	0.053 J	1.2	UG/L	LDCA-MW11-0615	16/17	0.1 - 0.1	1.2	NA	180 N	NA	NA	No	BSL
	56-55-3	**BENZO(A)ANTHRACENE**	0.084 J	1.1	UG/L	LDCA-MW11-0615	5/17	0.1 - 0.1	1.1	NA	**0.012 C**	NA	NA	**Yes**	ASL
	50-32-8	**BENZO(A)PYRENE**	0.42	0.42	UG/L	LDCA-MW11-0615	1/17	0.1 - 0.1	0.42	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	205-99-2	**BENZO(B)FLUORANTHENE**	0.12	0.52	UG/L	LDCA-MW11-0615	2/17	0.1 - 0.1	0.52	NA	**0.034 C**	NA	NA	**Yes**	ASL
	191-24-2	BENZO(G,H,I)PERYLENE	0.19	0.19	UG/L	LDCA-MW11-0615	1/17	0.1 - 0.1	0.19	NA	12 N[8]	NA	NA	No	NA
	207-08-9	BENZO(K)FLUORANTHENE	0.041 J	0.29	UG/L	LDCA-MW11-0615	2/17	0.1 - 0.1	0.29	NA	0.34 C	NA	NA	No	BSL
	218-01-9	CHRYSENE	0.11	0.73	UG/L	LDCA-MW11-0615	3/17	0.1 - 0.1	0.73	NA	3.4 C	NA	NA	No	BSL
	53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.061 J	0.061 J	UG/L	LDCA-MW11-0615	1/17	0.1 - 0.1	0.061	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	206-44-0	FLUORANTHENE	0.09 J	2.3	UG/L	LDCA-MW11-0615	9/17	0.1 - 0.1	2.3	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.098 J-	6.6	UG/L	LDCA-MW37-0615	11/17	0.1 - 0.1	6.6	NA	29 N	NA	NA	No	BSL
	193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.17	0.17	UG/L	LDCA-MW11-0615	1/17	0.1 - 0.1	0.17	NA	**0.034 C**	NA	NA	**Yes**	ASL
	91-20-3	**NAPHTHALENE**	0.062 J	0.4	UG/L	LDCA-MW20S-0615	9/17	0.1 - 0.1	0.4	NA	**0.17 C**	NA	NA	**Yes**	ASL
	87-86-5	**PENTACHLOROPHENOL**	0.11 J,	0.61	UG/L	LDCA-MW07D-0615	6/17	0.2 - 0.2	0.61	NA	**0.041 C**	NA	NA	**Yes**	ASL
	85-01-8	PHENANTHRENE	0.07 J	4.1	UG/L	LDCA-MW11-0615	10/17	0.1 - 0.1	4.1	NA	12 N[8]	NA	NA	No	NA
	129-00-0	PYRENE	0.065 J	1.7	UG/L	LDCA-MW11-0615	11/17	0.1 - 0.1	1.7	NA	12 N	NA	NA	No	BSL
	DIOXIN/FURANS														
	3268-87-9	**1,2,3,4,6,7,8,9-OCDD**	25.4	417	PG/L	LDCA-MW34S-0615	2/2	35.8 - 35.8	417	NA	**400 C[9]**	NA	NA	**Yes**	ASL
	35822-46-9	**1,2,3,4,6,7,8-HPCDD**	18.4	18.4	PG/L	LDCA-MW34S-0615	1/2	0.84 - 1.52	18.4	NA	**12 C[9]**	NA	NA	**Yes**	ASL
	39227-28-6	1,2,3,4,7,8-HXCDD	0.74 J	0.74 J	PG/L	LDCA-MW34D-0615-D	1/2	0.9 - 1.08	0.74	NA	1.2 C[9]	NA	NA	No	BSL
	70648-26-9	1,2,3,4,7,8-HXCDF	0.98 Z	0.98 Z	PG/L	LDCA-MW34D-0615-D	1/2	0.54 - 0.8	0.98	NA	1.2 C[9]	NA	NA	No	BSL
	57117-44-9	1,2,3,6,7,8-HXCDF	0.88 Z	0.88 Z	PG/L	LDCA-MW34D-0615-D	1/2	0.54 - 0.78	0.88	NA	1.2 C[9]	NA	NA	No	BSL
	40321-76-4	**1,2,3,7,8-PECDD**	1.32 Z	1.32 Z	PG/L	LDCA-MW34D-0615-D	1/2	0.84 - 1.18	1.32	NA	**0.12 C[9]**	NA	NA	**Yes**	ASL
	57117-41-6	1,2,3,7,8-PECDF	0.72 J	1.62 Z	PG/L	LDCA-MW34D-0615-D	1/2	0.68 - 0.68	1.62	NA	4 C[9]	NA	NA	No	BSL
	57117-31-4	**2,3,4,7,8-PECDF**	0.72 Z	0.72 Z	PG/L	LDCA-MW34D-0615-D	1/2	0.68 - 0.68	0.72	NA	**0.4 C[9]**	NA	NA	**Yes**	ASL
	--	**2,3,7,8-TCDD TEQ**	0.022	1.85	PG/L	LDCA-MW34D-0615-D	2/2	--	1.85	NA	**0.12 C**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	**ALUMINUM**	2.8 J	7,510	UG/L	LDCA-MW11-0615	15/18	20 - 20	7,510	NA	**2000 N**	NA	NA	**Yes**	ASL
	7440-36-0	**ANTIMONY**	0.14 J,	11.3	UG/L	LDCA-MW11-0615	7/18	2 - 2	11.3	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.45	43.4	UG/L	LDCA-MW01S-0615	18/18	--	43.4	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	48.7 J	2,420	UG/L	LDCA-MW11-0615	18/18	--	2,420	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.036 J	0.28 J	UG/L	LDCA-MW11-0615	6/18	1 - 1	0.28	NA	2.5 N	NA	NA	No	BSL
	7440-43-9	**CADMIUM**	0.014 J	4.6	UG/L	LDCA-MW11-0615	8/18	1 - 1	4.6	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	23,200 J	175,000 J	UG/L	LDCA-MW06-0615	18/18	--	175,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	1.7 J	85.9	UG/L	LDCA-MW11-0615	16/18	2 - 2	85.9	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.73 J	15	UG/L	LDCA-MW11-0615	16/18	1 - 1	15	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	**COPPER**	0.39 J-	159	UG/L	LDCA-MW11-0615	7/18	2 - 2	159	NA	**80 N**	NA	NA	**Yes**	ASL
	57-12-5	**CYANIDE**	2.5 J-	200 J	UG/L	LDCA-MW11-0615	13/15	10 - 10	200	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	1,050 J	92,800 J	UG/L	LDCA-MW34D-0615	18/18	--	92,800	NA	**1400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	0.033 J	1,130	UG/L	LDCA-MW11-0615	13/18	1 - 1	1,130	NA	**15**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	736 J	151,000 J	UG/L	LDCA-MW05S-0615	18/18	--	151,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	19.8 J	13,000	UG/L	LDCA-MW34D-0615	18/18	--	13,000	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.014 J	0.065 J	UG/L	LDCA-MW01S-0615	12/16	0.2 - 0.2	0.065	NA	0.2 N[11]	NA	NA	No	BSL
	7440-02-0	**NICKEL**	1 J	135	UG/L	LDCA-MW11-0615	18/18	--	135	NA	**39 N**	NA	NA	**Yes**	ASL
	7440-09-7	POTASSIUM	5,400	117,000	UG/L	LDCA-MW11-0615	18/18	--	117,000	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.2 J	1.1 J	UG/L	LDCA-MW02-0615	8/18	5 - 5	1.1	NA	10 N	NA	NA	No	BSL
	7440-22-4	SILVER	0.019 J	5.4	UG/L	LDCA-MW11-0615	5/18	1 - 1	5.4	NA	9.4 N	NA	NA	No	BSL
	7440-23-5	SODIUM	24,800	7,190,000 J	UG/L	LDCA-MW12-0615	18/18	--	7,190,000	NA	NA	NA	NA	No	NUT
	7440-62-2	**VANADIUM**	0.73 J	79	UG/L	LDCA-MW11-0615	14/18	2.6 - 2.6	79	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	**ZINC**	1.1 J	1,440	UG/L	LDCA-MW11-0615	17/18	2 - 2	1,440	NA	**600 N**	NA	NA	**Yes**	ASL

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 3
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 3	**FILTERED METALS**														
	7429-90-5	ALUMINUM	0.97 J	41.8	UG/L	LDCA-MW20S-0615	20/20	--	41.8	NA	2000 N	NA	NA	No	BSL
	7440-36-0	**ANTIMONY**	0.11 J	0.82 J	UG/L	LDCA-MW20S-0615	6/20	2 - 2	0.82	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.44	40.9	UG/L	LDCA-MW01S-0615	20/20	--	40.9	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	43.9	2,080	UG/L	LDCA-MW11-0615	20/20	--	2,080	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.032	0.19 J	UG/L	LDCA-MW01D-0615	3/20	1 - 1	0.19	NA	2.5 N	NA	NA	No	BSL
	7440-70-2	CALCIUM	10,900	169,000	UG/L	LDCA-MW04-0615-D	20/20	--	169,000	NA	--	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.25 J	15.7	UG/L	LDCA-MW37-0615	20/20	--	15.7	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.051 J	9.7	UG/L	LDCA-MW01D-0615	20/20	--	9.7	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.072	2.3	UG/L	LDCA-MW11-0615	7/20	2 - 2	2.3	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	16.5 J	87,900	UG/L	LDCA-MW34D-0615-D	20/20	--	87,900	NA	**1400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.02 J	0.46 J	UG/L	LDCA-MW11-0615	19/20	1 - 1	0.46	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	501	154,000	UG/L	LDCA-MW05S-0615	20/20	--	154,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	3	13,100	UG/L	LDCA-MW34D-0615-D	20/20	--	13,100	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.014 J+	0.067	UG/L	LDCA-MW34D-0615-D	15/18	0.025 - 0.2	0.067	NA	0.2 N[11]	NA	NA	No	BSL
	7440-02-0	NICKEL	0.39	14.5	UG/L	LDCA-MW07D-0615	20/20	--	14.5	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	3,970	115,000	UG/L	LDCA-MW11-0615	20/20	--	115,000	NA	NA	NA	NA	No	NUT
	7440-23-5	SODIUM	5,270	494,000	UG/L	LDCA-MW37-0615	20/20	--	494,000	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.65 J-	8.4	UG/L	LDCA-MW37-0615	13/20	2.6 - 2.6	8.4	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	0.87 J	8.7 J	UG/L	LDCA-MW11-0615	20/20	--	8.7	NA	600 N	NA	NA	No	BSL
	PESTICIDES														
	72-54-8	**4,4'-DDD**	0.00102	0.0334	UG/L	LDCA-MW01S-0615	8/20	0.00094 - 0.001	0.0334	NA	**0.032 C**	NA	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	0.0022	0.0554	UG/L	LDCA-MW11-0615	3/20	0.00094 - 0.001	0.0554	NA	**0.046 C**	NA	NA	**Yes**	ASL
	319-84-6	ALPHA-BHC	0.00123	0.00436 J	UG/L	LDCA-MW36-0615	2/20	0.00094 - 0.00102	0.00436	NA	0.0072 C	NA	NA	No	BSL
	5103-71-9	ALPHA-CHLORDANE	0.00189 NJ	0.00268	UG/L	LDCA-MW34S-0615	3/20	0.00094 - 0.0167	0.00268	NA	0.045 C[12]	NA	NA	No	BSL
	319-85-7	BETA-BHC	0.00256 J	0.00256 J	UG/L	LDCA-MW36-0615	1/20	0.00094 - 0.00393	0.00256	NA	0.025 C	NA	NA	Np	BSL
	319-86-8	DELTA-BHC	0.00166	0.00166	UG/L	LDCA-MW02-0615	1/20	0.00094 - 0.00102	0.00166	NA	0.0072 C[13]	NA	NA	No	BSL
	5103-74-2	GAMMA-CHLORDANE	0.00146 J	0.00234	UG/L	LDCA-MW34S-0615	2/20	0.00094 - 0.00491	0.00234	NA	0.045 C[12]	NA	NA	No	BSL
	SEMIVOLATILES														
	123-91-1	**1,4-DIOXANE**	1.3	150	UG/L	LDCA-MW11-0615, LDCA-MW12-0615	19/20	0.5 - 0.5	150	NA	**0.46 C**	NA	NA	**Yes**	ASL
	91-57-6	2-METHYLNAPHTHALENE	0.51 J	2.5 J	UG/L	LDCA-MW01S-0615	2/12	5 - 5	2.5	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.55 J	15	UG/L	LDCA-MW37-0615	6/12	5 - 5	15	NA	53 N	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.66 J	2.8 J	UG/L	LDCA-MW01S-0615	5/12	5 - 5	2.8	NA	180 N	NA	NA	No	BSL
	100-52-7	BENZALDEHYDE	1.1 J	1.2 J	UG/L	LDCA-MW36-0615	2/17	10 - 10	1.2	NA	19 C	NA	NA	No	BSL
	56-55-3	**BENZO(A)ANTHRACENE**	0.79 J	2.3 J	UG/L	LDCA-MW01S-0615	2/14	5 - 5	2.3	NA	**0.012 C**	NA	NA	**Yes**	ASL
	205-99-2	**BENZO(B)FLUORANTHENE**	1.4 J	1.4 J	UG/L	LDCA-MW01S-0615	1/12	5 - 5	1.4	NA	**0.034 C**	NA	NA	**Yes**	ASL
	117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	0.63 J	26 J	UG/L	LDCA-MW11-0615	7/17	5 - 5	26	NA	**5.6 C**	NA	NA	**Yes**	ASL
	85-68-7	BUTYL BENZYL PHTHALATE	0.49 J	3.5 J	UG/L	LDCA-MW20l-0615	6/17	5 - 5	3.5	NA	16 C	NA	NA	No	BSL
	218-01-9	CHRYSENE	0.72 J	2.1 J	UG/L	LDCA-MW01S-0615	2/12	5 - 5	2.1	NA	3.4 C	NA	NA	No	BSL
	132-64-9	**DIBENZOFURAN**	4.2 J	7.4 J	UG/L	LDCA-MW37-0615	2/17	5 - 5	7.4	NA	**0.79 N**	NA	NA	**Yes**	ASL
	206-44-0	FLUORANTHENE	1.1 J	12 J	UG/L	LDCA-MW01S-0615	4/12	10 - 10	12	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.68 J	6.8	UG/L	LDCA-MW01S-0615	5/12	5 - 5	6.8	NA	29 N	NA	NA	No	BSL
	91-20-3	**NAPHTHALENE**	0.48 J	3 J	UG/L	LDCA-MW01S-0615	2/12	5 - 5	3	NA	**0.17 C**	NA	NA	**Yes**	ASL
	86-30-6	N-NITROSODIPHENYLAMINE	0.68 J	1.6 J	UG/L	LDCA-MW11-0615	2/12	5 - 5	1.6	NA	12 C	NA	NA	No	BSL
	85-01-8	**PHENANTHRENE**	0.69 J	22 J	UG/L	LDCA-MW01S-0615	6/12	5 - 5	22	NA	**12 N[8]**	NA	NA	**Yes**	ASL
	129-00-0	PYRENE	0.89 J	7.1	UG/L	LDCA-MW01S-0615	4/12	5 - 5	7.1	NA	12 N	NA	NA	No	BSL
	VOLATILES														
	95-50-1	1,2-DICHLOROBENZENE	0.23 J	0.56	UG/L	LDCA-MW07D-0615	8/20	0.5 - 0.5	0.56	NA	30 N	NA	NA	No	BSL
	541-73-1	**1,3-DICHLOROBENZENE**	0.26 J	1	UG/L	LDCA-MW04-0615, LDCA-MW12-0615	4/20	0.5 - 0.5	1	NA	**0.48 C[14]**	NA	NA	**Yes**	ASL
	106-46-7	**1,4-DICHLOROBENZENE**	0.35 J	3.3	UG/L	LDCA-MW11-0615, LDCA-MW34S-0615	10/20	0.5 - 0.5	3.3	NA	**0.48 C**	NA	NA	**Yes**	ASL
	67-64-1	ACETONE	5.4	14	UG/L	LDCA-MW03-0615, LDCA-MW11-0615	4/20	5 - 5	14	NA	1,400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.27 J	1.6	UG/L	LDCA-MW20S-0615	6/20	0.5 - 0.5	1.6	NA	**0.46 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.21 J	16 J-	UG/L	LDCA-MW20S-0615	5/20	0.5 - 0.5	16	NA	81 N	NA	NA	No	BSL

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER INSIDE LANDFILL - EVENT 3
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill Event 3	108-90-7	**CHLOROBENZENE**	0.79	51	UG/L	LDCA-MW12-0615	14/20	0.5 - 0.5	51	NA	**7.8 N**	NA	NA	**Yes**	ASL
	110-82-7	CYCLOHEXANE	0.27 J	0.59	UG/L	LDCA-MW34S-0615	2/20	0.5 - 0.5	0.59	NA	1,300 N	NA	NA	No	BSL
	98-82-8	ISOPROPYLBENZENE	0.96	5	UG/L	LDCA-MW04-0615	7/20	0.5 - 0.5	5	NA	45 N	NA	NA	No	BSL
	--	M+P-XYLENES	0.23 J	0.34 J	UG/L	LDCA-MW37-0615	4/20	0.5 - 0.5	0.34	NA	19 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.27 J	0.92	UG/L	LDCA-MW12-0615	5/20	0.5 - 0.5	0.92	NA	NA	NA	NA	No	NA
	1634-04-4	METHYL TERT-BUTYL ETHER	0.21 J	3.1	UG/L	LDCA-MW04-0615	7/20	0.5 - 0.5	3.1	NA	14 C	NA	NA	No	BSL
	75-09-2	METHYLENE CHLORIDE	0.44 J	0.44 J	UG/L	LDCA-MW20S-0615	1/20	0.5 - 0.5	0.44	NA	11 N	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.23 J	0.6	UG/L	LDCA-MW37-0615	5/20	0.5 - 0.5	0.6	NA	19 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.21 J,	0.21 J	UG/L	LDCA-MW11-0615, LDCA-MW12-0615	2/20	0.5 - 0.5	0.21	NA	110 N	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for acenaphthene.
8 - Value is for pyrene.
9 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
10 - Value is for hexavalent chromium.
11 - Value is for methyl mercury.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for 1,4-dichlorobenzene.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:

LDCA-MW01D-0615	LDCA-MW11-0615
LDCA-MW01S-0615	LDCA-MW12-0615
LDCA-MW02-0615	LDCA-MW20D-0615
LDCA-MW03-0615	LDCA-MW20D-0615-D
LDCA-MW04-0615-D	LDCA-MW20I-0615
LDCA-MW04-0615	LDCA-MW20S-0615
LDCA-MW05D-0615	LDCA-MW34D-0615-D
LDCA-MW05S-0615	LDCA-MW34D-0615
LDCA-MW06-0615	LDCA-MW34S-0615
LDCA-MW07D-0615	LDCA-MW36-0615
LDCA-MW07S-0615	LDCA-MW37-0615
LDCA-MW09-0615	

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 1	**SEMIVOLATILE ORGANICS - SIM**														
	91-57-6	2-METHYLNAPHTHALENE	0.098 J	0.098 J	UG/L	LDCA-MW25-0314	1/16	0.1 - 0.1	0.098	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.43	0.43	UG/L	LDCA-MW38-0314	1/20	0.1 - 0.1	0.43	NA	53 N	NA	NA	No	BSL
	206-44-0	FLUORANTHENE	0.11	0.11	UG/L	LDCA-MW24-0314	1/13	0.1 - 0.1	0.11	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.12	0.12	UG/L	LDCA-MW24-0314	1/19	0.1 - 0.1	0.12	NA	29 N	NA	NA	No	BSL
	91-20-3	NAPHTHALENE	0.1	0.1	UG/L	LDCA-MW25-0314	1/17	0.1 - 0.1	0.1	NA	0.17 C	NA	NA	No	BSL
	87-86-5	**PENTACHLOROPHENOL**	0.18 J	0.18 J	UG/L	LDCA-MW25-0314	1/18	0.2 - 0.2	0.18	NA	**0.041 C**	NA	NA	**Yes**	ASL
	85-01-8	PHENANTHRENE	0.11	0.11	UG/L	LDCA-MW17S-0314, LDCA-MW26D-0314	2/15	0.1 - 0.1	0.11	NA	12 N[7]	NA	NA	No	BSL
	129-00-0	PYRENE	0.17	0.17	UG/L	LDCA-MW24-0314	1/18	0.1 - 0.1	0.17	NA	12 N	NA	NA	No	BSL
	DIOXIN/FURANS														
	3268-87-9	**1,2,3,4,6,7,8,9-OCDD**	120	510	PG/L	LDCA-MW15S-0314	3/13	0.119 - 0.979	510	NA	**400 C[8]**	NA	NA	**Yes**	ASL
	--	**2,3,7,8-TCDD TEQ**	0.036	0.153	PG/L	LDCA-MW15S-0314	3/13	0.0849 - 0.475	0.153	NA	**0.12 C[8]**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	ALUMINUM	2.8 J	981	UG/L	LDCA-MW26D-0314	14/28	20 - 20	981	NA	2,000 N	NA	NA	No	BSL
	7440-36-0	**ANTIMONY**	5.3	5.3	UG/L	LDCA-MW08-0314	1/28	2 - 2	5	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.16 J	54.3	UG/L	LDCA-MW41S-0314	13/28	1 - 1	54.3	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	35.4	1110 J	UG/L	LDCA-MW26S-0314	28/28	--	1,110	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.072 J	0.072 J	UG/L	LDCA-MW26D-0314	1/28	1 - 2	0.072	NA	2.5 N	NA	NA	No	BSL
	7440-42-8	**BORON**	33.9	1380	UG/L	LDCA-MW16S-0314	28/28	--	1,380	NA	**400 N**	NA	NA	**Yes**	ASL
	7440-43-9	**CADMIUM**	0.096 J	2.7	UG/L	LDCA-MW08-0314	8/28	1 - 1	2.7	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	27400 J	152000	UG/L	LDCA-MW14S-0314	28/28	--	152,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	2.3 J	7.4 J	UG/L	LDCA-MW16S-0314	18/28	2 - 3.2	7.4	NA	**0.035 C[9]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	1.4	53.3	UG/L	LDCA-MW41D-0314-D	28/28	--	53.3	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	2.1	31.2	UG/L	LDCA-MW41D-0314-D	19/28	2 - 4.3	31.2	NA	80 N	NA	NA	No	BSL
	57-12-5	**CYANIDE**	0.91 J-	3.3 J	UG/L	LDCA-MW14S-0314	8/28	10 - 10	3.3	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	70 J	62400	UG/L	LDCA-MW41S-0314	20/28	200 - 200	62,400	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	0.31 J	51.6	UG/L	LDCA-MW08-0314	20/28	0.36 - 1	51.6	NA	**15**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	11700	84700	UG/L	LDCA-MW14S-0314	28/28	--	84,700	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	32.3	67200	UG/L	LDCA-MW41D-0314	28/28	--	67,200	NA	**43 N**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	2.3	31.2 J	UG/L	LDCA-MW41D-0314-D	28/28	--	31.2	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	2830	34300	UG/L	LDCA-MW16S-0314	28/28	--	34,300	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.53 J	9.7	UG/L	LDCA-MW41D-0314	11/28	5 - 5	9.7	NA	10 N	NA	NA	No	BSL
	7440-23-5	SODIUM	7920	338000	UG/L	LDCA-MW41D-0314-D	28/28	--	338,000	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.19 J	7.6 J	UG/L	LDCA-MW08-0314	9/28	5 - 5	7.6	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	4.3	177	UG/L	LDCA-MW08-0314	27/28	4.4 - 4.4	177	NA	600 N	NA	NA	No	BSL
	FILTERED METALS														
	7429-90-5	ALUMINUM	21.3 J	21.3 J	UG/L	LDCA-MW18S-0314	1/28	20 - 20	21.3	NA	2,000 N	NA	NA	No	BSL
	7440-38-2	**ARSENIC**	2.1	58.8	UG/L	LDCA-MW41S-0314	7/28	1 - 1	58.8	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	34.4	1100	UG/L	LDCA-MW26S-0314	28/28	--	1,100	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-42-8	**BORON**	33.1	1600	UG/L	LDCA-MW16S-0314	28/28	--	1,600	NA	**400 N**	NA	NA	**Yes**	ASL
	7440-43-9	CADMIUM	0.094 J	2.3	UG/L	LDCA-MW41D-0314-D	5/28	1 - 1	2.3	NA	**0.92 N**	NA	NA	No	BSL
	7440-70-2	CALCIUM	25500	141000	UG/L	LDCA-MW14S-0314	28/28	--	141,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.7 J	6.2 J	UG/L	LDCA-MW47-0314	25/28	2 - 2	6.2	NA	**0.035 C[9]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	1.3	55.1 J	UG/L	LDCA-MW41D-0314	26/28	1 - 1	55.1	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	2.1	39.4	UG/L	LDCA-MW41D-0314	24/28	2 - 2	39.4	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	57.1 J	64500 J	UG/L	LDCA-MW41S-0314	23/28	200 - 200	64,500	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.41 J	45.7	UG/L	LDCA-MW26D-0314	12/28	1 - 1	45.7	NA	**15**	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	11300	94100	UG/L	LDCA-MW14S-0314	28/28	--	94,100	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	24.9 J	73400	UG/L	LDCA-MW41D-0314	28/28	--	73,400	NA	**43 N**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	2.2	31.9	UG/L	LDCA-MW41D-0314	28/28	--	31.9	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	2750	39800	UG/L	LDCA-MW16S-0314	28/28	--	39,800	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.56 J	10.3	UG/L	LDCA-MW41D-0314	3/28	5 - 5	10.3	NA	**10 N**	NA	NA	No	BSL
	7440-22-4	SILVER	0.054 J	0.093 J	UG/L	LDCA-MW45-0314	6/28	1 - 1	0.093	NA	9.4 N	NA	NA	No	BSL
	7440-23-5	SODIUM	7570	351000	UG/L	LDCA-MW41D-0314	28/28	--	351,000	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.14 J	5.6	UG/L	LDCA-MW47-0314	5/28	5 - 5	5.6	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	3.9	38.4 J	UG/L	LDCA-MW31-0314	28/28	--	38.4	NA	600 N	NA	NA	No	BSL
	PESTICIDES														
	319-85-7	**BETA-BHC**	0.017 J	0.036 J	UG/L	LDCA-MW16S-0314	2/30	0.05 - 0.05	0.036	NA	**0.025 C**	NA	NA	**Yes**	ASL

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow	**SEMIVOLATILES**														
Groundwater	123-91-1	**1,4-DIOXANE**	2.6	260	UG/L	LDCA-MW41D-0314, LDCA-MW41D-0314-D	13/30	2 - 2	260	NA	**0.46 C**	NA	NA	**Yes**	ASL
Outside	105-67-9	2,4-DIMETHYLPHENOL	4.3 J	4.3 J	UG/L	LDCA-MW25-0314	1/30	5 - 5	4.3	NA	36 N	NA	NA	No	BSL
Landfill	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	2.1 J	4.9 J	UG/L	LDCA-MW26S-0314	2/30	5 - 5	4.9	NA	5.6 C	NA	NA	No	BSL
Event 1	86-74-8	CARBAZOLE	2.5 J	2.5 J	UG/L	LDCA-MW43-0314	1/30	5 - 5	2.5	NA	NA	NA	NA	No	NTX
	84-66-2	DIETHYL PHTHALATE	2 J	23	UG/L	LDCA-MW31-0314	3/30	5 - 5	23	NA	1,500 N	NA	NA	No	BSL
	VOLATILES														
	87-61-6	1,2,3-TRICHLOROBENZENE	0.56	0.56	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	0.56	NA	0.7 N	NA	NA	No	BSL
	95-50-1	1,2-DICHLOROBENZENE	1.2	1.2	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	1.2	NA	30 N	NA	NA	No	BSL
	78-93-3	2-BUTANONE	12	12	UG/L	LDCA-MW25-0314	1/30	5 - 10	12	NA	560 N	NA	NA	No	BSL
	67-64-1	ACETONE	14	69	UG/L	LDCA-MW25-0314	3/30	5 - 10	69	NA	1,400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	3.1	3.1	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	3.1	NA	**0.46 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	1.4	1.7	UG/L	LDCA-MW25-0314	2/30	0.5 - 5	1.7	NA	81 N	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	1	7.2	UG/L	LDCA-MW38-0314	3/30	0.5 - 5	7.2	NA	7.8 N	NA	NA	No	BSL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	0.28 J	46	UG/L	LDCA-MW38-0314	8/30	0.5 - 5	46	NA	**3.6 N**	NA	NA	**Yes**	ASL
	110-82-7	CYCLOHEXANE	0.31 J	0.31 J	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	0.31	NA	1,300 N	NA	NA	No	BSL
	100-41-4	ETHYLBENZENE	1.4	1.4	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	1.4	NA	1.5 C	NA	NA	No	BSL
	98-82-8	ISOPROPYLBENZENE	0.32 J	0.32 J	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	0.32	NA	45 N	NA	NA	No	BSL
	--	M+P-XYLENES	5.8	5.8	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	5.8	NA	19 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.38 J	0.38 J	UG/L	LDCA-MW25-0314	1/30	0.5 - 5	0.38	NA	NA	NA	NA	No	NTX
	1634-04-4	METHYL TERT-BUTYL ETHER	0.29 J	1.7	UG/L	LDCA-MW38-0314	4/30	0.5 - 5	1.7	NA	14 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.24 J	4.9	UG/L	LDCA-MW25-0314	2/30	0.5 - 5	4.9	NA	19 N	NA	NA	No	BSL
	127-18-4	TETRACHLOROETHENE	0.16 J	0.23 J	UG/L	LDCA-MW08-0314	2/30	0.5 - 5	0.23	NA	4.1 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.17 J	4.1	UG/L	LDCA-MW25-0314	6/30	0.5 - 5	4.1	NA	110 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	0.25 J	0.25 J	UG/L	LDCA-MW38-0314	1/30	0.5 - 5	0.25	NA	36 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	0.26 J	7.2	UG/L	LDCA-MW38-0314	5/30	0.5 - 5	7.2	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**VINYL CHLORIDE**	3.7	4.2	UG/L	LDCA-MW25-0314	2/30	0.5 - 5	4.2	NA	**0.019 C**	NA	NA	**Yes**	ASL
	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	26	64000	PG/L	LDCA-MW26S-0314	9/12	20 - 22	64,000	NA	NA	NA	NA	No	NTX
	33146-45-1	PCB-10	61	3600	PG/L	LDCA-MW26S-0314	5/12	20 - 22	3,600	NA	NA	NA	NA	No	NTX
	32598-14-4	PCB-105	42 J	77	PG/L	LDCA-MW26D-0314	2/12	19 - 22	77	NA	4,000 C	NA	NA	No	BSL
	2050-67-1	PCB-11	23	110	PG/L	LDCA-MW26S-0314	5/12	20 - 22	110	NA	NA	NA	NA	No	NTX
	--	PCB-110/115	29	460	PG/L	LDCA-MW26D-0314	7/12	20 - 22	460	NA	NA	NA	NA	No	NTX
	31508-00-6	PCB-118	21	260	PG/L	LDCA-MW26D-0314	5/12	19 - 22	260	NA	4,000 C	NA	NA	No	BSL
	--	PCB-12/13	30	980	PG/L	LDCA-MW26S-0314	5/12	20 - 22	980	NA	NA	NA	NA	No	NTX
	--	PCB-128/166	24 Z	53 J	PG/L	LDCA-MW26D-0314	2/12	19 - 22	53	NA	NA	NA	NA	No	NTX
	--	PCB-129/138/163	22	420	PG/L	LDCA-MW26D-0314	8/12	21 - 21	420	NA	NA	NA	NA	No	NTX
	38380-05-1	PCB-132	29	160	PG/L	LDCA-MW26D-0314	5/12	19 - 22	160	NA	NA	NA	NA	No	NTX
	--	PCB-134/143	24	24	PG/L	LDCA-MW26D-0314	1/12	19 - 22	24						
	--	PCB-135/151/154	23	210	PG/L	LDCA-MW41S-0314	7/12	20 - 22	210	NA	NA	NA	NA	No	NTX
	38411-22-2	PCB-136	46	73	PG/L	LDCA-MW26D-0314	3/12	19 - 22	73	NA	NA	NA	NA	No	NTX
	52712-04-6	PCB-141	92	95	PG/L	LDCA-MW26D-0314	2/12	19 - 22	95	NA	NA	NA	NA	No	NTX
	68194-14-9	PCB-144	22	24	PG/L	LDCA-MW26D-0314	2/12	19 - 22	24	NA	NA	NA	NA	No	NTX
	51908-16-8	PCB-146	22	78	PG/L	LDCA-MW26D-0314	3/12	19 - 22	78	NA	NA	NA	NA	No	NTX
	--	PCB-147/149	43	430	PG/L	LDCA-MW41S-0314	7/12	20 - 22	430	NA	NA	NA	NA	No	NTX
	2050-68-2	PCB-15	23	4100	PG/L	LDCA-MW26S-0314	6/12	20 - 22	4,100	NA	NA	NA	NA	No	NTX
	--	PCB-153/168	42	430	PG/L	LDCA-MW41S-0314	8/12	21 - 21	430	NA	NA	NA	NA	No	NTX
	74472-42-7	PCB-158	30	41	PG/L	LDCA-MW26D-0314	2/12	19 - 22	41	NA	NA	NA	NA	No	NTX
	38444-78-9	PCB-16	33	1300	PG/L	LDCA-MW26S-0314	6/12	20 - 22	1,300	NA	NA	NA	NA	No	NTX
	74472-45-0	PCB-164	29	32	PG/L	LDCA-MW41S-0314	2/12	19 - 22	32	NA	NA	NA	NA	No	NTX
	37680-66-3	PCB-17	25	4200	PG/L	LDCA-MW26S-0314	8/12	20 - 22	4,200	NA	NA	NA	NA	No	NTX
	35065-30-6	PCB-170	30	190	PG/L	LDCA-MW41S-0314	3/12	19 - 22	190	NA	NA	NA	NA	No	NTX
	--	PCB-171/173	40	63	PG/L	LDCA-MW41S-0314	2/12	19 - 22	63	NA	NA	NA	NA	No	NTX
	52663-74-8	PCB-172	23	38	PG/L	LDCA-MW41S-0314	2/12	19 - 22	38	NA	NA	NA	NA	No	NTX
	38411-25-5	PCB-174	34	260	PG/L	LDCA-MW41S-0314	3/12	19 - 22	260	NA	NA	NA	NA	No	NTX
	52663-65-7	PCB-176	27	27	PG/L	LDCA-MW41S-0314	1/12	19 - 22	27	NA	NA	NA	NA	No	NTX
	52663-70-4	PCB-177	50 J	150	PG/L	LDCA-MW41S-0314	2/12	19 - 22	150	NA	NA	NA	NA	No	NTX
	52663-67-9	PCB-178	30	60	PG/L	LDCA-MW41S-0314	2/12	19 - 22	60	NA	NA	NA	NA	No	NTX

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 1	52663-64-6	PCB-179	62	110	PG/L	LDCA-MW41S-0314	2/12	19 - 22	110	NA	NA	NA	NA	No	NTX
	--	PCB-18/30	26	3700	PG/L	LDCA-MW26S-0314	8/12	20 - 22	3,700	NA	NA	NA	NA	No	NTX
	--	PCB-180/193	25	480	PG/L	LDCA-MW41S-0314	7/12	21 - 21	480	NA	NA	NA	NA	No	NTX
	--	PCB-183/185	23	160	PG/L	LDCA-MW41S-0314	3/12	19 - 22	160	NA	NA	NA	NA	No	NTX
	52663-68-0	PCB-187	22	390	PG/L	LDCA-MW41S-0314	4/12	20 - 22	390	NA	NA	NA	NA	No	NTX
	38444-73-4	PCB-19	24	5700	PG/L	LDCA-MW26S-0314	9/12	20 - 22	5,700	NA	NA	NA	NA	No	NTX
	41411-64-7	PCB-190	26	42	PG/L	LDCA-MW41S-0314	2/12	19 - 22	42	NA	NA	NA	NA	No	NTX
	35694-08-7	PCB-194	57	130	PG/L	LDCA-MW41S-0314	2/12	19 - 22	130	NA	NA	NA	NA	No	NTX
	52663-78-2	PCB-195	25	59	PG/L	LDCA-MW41S-0314	2/12	19 - 22	59	NA	NA	NA	NA	No	NTX
	42740-50-1	PCB-196	33	70	PG/L	LDCA-MW41S-0314	2/12	19 - 22	70	NA	NA	NA	NA	No	NTX
	--	PCB-197/200	30 J	30 J	PG/L	LDCA-MW41S-0314	1/12	19 - 22	30	NA	NA	NA	NA	No	NTX
	--	PCB-198/199	77	210	PG/L	LDCA-MW41S-0314	2/12	19 - 22	210	NA	NA	NA	NA	No	NTX
	2051-61-8	PCB-2	29	2000	PG/L	LDCA-MW26S-0314	4/12	20 - 22	2,000	NA	NA	NA	NA	No	NTX
	--	PCB-20/28	29	1900	PG/L	LDCA-MW26S-0314	7/12	20 - 22	1,900	NA	NA	NA	NA	No	NTX
	2136-99-4	PCB-202	50	50	PG/L	LDCA-MW41S-0314	1/12	19 - 22	50	NA	NA	NA	NA	No	NTX
	52663-76-0	PCB-203	51	110	PG/L	LDCA-MW41S-0314	2/12	19 - 22	110	NA	NA	NA	NA	No	NTX
	40186-72-9	PCB-206	37	370	PG/L	LDCA-MW41S-0314	2/12	19 - 22	370	NA	NA	NA	NA	No	NTX
	52663-79-3	PCB-207	27	27	PG/L	LDCA-MW41S-0314	1/12	19 - 22	27	NA	NA	NA	NA	No	NTX
	52663-77-1	PCB-208	170	170	PG/L	LDCA-MW41S-0314	1/12	19 - 22	170	NA	NA	NA	NA	No	NTX
	2051-24-3	PCB-209	40	440	PG/L	LDCA-MW41S-0314	2/12	19 - 22	440	NA	NA	NA	NA	No	NTX
	--	PCB-21/33	30	700	PG/L	LDCA-MW26S-0314	5/12	20 - 22	700	NA	NA	NA	NA	No	NTX
	38444-85-8	PCB-22	21	510	PG/L	LDCA-MW26S-0314	5/12	20 - 22	510	NA	NA	NA	NA	No	NTX
	55702-45-9	PCB-24	67	67	PG/L	LDCA-MW26S-0314	1/12	19 - 22	67	NA	NA	NA	NA	No	NTX
	55712-37-3	PCB-25	32	420	PG/L	LDCA-MW26S-0314	5/12	20 - 22	420	NA	NA	NA	NA	No	NTX
	--	PCB-26/29	55	790	PG/L	LDCA-MW26S-0314	5/12	20 - 22	790	NA	NA	NA	NA	No	NTX
	38444-76-7	PCB-27	24	1200	PG/L	LDCA-MW26S-0314	7/12	20 - 22	1,200	NA	NA	NA	NA	No	NTX
	2051-62-9	PCB-3	24	11000	PG/L	LDCA-MW26S-0314	7/12	20 - 22	11,000	NA	NA	NA	NA	No	NTX
	16606-02-3	PCB-31	27	2100	PG/L	LDCA-MW26S-0314	7/12	20 - 22	2,100	NA	NA	NA	NA	No	NTX
	38444-77-8	PCB-32	23	2000	PG/L	LDCA-MW26S-0314	8/12	20 - 22	2,000	NA	NA	NA	NA	No	NTX
	--	PCB-34	35	35	PG/L	LDCA-MW26S-0314	1/12	19 - 22	35	NA	NA	NA	NA	No	NTX
	38444-90-5	PCB-37	31	170	PG/L	LDCA-MW26S-0314	3/12	19 - 22	170	NA	NA	NA	NA	No	NTX
	--	PCB-4	150	74000	PG/L	LDCA-MW26S-0314	9/12	20 - 33	74,000	NA	NA	NA	NA	No	NTX
	--	PCB-41/40/71	23	630	PG/L	LDCA-MW26S-0314	8/12	20 - 22	630	NA	NA	NA	NA	No	NTX
	36559-22-5	PCB-42	27	230	PG/L	LDCA-MW26S-0314	4/12	19 - 22	230	NA	NA	NA	NA	No	NTX
	70362-46-8	PCB-43	39	52	PG/L	LDCA-MW26S-0314	2/12	19 - 22	52	NA	NA	NA	NA	No	NTX
	--	PCB-44/47/65	24	1300	PG/L	LDCA-MW26S-0314	11/12	20 - 22	1,300	NA	NA	NA	NA	No	NTX
	--	PCB-45/51	32	590	PG/L	LDCA-MW26S-0314	9/12	20 - 22	590	NA	NA	NA	NA	No	NTX
	41464-47-5	PCB-46	22	160	PG/L	LDCA-MW26S-0314	5/12	20 - 22	160	NA	NA	NA	NA	No	NTX
	70362-47-9	PCB-48	37	160	PG/L	LDCA-MW26S-0314	3/12	19 - 22	160	NA	NA	NA	NA	No	NTX
	--	PCB-49/69	49	890	PG/L	LDCA-MW26S-0314	7/12	20 - 22	890	NA	NA	NA	NA	No	NTX
	16605-91-7	PCB-5	42	280	PG/L	LDCA-MW26S-0314	2/12	19 - 22	280	NA	NA	NA	NA	No	NTX
	--	PCB-50/53	45	600	PG/L	LDCA-MW26S-0314	8/12	20 - 22	600	NA	NA	NA	NA	No	NTX
	35693-99-3	PCB-52	28	1500	PG/L	LDCA-MW26S-0314	8/12	20 - 22	1,500	NA	NA	NA	NA	No	NTX
	15968-05-5	PCB-54	23	120	PG/L	LDCA-MW26S-0314	6/12	20 - 22	120	NA	NA	NA	NA	No	NTX
	41464-43-1	PCB-56	35	160	PG/L	LDCA-MW26S-0314	3/12	19 - 22	160	NA	NA	NA	NA	No	NTX
	--	PCB-59/62/75	59	89	PG/L	LDCA-MW26S-0314	2/12	19 - 22	89	NA	NA	NA	NA	No	NTX
	25569-80-6	PCB-6	34	3300	PG/L	LDCA-MW26S-0314	7/12	20 - 22	3,300	NA	NA	NA	NA	No	NTX
	33025-41-1	PCB-60	26	40	PG/L	LDCA-MW26S-0314	2/12	19 - 22	40	NA	NA	NA	NA	No	NTX
	--	PCB-61/70/74/76	55	690	PG/L	LDCA-MW26S-0314	5/12	19 - 22	690	NA	NA	NA	NA	No	NTX
	74472-34-7	PCB-63	26	26	PG/L	LDCA-MW26S-0314	1/12	19 - 22	26	NA	NA	NA	NA	No	NTX
	52663-58-8	PCB-64	36	310	PG/L	LDCA-MW26S-0314	4/12	19 - 22	310	NA	NA	NA	NA	No	NTX
	32598-10-0	PCB-66	28	370	PG/L	LDCA-MW26S-0314	5/12	19 - 22	370	NA	NA	NA	NA	No	NTX
	33284-50-3	PCB-7	25	940	PG/L	LDCA-MW26S-0314	6/12	20 - 22	940	NA	NA	NA	NA	No	NTX
	34883-43-7	PCB-8	68	13,000	PG/L	LDCA-MW26S-0314	7/12	20 - 30	13,000	NA	NA	NA	NA	No	NTX
	52663-62-4	PCB-82	27	31	PG/L	LDCA-MW26D-0314	2/12	19 - 22	31	NA	NA	NA	NA	No	NTX
	--	PCB-83/99	23	290	PG/L	LDCA-MW26D-0314	6/12	19 - 22	290	NA	NA	NA	NA	No	NTX
	52663-60-2	PCB-84	22	160	PG/L	LDCA-MW26S-0314	5/12	19 - 22	160	NA	NA	NA	NA	No	NTX
	--	PCB-85/116/117	22	45	PG/L	LDCA-MW26D-0314	3/12	19 - 22	45	NA	NA	NA	NA	No	NTX
	--	PCB-86/87/97/109/119/125	31	250	PG/L	LDCA-MW26D-0314	6/12	19 - 22	250	NA	NA	NA	NA	No	NTX

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 1
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 1	--	PCB-88/91	43	85	PG/L	LDCA-MW26D-0314	3/12	19 - 22	85	NA	NA	NA	NA	No	NTX
	34883-39-1	PCB-9	24	1,000	PG/L	LDCA-MW26S-0314	4/12	20 - 22	1,000	NA	NA	NA	NA	No	NTX
	--	PCB-90/101/113	48	490	PG/L	LDCA-MW26D-0314	7/12	20 - 22	490	NA	NA	NA	NA	No	NTX
	52663-61-3	PCB-92	25	100	PG/L	LDCA-MW26D-0314	3/12	19 - 22	100	NA	NA	NA	NA	No	NTX
	--	PCB-93/95/98/100/102	30	580	PG/L	LDCA-MW26D-0314	8/12	20 - 22	580	NA	NA	NA	NA	No	NTX
	73575-54-9	PCB-96	29	29	PG/L	LDCA-MW42-0314	1/12	19 - 22	29	NA	NA	NA	NA	No	NTX
	--	TEQ-DIOXIN-LIKE PCBS	0.0006	0.010	PG/L	LDCA-MW26D-0314	5/12	19 - 22	0.010	NA	0.12 C[10]	NA	NA	No	BSL
	--	**TEQ HALFND-DIOXIN-LIKE PCBS**	1.31	1.45	PG/L	LDCA-MW26D-0314	5/12	19 - 22	1.45	NA	**0.12 C[10]**	NA	NA	**Yes**	ASL
	--	**NONDIOXIN-LIKE PCBS**	100	213,644	PG/L	LDCA-MW26D-0314	12/12	--	213,644	NA	**44,000 C[11,J]**	NA	NA	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), November 2015. Carcinogenic values represent an incremental cancer risk of $1x10^{-6}$. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for pyrene.
8 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
9 - Value is for hexavalent chromium.
10 - Value is for 2,3,7,8-TCDD.
11 - Value is for polychlorinated biphenyls (low risk).
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:

LDCA-MW08-0314	LDCA-MW32-0314
LDCA-MW13S-0314	LDCA-MW33-0314
LDCA-MW14S-0314	LDCA-MW35-0314
LDCA-MW15S-0314	LDCA-MW38-0314
LDCA-MW16S-0314	LDCA-MW39-0314
LDCA-MW17S-0314-D	LDCA-MW40-0314
LDCA-MW17S-0314	LDCA-MW41D-0314
LDCA-MW18S-0314	LDCA-MW41D-0314-D
LDCA-MW24-0314	LDCA-MW41S-0314
LDCA-MW25-0314	LDCA-MW42-0314
LDCA-MW26D-0314	LDCA-MW43-0314
LDCA-MW26S-0314	LDCA-MW44-0314
LDCA-MW27-0314	LDCA-MW45-0314
LDCA-MW28-0314	LDCA-MW46-0314
LDCA-MW29-0314	LDCA-MW47-0314-D
LDCA-MW30-0314	LDCA-MW47-0314
LDCA-MW31-0314	

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 2	**SEMIVOLATILE ORGANICS - SIM**														
	123-91-1	**1,4-DIOXANE**	0.12 J	150	UG/L	LDCA-MW41D-1014	24/29	0.5 - 0.5	150	NA	**0.46 C**	NA	NA	**Yes**	ASL
	91-57-6	2-METHYLNAPHTHALENE	0.0064 J	3.3	UG/L	LDCA-MW25-1014	4/27	0.091 - 0.1	3.3	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.019 J	0.17	UG/L	LDCA-MW25-1014	4/27	0.091 - 0.1	0.17	NA	53 N	NA	NA	No	BSL
	208-96-8	ACENAPHTHYLENE	0.0057 J	0.081 J	UG/L	LDCA-MW14S-1014	9/27	0.091 - 0.1	0.081	NA	53 N[7]	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.029 J	0.63	UG/L	LDCA-MW41D-1014	7/27	0.091 - 0.1	0.63	NA	180 N	NA	NA	No	BSL
	56-55-3	**BENZO(A)ANTHRACENE**	0.0078 J	0.034 J	UG/L	LDCA-MW28-1014	3/27	0.091 - 0.1	0.034	NA	**0.012 C**	NA	NA	**Yes**	ASL
	205-99-2	BENZO(B)FLUORANTHENE	0.0054 J	0.0077 J	UG/L	LDCA-MW17S-1014-D	3/27	0.091 - 0.1	0.0077	NA	0.034 C	NA	NA	No	BSL
	207-08-9	BENZO(K)FLUORANTHENE	0.0072 J	0.0072 J	UG/L	LDCA-MW17S-1014-D	1/27	0.091 - 0.1	0.0072	NA	0.34 C	NA	NA	No	BSL
	206-44-0	FLUORANTHENE	0.0052 J	0.035 J	UG/L	LDCA-MW41D-1014	6/27	0.091 - 0.1	0.035	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.048 J	0.12	UG/L	LDCA-MW26S-1014	3/27	0.091 - 0.1	0.12	NA	29 N	NA	NA	No	BSL
	91-20-3	**NAPHTHALENE**	0.0075 J	5.2	UG/L	LDCA-MW25-1014	15/27	0.091 - 0.1	5.2	NA	**0.17 C**	NA	NA	**Yes**	ASL
	87-86-5	**PENTACHLOROPHENOL**	0.21 J	0.21 J	UG/L	LDCA-MW25-1014	1/10	0.2 - 0.2	0.21	NA	**0.041 C**	NA	NA	**Yes**	ASL
	85-01-8	PHENANTHRENE	0.0052 J	0.025 J	UG/L	LDCA-MW26S-1014	5/27	0.091 - 0.1	0.025	NA	12 N[8]	NA	NA	No	BSL
	129-00-0	PYRENE	0.015 J	0.025 J	UG/L	LDCA-MW08-1014	2/27	0.091 - 0.1	0.025	NA	12 N	NA	NA	No	BSL
	DIOXIN/FURANS														
	3268-87-9	1,2,3,4,6,7,8,9-OCDD	310	310	PG/L	LDCA-MW24-1014	1/13	0.399 - 4.88	310	NA	400 C[9]	NA	NA	No	BSL
	39001-02-0	1,2,3,4,6,7,8,9-OCDF	14.9 J	14.9 J	PG/L	LDCA-MW24-1014	1/13	0.412 - 2.45	14.9	NA	400 C[9]	NA	NA	No	BSL
	35822-46-9	**1,2,3,4,6,7,8-HPCDD**	2.21 Z	39.1 J	PG/L	LDCA-MW24-1014	5/13	0.434 - 1.15	39.1	NA	**12 C[9]**	NA	NA	**Yes**	ASL
	67562-39-4	**1,2,3,4,6,7,8-HPCDF**	5.09 Z	18 J	PG/L	LDCA-MW24-1014	2/13	0.293 - 1.38	18	NA	**12 C[9]**	NA	NA	**Yes**	ASL
	39227-28-6	1,2,3,4,7,8-HXCDD	1.07 Z	1.07 Z	PG/L	LDCA-MW26S-1014	1/13	0.256 - 2.55	1	NA	1.2 C[9]	NA	NA	No	BSL
	70648-26-9	**1,2,3,4,7,8-HXCDF**	1.42 J	5.32 Z	PG/L	LDCA-MW24-1014	2/13	0.201 - 2.73	5.32	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	57653-85-7	**1,2,3,6,7,8-HXCDD**	0.901 Z	1.49 J	PG/L	LDCA-MW26S-1014	2/13	0.227 - 2.23	1.49	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	57117-44-9	**1,2,3,6,7,8-HXCDF**	1.28 Z	3.57 J	PG/L	LDCA-MW24-1014	2/13	0.179 - 2.43	3.57	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	19408-74-3	**1,2,3,7,8,9-HXCDD**	0.478 Z	1.22 J	PG/L	LDCA-MW26S-1014	4/13	0.211 - 1.98	1.22	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	72918-21-9	**1,2,3,7,8,9-HXCDF**	1.34 J	1.34 J	PG/L	LDCA-MW26S-1014	1/13	0.242 - 3.46	1.34	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	40321-76-4	**1,2,3,7,8-PECDD**	0.844 Z	0.844 Z	PG/L	LDCA-MW26S-1014	1/13	0.361 - 3.8	0.844	NA	**0.12 C[9]**	NA	NA	**Yes**	ASL
	57117-41-6	1,2,3,7,8-PECDF	0.948 J	0.948 J	PG/L	LDCA-MW26S-1014	1/13	0.205 - 9.1	0.948	NA	4 C[9]	NA	NA	No	BSL
	60851-34-5	**2,3,4,6,7,8-HXCDF**	1.35 Z	5.65 Z	PG/L	LDCA-MW24-1014	2/13	0.178 - 2.37	5.65	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	57117-31-4	**2,3,4,7,8-PECDF**	1.04 Z	1.04 Z	PG/L	LDCA-MW26S-1014	1/13	0.209 - 9.34	1.04	NA	**0.4 C[9]**	NA	NA	**Yes**	ASL
	1746-01-6	**2,3,7,8-TCDD**	0.449 Z	0.449 Z	PG/L	LDCA-MW17S-1014-D	1/13	0.223 - 3.03	0.449	NA	**0.12 C**	NA	NA	**Yes**	ASL
	--	**2,3,7,8-TCDD TEQ**	0.022	2.12	PG/L	LDCA-MW24-1014	8/13	0.223 - 0.686	2.122	NA	**0.12 C**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	ALUMINUM	2.8 J	1660	UG/L	LDCA-MW15S-1014	9/27	20 - 1000	1,660	NA	2,000 N	NA	NA	No	BSL
	7440-36-0	ANTIMONY	0.13 J	0.13 J	UG/L	LDCA-MW41D-1014	1/27	2 - 60	0.13	NA	0.78 N	NA	NA	No	BSL
	7440-38-2	**ARSENIC**	0.12 J	51.3	UG/L	LDCA-MW15S-1014	15/27	0.5 - 10	51.3	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	33.1 J	1220	UG/L	LDCA-MW26S-1014	27/27	--	1,220	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.084 J	0.084 J	UG/L	LDCA-MW15S-1014	1/27	1 - 5	0.084	NA	2.5 N	NA	NA	No	BSL
	7440-42-8	**BORON**	28.9 J-	2920	UG/L	LDCA-MW25-1014	22/27	100 - 100	2,920	NA	**400 N**	NA	NA	**Yes**	ASL
	7440-43-9	**CADMIUM**	0.033 J	2.2	UG/L	LDCA-MW41D-1014	9/27	1 - 5	2.2	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	17300	197000	UG/L	LDCA-MW14S-1014	26/27	25000 - 25000	197,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.24 J	4.7 J	UG/L	LDCA-MW15S-1014	14/27	2 - 2	4.7	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.12 J	65.6	UG/L	LDCA-MW41D-1014	12/27	1 - 50	65.6	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.14 J-	15.9	UG/L	LDCA-MW41D-1014-D	20/27	2 - 25	15.9	NA	80 N	NA	NA	No	BSL
	TOTAL METALS														
	57-12-5	**CYANIDE**	1.1 J-	1.3 J-	UG/L	LDCA-MW47-1014	2/27	10 - 10	1.3	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	132 J	53400	UG/L	LDCA-MW15S-1014	16/27	100 - 200	53,400	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	0.35 J	19.8	UG/L	LDCA-MW25-1014	3/27	1 - 10	19.8	NA	**15**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	10800	105000	UG/L	LDCA-MW14S-1014	27/27	--	105,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	2.5	71800	UG/L	LDCA-MW41D-1014-D	27/27	--	71,800	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.015 J-	0.12 J	UG/L	LDCA-MW38-1014	6/27	0.2 - 0.2	0.12	NA	0.2 N[11]	NA	NA	No	BSL
	7440-02-0	NICKEL	1.1 J	32	UG/L	LDCA-MW41D-1014	27/27	--	32	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	2360	53800	UG/L	LDCA-MW25-1014	24/27	25000 - 25000	53,800	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.41 J	3.5 J	UG/L	LDCA-MW39-1014	6/27	5 - 35	3.5	NA	10 N	NA	NA	No	BSL
	7440-23-5	SODIUM	6640	2620000	UG/L	LDCA-MW25-1014	27/27	--	2,620,000	NA	NA	NA	NA	No	NUT

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 2	7440-28-0	**THALLIUM**	3.9 J	3.9 J	UG/L	LDCA-MW46-1014	1/27	1 - 25	3.9	NA	**0.02 N**	NA	NA	Yes	ASL
	7440-62-2	VANADIUM	0.26 J-	5.9 J	UG/L	LDCA-MW15S-1014	15/27	2.6 - 50	5.9	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	2 J	18.8 J	UG/L	LDCA-MW08-1014	18/27	2 - 60	18.8	NA	600 N	NA	NA	No	BSL
	FILTERED METALS														
	7429-90-5	ALUMINUM	2.8 J	3.6 J	UG/L	LDCA-MW17S-1014-D	1/27	20 - 200	3.6	NA	2,000 N	NA	NA	No	BSL
	7440-36-0	**ANTIMONY**	2 J-	2 J-	UG/L	LDCA-MW15S-1014	1/27	2 - 60	2	NA	**0.78 N**	NA	NA	Yes	ASL
	7440-38-2	**ARSENIC**	0.15 J	49.2	UG/L	LDCA-MW15S-1014	23/27	0.5 - 10	49.2	NA	**0.052 C**	NA	NA	Yes	ASL
	7440-39-3	**BARIUM**	37.9	1130	UG/L	LDCA-MW26S-1014	23/27	200 - 200	1,130	NA	**380 N**	NA	NA	Yes	ASL
	7440-41-7	BERYLLIUM	0.052 J	0.052 J	UG/L	LDCA-MW18S-1014	1/27	1 - 5	0.052	NA	2.5 N	NA	NA	No	BSL
	7440-43-9	**CADMIUM**	0.029 J	2.2	UG/L	LDCA-MW41D-1014	4/27	1 - 5	2.200	NA	**0.92 N**	NA	NA	Yes	ASL
	7440-70-2	CALCIUM	17400	278000	UG/L	LDCA-MW38-1014	27/27	--	278,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.25 J	3	UG/L	LDCA-MW38-1014	8/27	2 - 10	3	NA	**0.035 C**[10]	NA	NA	Yes	ASL
	7440-48-4	**COBALT**	0.11 J	59.6 J	UG/L	LDCA-MW41D-1014	16/27	1 - 50	59.6	NA	**0.6 N**	NA	NA	Yes	ASL
	7440-50-8	COPPER	0.17 J	15	UG/L	LDCA-MW41D-1014	14/27	2 - 25	15	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	129	52900	UG/L	LDCA-MW15S-1014	14/27	100 - 200	52,900	NA	**1,400 N**	NA	NA	Yes	ASL
	7439-92-1	LEAD	0.061 J	0.072 J	UG/L	LDCA-MW17S-1014-D	2/27	1 - 10	0.072	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	10700	145000	UG/L	LDCA-MW38-1014	27/27	--	145,000	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	4.6	77000	UG/L	LDCA-MW41D-1014-D	26/27	1 - 1	77,000	NA	**43 N**	NA	NA	Yes	ASL
	7439-97-6	MERCURY	0.018 J-	0.14 J	UG/L	LDCA-MW38-1014	9/27	0.2 - 0.2	0.14	NA	0.2 N[11]	NA	NA	No	BSL
	7440-02-0	NICKEL	1	34 J	UG/L	LDCA-MW41D-1014	21/27	40 - 40	34	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	2350	63000 J	UG/L	LDCA-MW38-1014	27/27	--	63,000	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.4 J	2.9 J	UG/L	LDCA-MW39-1014	7/27	5 - 35	2.9	NA	10 N	NA	NA	No	BSL
	7440-23-5	SODIUM	6610	492000	UG/L	LDCA-MW38-1014	27/27	--	492,000	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.24 J	2.7	UG/L	LDCA-MW38-1014	12/27	2.6 - 50	2.7	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	2.2 J	11.1 J	UG/L	LDCA-MW38-1014	16/27	2 - 60	11.1	NA	600 N	NA	NA	No	BSL
	PERFLUORINATED COMPOUNDS														
	335-67-1	**PENTADECAFLUOROOCTANOIC ACID**	0.012 J	2	UG/L	LDCA-MW14S-1014	27/29	0.02 - 0.2	2	NA	**0.04 N**[18]	NA	NA	Yes	ASL
	375-85-9	PERFLUOROHEPTANOIC ACID	0.0049 J	0.17	UG/L	LDCA-MW24-1014	24/29	0.01 - 0.1	0.17	NA	NA	NA	NA	No	NTX
	355-46-4	PERFLUOROHEXANE SULFONIC ACID	0.012 J	0.36	UG/L	LDCA-MW24-1014	13/29	0.029 - 0.31	0.36	NA	NA	NA	NA	No	NTX
	375-95-1	PERFLUORONONANOIC ACID	0.014 J	0.055	UG/L	LDCA-MW08-1014	15/29	0.02 - 0.2	0.055	NA	NA	NA	NA	No	NTX
	1763-23-1	**PERFLUOROOCTANE SULFONIC ACID**	0.015 J	0.42	UG/L	LDCA-MW08-1014	20/29	0.039 - 0.41	0.42	NA	**0.04 N**[19]	NA	NA	Yes	ASL
	PESTICIDES														
	72-54-8	4,4'-DDD	0.00017 J	0.0056 J	UG/L	LDCA-MW25-1014	18/29	0.0093 - 0.01	0.0056	NA	0.032 C	NA	NA	No	BSL
	72-55-9	4,4'-DDE	0.0001 J	0.0017 J	UG/L	LDCA-MW38-1014, LDCA-MW41D-1014	25/29	0.0097 - 0.01	0.0017	NA	0.046 C	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.00017 J	0.00057 J	UG/L	LDCA-MW26D-1014	3/29	0.0093 - 0.01	0.00057	NA	0.23 C	NA	NA	No	BSL
	309-00-2	**ALDRIN**	0.00015 J	0.0059 J	UG/L	LDCA-MW25-1014	21/29	0.0045 - 0.005	0.0059	NA	**0.00092 C**	NA	NA	Yes	ASL
	319-84-6	ALPHA-BHC	0.0001 J	0.0026 J	UG/L	LDCA-MW41D-1014	18/29	0.00093 - 0.001	0.0026	NA	0.0072 C	NA	NA	No	BSL
	5103-71-9	ALPHA-CHLORDANE	0.0001 J	0.0035 J	UG/L	LDCA-MW33-1014	19/29	0.0049 - 0.005	0.0035	NA	0.045 C[12]	NA	NA	No	BSL
	319-85-7	BETA-BHC	0.0002 J	0.0049	UG/L	LDCA-MW16S-1014	15/29	0.00091 - 0.005	0.0049	NA	0.025 C	NA	NA	No	BSL
	319-86-8	DELTA-BHC	0.00013 J	0.0069	UG/L	LDCA-MW24-1014	20/29	0.0046 - 0.005	0.0069	NA	0.0072 C[13]	NA	NA	No	BSL
	60-57-1	**DIELDRIN**	0.00019 J	0.042	UG/L	LDCA-MW18S-1014	24/29	0.0019 - 0.002	0.042	NA	**0.0018 C**	NA	NA	Yes	ASL
	959-98-8	ENDOSULFAN I	0.0001 J	0.0019 J	UG/L	LDCA-MW25-1014	16/29	0.0046 - 0.005	0.0019	NA	10 N[14]	NA	NA	No	BSL
	33213-65-9	ENDOSULFAN II	0.00021 J	0.0031 J	UG/L	LDCA-MW26D-1014	4/29	0.0093 - 0.01	0.0031	NA	10 N[14]	NA	NA	No	BSL
	1031-07-8	ENDOSULFAN SULFATE	0.00025 J	0.0013 J	UG/L	LDCA-MW41D-1014	13/29	0.0091 - 0.01	0.0013	NA	10 N	NA	NA	No	BSL
	72-20-8	ENDRIN	0.00019 J	0.0027 J	UG/L	LDCA-MW25-1014	12/29	0.0093 - 0.01	0.0027	NA	0.23 N	NA	NA	No	BSL
	7421-93-4	ENDRIN ALDEHYDE	0.00016 J	0.0041 J	UG/L	LDCA-MW25-1014	11/29	0.0091 - 0.01	0.0041	NA	0.23 N[15]	NA	NA	No	BSL
	53494-70-5	ENDRIN KETONE	0.00019 J	0.0053 J	UG/L	LDCA-MW18S-1014	17/29	0.0097 - 0.01	0.0053	NA	0.23 N[15]	NA	NA	No	BSL
	58-89-9	GAMMA-BHC (LINDANE)	0.0001 J	0.002 J	UG/L	LDCA-MW25-1014, LDCA-MW46-1014	27/29	0.005 - 0.005	0.002	NA	0.042 C	NA	NA	No	BSL
	5103-74-2	GAMMA-CHLORDANE	0.00019 J	0.0031 J	UG/L	LDCA-MW38-1014	23/29	0.0048 - 0.005	0.0031	NA	0.045 C	NA	NA	No	BSL
	76-44-8	**HEPTACHLOR**	0.0003 J	0.0028 J	UG/L	LDCA-MW25-1014	15/29	0.00093 - 0.001	0.0028	NA	**0.0014 C**	NA	NA	Yes	ASL
	1024-57-3	**HEPTACHLOR EPOXIDE**	0.00022 J	0.0039 J	UG/L	LDCA-MW25-1014	19/29	0.0019 - 0.002	0.0039	NA	**0.0014 C**	NA	NA	Yes	ASL
	72-43-5	METHOXYCHLOR	0.0003 J	0.0069 J	UG/L	LDCA-MW25-1014	15/29	0.046 - 0.05	0.0069	NA	3.7 N	NA	NA	No	BSL

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LOWER DARBY CREEK AREA

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Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 2	**SEMIVOLATILES**														
	91-57-6	2-METHYLNAPHTHALENE	3.3 J	3.3 J	UG/L	LDCA-MW25-1014	1/29	4.5 - 5	3.3	NA	3.6 N	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.91 J	0.91 J	UG/L	LDCA-MW41D-1014	1/29	4.5 - 5	0.91	NA	180 N	NA	NA	No	BSL
	111-44-4	**BIS(2-CHLOROETHYL)ETHER**	1.2 J	1.2 J	UG/L	LDCA-MW14S-1014	1/29	4.5 - 5	1.2	NA	**0.014 C**	NA	NA	**Yes**	ASL
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.32 J	0.32 J	UG/L	LDCA-MW24-1014	1/29	4.5 - 5	0.32	NA	5.6 C	NA	NA	No	BSL
	91-20-3	**NAPHTHALENE**	5.2	5.2	UG/L	LDCA-MW25-1014	1/29	4.5 - 5	5.2	NA	**0.17 C**	NA	NA	**Yes**	ASL
	VOLATILES														
	79-00-5	**1,1,2-TRICHLOROETHANE**	0.12 J	0.12 J	UG/L	LDCA-MW25-1014	1/29	0.5 - 5	0.12	NA	**0.041 N**	NA	NA	**Yes**	ASL
	75-34-3	1,1-DICHLOROETHANE	0.2 J	0.27 J	UG/L	LDCA-MW38-1014	2/29	0.5 - 5	0.27	NA	2.8 C	NA	NA	No	BSL
	75-35-4	1,1-DICHLOROETHENE	0.33 J	0.46 J	UG/L	LDCA-MW38-1014	2/29	0.5 - 5	0.46	NA	28 N	NA	NA	No	BSL
	96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE**	0.23 J	0.23 J	UG/L	LDCA-MW39-1014	1/29	0.5 - 5	0.23	NA	**0.00033 C**	NA	NA	**Yes**	ASL
	95-50-1	1,2-DICHLOROBENZENE	0.22 J	3.4	UG/L	LDCA-MW25-1014	2/29	0.5 - 5	3.4	NA	30 N	NA	NA	No	BSL
	107-06-2	**1,2-DICHLOROETHANE**	1.1	1.1	UG/L	LDCA-MW14S-1014	1/29	0.5 - 5	1.1	NA	**0.17 C**	NA	NA	**Yes**	ASL
	106-46-7	**1,4-DICHLOROBENZENE**	0.1 J	0.77	UG/L	LDCA-MW26S-1014	6/29	0.5 - 5	0.77	NA	**0.48 C**	NA	NA	**Yes**	ASL
	78-93-3	2-BUTANONE	6	13	UG/L	LDCA-MW24-1014	2/29	5 - 5	13	NA	560 N	NA	NA	No	BSL
	67-64-1	ACETONE	1.5 J	54	UG/L	LDCA-MW24-1014	14/29	5 - 5	54	NA	1,400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.1 J	5.9	UG/L	LDCA-MW25-1014	5/29	0.5 - 5	5.9	NA	**0.46 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.089 J	1.3	UG/L	LDCA-MW41S-1014	6/29	0.5 - 5	1.3	NA	81 N	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	0.13 J	7.5	UG/L	LDCA-MW38-1014	9/29	0.5 - 5	7.5	NA	7.8 N	NA	NA	No	BSL
	67-66-3	CHLOROFORM	0.17 J	0.17 J	UG/L	LDCA-MW39-1014	1/29	0.5 - 5	0.17	NA	0.22 C	NA	NA	No	BSL
	74-87-3	CHLOROMETHANE	0.14 J	0.14 J	UG/L	LDCA-MW16S-1014	1/29	0.5 - 5	0.14	NA	19 N	NA	NA	No	BSL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	0.073 J	94	UG/L	LDCA-MW38-1014	12/29	0.5 - 5	94	NA	**3.6 N**	NA	NA	**Yes**	ASL
	100-41-4	**ETHYLBENZENE**	3.5	3.5	UG/L	LDCA-MW25-1014	1/29	0.5 - 5	3.5	NA	**1.5 C**	NA	NA	**Yes**	ASL
	98-82-8	ISOPROPYLBENZENE	0.63	0.63	UG/L	LDCA-MW25-1014	1/29	0.5 - 5	0.63	NA	45 N	NA	NA	No	BSL
	--	M+P-XYLENES	16	16	UG/L	LDCA-MW25-1014	1/29	0.5 - 5	16	NA	19 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.35 J	0.35 J	UG/L	LDCA-MW25-1014	1/29	0.5 - 5	0.35	NA	NA	NA	NA	No	NA
	1634-04-4	METHYL TERT-BUTYL ETHER	0.11 J	2.6	UG/L	LDCA-MW38-1014	14/29	0.5 - 5	2.6	NA	14 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	13	13	UG/L	LDCA-MW25-1014	1/29	0.5 - 5	13	NA	19 N	NA	NA	No	BSL
	127-18-4	TETRACHLOROETHENE	0.16 J	0.57	UG/L	LDCA-MW08-1014	2/29	0.5 - 5	0.57	NA	4.1 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.093 J	9.3	UG/L	LDCA-MW25-1014	2/29	0.5 - 5	9.3	NA	110 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	0.2 J	0.4 J	UG/L	LDCA-MW38-1014	3/29	0.5 - 5	0.4	NA	36 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	0.16 J	14	UG/L	LDCA-MW38-1014	5/29	0.5 - 5	14	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**VINYL CHLORIDE**	0.14 J	2.2	UG/L	LDCA-MW38-1014	6/29	0.5 - 5	2.2	NA	**0.019 C**	NA	NA	**Yes**	ASL
	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	6.2 Z	68000	PG/L	LDCA-MW26S-1014	11/12	21 - 21	68,000	NA	NA	NA	NA	No	NTX
	33146-45-1	PCB-10	65	2800	PG/L	LDCA-MW26S-1014	4/12	20 - 56	2,800	NA	NA	NA	NA	No	NTX
	--	PCB-103	5.6 J	5.6 J	PG/L	LDCA-MW26D-1014	1/12	19 - 29	6	NA	NA	NA	NA	No	NTX
	--	PCB-104	3.1 Z	3.1 Z	PG/L	LDCA-MW26S-1014	1/12	19 - 21	3.1	NA	NA	NA	NA	No	NTX
	32598-14-4	PCB-105	2 Z	380	PG/L	LDCA-MW24-1014	7/12	19 - 21	380	NA	4,000 C	NA	NA	No	BSL
	--	PCB-107/124	32	32	PG/L	LDCA-MW24-1014	1/12	19 - 21	32	NA	NA	NA	NA	No	NTX
	74472-35-8	PCB-109	4 Z	69	PG/L	LDCA-MW24-1014	3/12	19 - 21	69	NA	NA	NA	NA	No	NTX
	2050-67-1	PCB-11	27	1300 J+	PG/L	LDCA-MW26S-1014	6/12	21 - 1100	1,300	NA	NA	NA	NA	No	NTX
	--	PCB-110/115	8.9 J	1700	PG/L	LDCA-MW24-1014	10/12	20 - 21	1,700	NA	NA	NA	NA	No	NTX
	31508-00-6	PCB-118	2.8 Z	1000	PG/L	LDCA-MW24-1014	12/12	20 - 20	1,000	NA	4,000 C	NA	NA	No	BSL
	--	PCB-12/13	840	840	PG/L	LDCA-MW26S-1014	1/12	19 - 54	840	NA	NA	NA	NA	No	NTX
	--	PCB-128/166	4 Z	230	PG/L	LDCA-MW24-1014	6/12	19 - 21	230	NA	NA	NA	NA	No	NTX
	--	PCB-129/138/163	4.8 J	1700	PG/L	LDCA-MW24-1014	12/12	--	1,700	NA	NA	NA	NA	No	NTX
	52663-66-8	PCB-130	13 Z	99	PG/L	LDCA-MW24-1014	2/12	19 - 21	99	NA	NA	NA	NA	No	NTX
	38380-05-1	PCB-132	11 J	600	PG/L	LDCA-MW24-1014	9/12	19 - 21	600	NA	NA	NA	NA	No	NTX
	--	PCB-134/143	7.4 J	91	PG/L	LDCA-MW24-1014	3/12	19 - 21	91	NA	NA	NA	NA	No	NTX
	--	PCB-135/151	2.5 Z	690	PG/L	LDCA-MW24-1014	10/12	20 - 21	690	NA	NA	NA	NA	No	NTX
	38411-22-2	PCB-136	1.8 Z	280	PG/L	LDCA-MW24-1014	10/12	20 - 21	280	NA	NA	NA	NA	No	NTX
	35694-06-5	PCB-137	5 J	74	PG/L	LDCA-MW24-1014	3/12	19 - 21	74	NA	NA	NA	NA	No	NTX
	--	PCB-139/140	25	25	PG/L	LDCA-MW24-1014	1/12	19 - 21	25	NA	NA	NA	NA	No	NTX
	52712-04-6	PCB-141	11 J	350	PG/L	LDCA-MW24-1014	8/12	19 - 21	350	NA	NA	NA	NA	No	NTX
	68194-14-9	PCB-144	3.3 Z	96	PG/L	LDCA-MW24-1014	5/12	19 - 21	96	NA	NA	NA	NA	No	NTX
	51908-16-8	PCB-146	5.1 Z	230	PG/L	LDCA-MW24-1014	8/12	19 - 21	230	NA	NA	NA	NA	No	NTX

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 2	--	PCB-147/149	4.2 J	1600	PG/L	LDCA-MW24-1014	11/12	20 - 20	1,600	NA	NA	NA	NA	No	NTX
	2050-68-2	PCB-15	91	2700	PG/L	LDCA-MW26S-1014	4/12	19 - 72	2,700	NA	NA	NA	NA	No	NTX
	--	PCB-153/168	4.8 Z	1400	PG/L	LDCA-MW24-1014	12/12	--	1,400	NA	NA	NA	NA	No	NTX
	--	PCB-156/157	7.3 J	180	PG/L	LDCA-MW24-1014	5/12	19 - 21	180	NA	4,000 C	NA	NA	No	BSL
	74472-42-7	PCB-158	2.5 Z	170	PG/L	LDCA-MW24-1014	6/12	19 - 21	170	NA	NA	NA	NA	No	NTX
	39635-35-3	PCB-159	16 Z	16 Z	PG/L	LDCA-MW24-1014	1/12	19 - 21	16	NA	NA	NA	NA	No	NTX
	38444-78-9	PCB-16	4.5 J	1200	PG/L	LDCA-MW26S-1014	7/12	20 - 21	1,200	NA	NA	NA	NA	No	NTX
	74472-43-8	PCB-161	15 Z	15 Z	PG/L	LDCA-MW39-1014	1/12	19 - 21	15	NA	NA	NA	NA	No	NTX
	39635-34-2	PCB-162	2.9 Z	2.9 Z	PG/L	LDCA-MW24-1014	1/12	19 - 21	2.9	NA	NA	NA	NA	No	NTX
	74472-45-0	PCB-164	5.6 Z	110	PG/L	LDCA-MW24-1014	6/12	19 - 21	110	NA	NA	NA	NA	No	NTX
	52663-72-6	PCB-167	4.8 J	52	PG/L	LDCA-MW24-1014	3/12	19 - 21	52	NA	4,000 C	NA	NA	No	BSL
	37680-66-3	PCB-17	7.4 J	3100	PG/L	LDCA-MW26S-1014	9/12	20 - 20	3,100	NA	NA	NA	NA	No	NTX
	35065-30-6	PCB-170	3.5 Z	400	PG/L	LDCA-MW24-1014	8/12	19 - 21	400	NA	NA	NA	NA	No	NTX
	--	PCB-171/173	3.4 J	160	PG/L	LDCA-MW24-1014	5/12	19 - 21	160	NA	NA	NA	NA	No	NTX
	52663-74-8	PCB-172	2.1 J	73	PG/L	LDCA-MW24-1014	6/12	19 - 21	73	NA	NA	NA	NA	No	NTX
	38411-25-5	PCB-174	2.8 Z	620	PG/L	LDCA-MW24-1014	10/12	20 - 21	620	NA	NA	NA	NA	No	NTX
	40186-70-7	PCB-175	18 J	18 J	PG/L	LDCA-MW24-1014	1/12	19 - 21	18	NA	NA	NA	NA	No	NTX
	52663-65-7	PCB-176	11 J	65	PG/L	LDCA-MW24-1014	3/12	19 - 21	65	NA	NA	NA	NA	No	NTX
	52663-70-4	PCB-177	1.7 Z	320	PG/L	LDCA-MW24-1014	8/12	19 - 21	320	NA	NA	NA	NA	No	NTX
	52663-67-9	PCB-178	6.1 Z	93	PG/L	LDCA-MW24-1014	4/12	19 - 21	93	NA	NA	NA	NA	No	NTX
	52663-64-6	PCB-179	3.7 J	240	PG/L	LDCA-MW24-1014	8/12	19 - 21	240	NA	NA	NA	NA	No	NTX
	--	PCB-18/30	5.8 J	3100	PG/L	LDCA-MW26S-1014	12/12	20 - 20	3,100	NA	NA	NA	NA	No	NTX
	--	PCB-180/193	2.2 Z	1000	PG/L	LDCA-MW24-1014	11/12	21 - 21	1,000	NA	NA	NA	NA	No	NTX
	52663-69-1	PCB-183	2.1 Z	300	PG/L	LDCA-MW24-1014	10/12	19 - 21	300	NA	NA	NA	NA	No	NTX
	52712-05-7	PCB-185	6.3 J	55 Z	PG/L	LDCA-MW24-1014	3/12	19 - 21	55	NA	NA	NA	NA	No	NTX
	52663-68-0	PCB-187	3.2 Z	580	PG/L	LDCA-MW24-1014	10/12	19 - 21	580	NA	NA	NA	NA	No	NTX
	39635-31-9	PCB-189	14 J	14 J	PG/L	LDCA-MW24-1014	1/12	19 - 21	14	NA	4,000 C	NA	NA	No	BSL
	38444-73-4	PCB-19	14 Z	5300	PG/L	LDCA-MW26S-1014	11/12	20 - 20	5,300	NA	NA	NA	NA	No	NTX
	41411-64-7	PCB-190	1.5 Z	75	PG/L	LDCA-MW24-1014	5/12	19 - 21	75	NA	NA	NA	NA	No	NTX
	74472-50-7	PCB-191	2.9 Z	14 J	PG/L	LDCA-MW24-1014	2/12	19 - 21	14	NA	NA	NA	NA	No	NTX
	35694-08-7	PCB-194	4.5 J	210	PG/L	LDCA-MW24-1014	5/12	19 - 21	210	NA	NA	NA	NA	No	NTX
	52663-78-2	PCB-195	6.2 J	67	PG/L	LDCA-MW24-1014	4/12	19 - 21	67	NA	NA	NA	NA	No	NTX
	42740-50-1	PCB-196	20	130	PG/L	LDCA-MW24-1014	4/12	19 - 21	130	NA	NA	NA	NA	No	NTX
	--	PCB-197	10 J	10 J	PG/L	LDCA-MW24-1014	1/12	19 - 21	10	NA	NA	NA	NA	No	NTX
	--	PCB-198/199	4.6 Z	320	PG/L	LDCA-MW24-1014	5/12	19 - 21	320	NA	NA	NA	NA	No	NTX
	2051-61-8	PCB-2	12 Z	1400	PG/L	LDCA-MW26S-1014	2/12	20 - 160	1,400	NA	NA	NA	NA	No	NTX
	--	PCB-20/28	12 Z	1400	PG/L	LDCA-MW26S-1014	8/12	20 - 20	1,400	NA	NA	NA	NA	No	NTX
	52663-73-7	PCB-200	7.2 J	37	PG/L	LDCA-MW24-1014	3/12	19 - 21	37	NA	NA	NA	NA	No	NTX
	40186-71-8	PCB-201	3.5 J	42	PG/L	LDCA-MW24-1014	4/12	19 - 21	42	NA	NA	NA	NA	No	NTX
	2136-99-4	PCB-202	7.1 J	65	PG/L	LDCA-MW24-1014	4/12	19 - 21	65	NA	NA	NA	NA	No	NTX
	52663-76-0	PCB-203	1.8 Z	200	PG/L	LDCA-MW24-1014	5/12	19 - 21	200	NA	NA	NA	NA	No	NTX
	74472-53-0	PCB-205	8.3 J	8.3 J	PG/L	LDCA-MW24-1014	1/12	19 - 21	8.3	NA	NA	NA	NA	No	NTX
	40186-72-9	PCB-206	4.1 Z	220	PG/L	LDCA-MW24-1014	5/12	19 - 21	220	NA	NA	NA	NA	No	NTX
	52663-79-3	PCB-207	3.9 Z	26	PG/L	LDCA-MW24-1014	4/12	19 - 21	26	NA	NA	NA	NA	No	NTX
	52663-77-1	PCB-208	12 J	86	PG/L	LDCA-MW08-1014	4/12	19 - 21	86	NA	NA	NA	NA	No	NTX
	2051-24-3	PCB-209	6.1 J	350	PG/L	LDCA-MW08-1014	4/12	19 - 21	350	NA	NA	NA	NA	No	NTX
	--	PCB-21/33	5.9 J	540	PG/L	LDCA-MW26S-1014	7/12	20 - 21	540	NA	NA	NA	NA	No	NTX
	38444-85-8	PCB-22	4.3 Z	420	PG/L	LDCA-MW26S-1014	6/12	20 - 21	420	NA	NA	NA	NA	No	NTX
	55702-45-9	PCB-24	2.1 Z	2.1 Z	PG/L	LDCA-MW41D-1014-D	1/12	19 - 21	2.1	NA	NA	NA	NA	No	NTX
	55712-37-3	PCB-25	36	370	PG/L	LDCA-MW26S-1014	4/12	20 - 21	370	NA	NA	NA	NA	No	NTX
	--	PCB-26/29	3.1 J	700	PG/L	LDCA-MW26S-1014	6/12	19 - 21	700	NA	NA	NA	NA	No	NTX
	38444-76-7	PCB-27	3.9 Z, J	970	PG/L	LDCA-MW26S-1014	7/12	20 - 21	970	NA	NA	NA	NA	No	NTX
	2051-62-9	PCB-3	5.2 Z	10000	PG/L	LDCA-MW26S-1014	7/12	20 - 21	10,000	NA	NA	NA	NA	No	NTX
	16606-02-3	PCB-31	9.5 Z	1700	PG/L	LDCA-MW26S-1014	8/12	20 - 20	1,700	NA	NA	NA	NA	No	NTX
	38444-77-8	PCB-32	3.9 J	1500	PG/L	LDCA-MW26S-1014	8/12	20 - 21	1,500	NA	NA	NA	NA	No	NTX
	38444-87-0	PCB-36	27	27	PG/L	LDCA-MW24-1014	1/12	19 - 33	27	NA	NA	NA	NA	No	NTX
	38444-90-5	PCB-37	110	120	PG/L	LDCA-MW26S-1014	2/12	19 - 21	120	NA	NA	NA	NA	No	NTX

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 2	--	PCB-4	120	66000	PG/L	LDCA-MW26S-1014	8/12	29 - 75	66,000	NA	NA	NA	NA	No	NTX
	--	PCB-40/71	5.4 Z	440	PG/L	LDCA-MW26S-1014	9/12	20 - 21	440	NA	NA	NA	NA	No	NTX
	52663-59-9	PCB-41	2 Z	31	PG/L	LDCA-MW24-1014	4/12	19 - 21	31	NA	NA	NA	NA	No	NTX
	36559-22-5	PCB-42	3.9 Z	190	PG/L	LDCA-MW26S-1014	8/12	20 - 21	190	NA	NA	NA	NA	No	NTX
	70362-46-8	PCB-43	18 Z	52	PG/L	LDCA-MW26S-1014	3/12	19 - 21	52	NA	NA	NA	NA	No	NTX
	--	PCB-44/47/65	26	1100	PG/L	LDCA-MW26S-1014	12/12	--	1,100	NA	NA	NA	NA	No	NTX
	70362-45-7	PCB-45	2.1 Z	200	PG/L	LDCA-MW26S-1014	8/12	19 - 21	200	NA	NA	NA	NA	No	NTX
	41464-47-5	PCB-46	37	140	PG/L	LDCA-MW26S-1014	5/12	19 - 21	140	NA	NA	NA	NA	No	NTX
	70362-47-9	PCB-48	2.6 Z	140	PG/L	LDCA-MW26S-1014	5/12	19 - 21	140	NA	NA	NA	NA	No	NTX
	--	PCB-49/69	8.6 Z,	750	PG/L	LDCA-MW26S-1014	10/12	20 - 20	750	NA	NA	NA	NA	No	NTX
	16605-91-7	PCB-5	720	720	PG/L	LDCA-MW26S-1014	1/12	19 - 50	720	NA	NA	NA	NA	No	NTX
	--	PCB-50/53	6.2 J	490	PG/L	LDCA-MW26S-1014	10/12	20 - 20	490	NA	NA	NA	NA	No	NTX
	68194-04-7	PCB-51	16 J	340	PG/L	LDCA-MW26S-1014	11/12	20 - 20	340	NA	NA	NA	NA	No	NTX
	35693-99-3	PCB-52	12 J	1400	PG/L	LDCA-MW24-1014, LDCA-MW26S-1014	12/12	--	1,400	NA	NA	NA	NA	No	NTX
	15968-05-5	PCB-54	1.6 Z	100 Z	PG/L	LDCA-MW38-1014	9/12	20 - 20	100	NA	NA	NA	NA	No	NTX
	41464-43-1	PCB-56	4.4 Z	150	PG/L	LDCA-MW24-1014	5/12	19 - 21	150	NA	NA	NA	NA	No	NTX
	70424-67-8	PCB-57	30	30	PG/L	LDCA-MW24-1014	1/12	19 - 21	30	NA	NA	NA	NA	No	NTX
	--	PCB-59/62/75	22	70	PG/L	LDCA-MW26S-1014	3/12	19 - 21	70	NA	NA	NA	NA	No	NTX
	25569-80-6	PCB-6	88	3500	PG/L	LDCA-MW26S-1014	4/12	19 - 50	3,500	NA	NA	NA	NA	No	NTX
	33025-41-1	PCB-60	25 Z	73	PG/L	LDCA-MW24-1014	2/12	19 - 21	73	NA	NA	NA	NA	No	NTX
	--	PCB-61/70/74/76	13 J	940	PG/L	LDCA-MW24-1014	8/12	20 - 21	940	NA	NA	NA	NA	No	NTX
	74472-34-7	PCB-63	4.5 J	20 J	PG/L	LDCA-MW26S-1014	3/12	19 - 21	20	NA	NA	NA	NA	No	NTX
	52663-58-8	PCB-64	4.5 J	230	PG/L	LDCA-MW26S-1014	8/12	20 - 21	230	NA	NA	NA	NA	No	NTX
	32598-10-0	PCB-66	5 Z	430	PG/L	LDCA-MW24-1014	8/12	20 - 21	430	NA	NA	NA	NA	No	NTX
	73575-53-8	PCB-67	11 Z	11 Z	PG/L	LDCA-MW26S-1014	1/12	19 - 21	11	NA	NA	NA	NA	No	NTX
	73575-52-7	PCB-68	3.7 Z	13 Z	PG/L	LDCA-MW26S-1014	6/12	20 - 21	13	NA	NA	NA	NA	No	NTX
	33284-50-3	PCB-7	67	710	PG/L	LDCA-MW26S-1014	3/12	19 - 49	710	NA	NA	NA	NA	No	NTX
	41464-42-0	PCB-72	12 Z	12 Z	PG/L	LDCA-MW26S-1014	1/12	19 - 21	12	NA	NA	NA	NA	No	NTX
	74338-23-1	PCB-73	18 J	18 J	PG/L	LDCA-MW26S-1014	1/12	19 - 21	18	NA	NA	NA	NA	No	NTX
	32598-13-3	PCB-77	26	26	PG/L	LDCA-MW24-1014	1/12	19 - 21	26	NA	6,000 C	NA	NA	No	BSL
	34883-43-7	PCB-8	99 Z	11,000	PG/L	LDCA-MW26S-1014	5/12	20 - 48	11,000	NA	NA	NA	NA	No	NTX
	52663-62-4	PCB-82	11 J	160	PG/L	LDCA-MW24-1014	5/12	19 - 21	160	NA	NA	NA	NA	No	NTX
	52663-60-2	PCB-84	2.9 J	470	PG/L	LDCA-MW24-1014	9/12	19 - 21	470	NA	NA	NA	NA	No	NTX
	--	PCB-85/116/117	13 J	180	PG/L	LDCA-MW24-1014	5/12	19 - 21	180	NA	NA	NA	NA	No	NTX
	--	PCB-86/87/97/108/119/125	3.7 J	970	PG/L	LDCA-MW24-1014	11/12	20 - 20	970	NA	NA	NA	NA	No	NTX
	55215-17-3	PCB-88	7.5 Z	200	PG/L	LDCA-MW24-1014	6/9	19 - 20	200	NA	NA	NA	NA	No	NTX
	--	PCB-88/91	7.5 Z	200	PG/L	LDCA-MW24-1014	8/12	19 - 21	200	NA	NA	NA	NA	No	NTX
	73575-57-2	PCB-89	12 J	12 J	PG/L	LDCA-MW42-1014	1/12	19 - 34	12	NA	NA	NA	NA	No	NTX
	34883-39-1	PCB-9	61 Z	1,000	PG/L	LDCA-MW26S-1014	3/12	19 - 54	1,000	NA	NA	NA	NA	No	NTX
	--	PCB-90/101/113	5 J	1,700	PG/L	LDCA-MW24-1014	11/12	20 - 20	1,700	NA	NA	NA	NA	No	NTX
	68194-05-8	PCB-91	7.5 Z	200	PG/L	LDCA-MW24-1014	6/9	19 - 20	200	NA	NA	NA	NA	No	NTX
	52663-61-3	PCB-92	8.5 Z	300	PG/L	LDCA-MW24-1014	9/12	19 - 21	300	NA	NA	NA	NA	No	NTX
	--	PCB-93/100	14 Z	21	PG/L	LDCA-MW26S-1014	2/12	19 - 31	21	NA	NA	NA	NA	No	NTX
	38379-99-6	PCB-95	4.6 J	1,600	PG/L	LDCA-MW24-1014	11/12	20 - 20	1,600	NA	NA	NA	NA	No	NTX
	73575-54-9	PCB-96	4.4 Z	50	PG/L	LDCA-MW42-1014	4/12	19 - 21	50	NA	NA	NA	NA	No	NTX
	--	PCB-98/102	3.4 Z	24	PG/L	LDCA-MW26S-1014	4/12	19 - 28	24	NA	NA	NA	NA	No	NTX
	--	PCB-99	2.5 Z	730	PG/L	LDCA-MW24-1014	10/12	20 - 21	730	NA	NA	NA	NA	No	NTX
	--	TEQ-DIOXIN-LIKE PCBS	0.00008	0.051	PG/L	LDCA-MW24-1014	12/12	20 - 20	0.051	NA	0.12 C[16]	NA	NA	No	BSL
	--	**TEQ HALFND-DIOXIN-LIKE PCBS**	1.24	2.46	PG/L	LDCA-MW24-1014	12/12	20 - 20	2.46	NA	**0.12 C[16]**	NA	NA	**Yes**	ASL
	--	**NONDIOXIN-LIKE PCBS**	314	199,170	PG/L	LDCA-MW26S-1014	12/12	--	199,170	NA	**44,000 C[17]**	NA	NA	**Yes**	ASL

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), November 2015. Carcinogenic values represent an incremental cancer risk of $1x10^{-6}$. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for acenaphthene.
8 - Value is for pyrene.
9 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
10 - Value is for hexavalent chromium.
11 - Value is for methyl mercury.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for endosulfan.
15 - Value is for endrin.
16 - Value is for 2,3,7,8-TCDD.
17 - Value is for polychlorinated biphenyls (low risk).
18 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 882-R-16-005.
19 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS), EPA 882-R-16-004.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

ASL = Above screening level

Associated Samples:

LDCA-MW08-1014	LDCA-MW31-1014
LDCA-MW13S-1014	LDCA-MW32-1014
LDCA-MW14S-1014	LDCA-MW33-1014
LDCA-MW15S-1014	LDCA-MW35-1014
LDCA-MW16S-1014	LDCA-MW38-1014
LDCA-MW17S-1014	LDCA-MW39-1014
LDCA-MW17S-1014-D	LDCA-MW40-1014
LDCA-MW18S-1014	LDCA-MW41D-1014-D
LDCA-MW24-1014	LDCA-MW41D-1014
LDCA-MW25-1014	LDCA-MW41S-1014
LDCA-MW26D-1014	LDCA-MW42-1014
LDCA-MW26S-1014	LDCA-MW43-1014
LDCA-MW27-1014	LDCA-MW44-1014
LDCA-MW28-1014	LDCA-MW46-1014
LDCA-MW29-1014	LDCA-MW47-1014-D
LDCA-MW30-1014	LDCA-MW47-1014

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 3
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 3	**SEMIVOLATILE ORGANICS - SIM**														
	83-32-9	ACENAPHTHENE	0.22	0.27	UG/L	LDCA-MW25-0615	2/11	0.1 - 0.1	0.27	NA	53 N	NA	NA	No	BSL
	208-96-8	ACENAPHTHYLENE	0.086 J+	0.086 J+	UG/L	LDCA-MW41D-0615-D	1/11	0.1 - 0.1	0.086	NA	NA	NA	NA	No	NTX
	120-12-7	ANTHRACENE	0.054 J	1.6	UG/L	LDCA-MW41D-0615	7/11	0.1 - 0.1	1.6	NA	180 N	NA	NA	No	BSL
	56-55-3	**BENZO(A)ANTHRACENE**	0.26	0.26	UG/L	LDCA-MW16S-0615	1/11	0.1 - 0.1	0.26	NA	**0.012 C**	NA	NA	**Yes**	ASL
	50-32-8	**BENZO(A)PYRENE**	0.073 J	0.12	UG/L	LDCA-MW25-0615	2/11	0.1 - 0.1	0.12	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	191-24-2	BENZO(G,H,I)PERYLENE	0.1	0.1	UG/L	LDCA-MW25-0615	1/11	0.1 - 0.1	0.1	NA	12 N[(/)]	NA	NA	No	BSL
	218-01-9	CHRYSENE	0.21	0.21	UG/L	LDCA-MW16S-0615	1/11	0.1 - 0.1	0.21	NA	3.4 C	NA	NA	No	BSL
	206-44-0	FLUORANTHENE	0.21	0.21	UG/L	LDCA-MW25-0615	1/11	0.1 - 0.1	0.21	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	0.083 J	0.47	UG/L	LDCA-MW25-0615	3/11	0.1 - 0.1	0.47	NA	29 N	NA	NA	No	BSL
	91-20-3	NAPHTHALENE	0.065 J	0.065 J	UG/L	LDCA-MW26S-0615	1/10	0.1 - 0.1	0.065	NA	0.17 C	NA	NA	No	BSL
	87-86-5	**PENTACHLOROPHENOL**	0.094 J	0.49	UG/L	LDCA-MW16S-0615-D	3/11	0.2 - 0.2	0.49	NA	**0.041 C**	NA	NA	**Yes**	ASL
	85-01-8	PHENANTHRENE	0.43	0.67	UG/L	LDCA-MW25-0615	2/11	0.1 - 0.1	0.67	NA	12 N[(/)]	NA	NA	No	BSL
	129-00-0	PYRENE	0.065 J	0.47	UG/L	LDCA-MW25-0615	5/11	0.1 - 0.16	0.47	NA	12 N	NA	NA	No	BSL
	TOTAL METALS														
	7429-90-5	**ALUMINUM**	3.4 J	29300 J	UG/L	LDCA-MW26D-0615	21/28	20 - 20	29,300	NA	**2000 N**	NA	NA	**Yes**	ASL
	7440-36-0	**ANTIMONY**	0.11 J	10	UG/L	LDCA-MW25-0615	5/28	2 - 2	10	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.1	84.1	UG/L	LDCA-MW41S-0615	28/28	--	84.1	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	30.9	1220 J	UG/L	LDCA-MW26S-0615	28/28	--	1,220	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.031 J	1.5 J-	UG/L	LDCA-MW26S-0615	6/28	1 - 1	2	NA	2.5 N	NA	NA	No	BSL
	7440-43-9	**CADMIUM**	0.018 J	8.3	UG/L	LDCA-MW25-0615	25/28	1 - 1	8.3	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	5720 J	605000	UG/L	LDCA-MW47-0615	28/28	--	605,000	NA	NA	NA	NA	No	NTX
	7440-47-3	**CHROMIUM**	0.15 J	31.3 J	UG/L	LDCA-MW26D-0615	20/28	2 - 2	31.3	NA	**0.035 C[(8)]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.066 J	58.7	UG/L	LDCA-MW41D-0615-D	27/28	1 - 1	58.7	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	**COPPER**	0.27 J-	94.6	UG/L	LDCA-MW25-0615	18/28	2 - 2	94.6	NA	**80 N**	NA	NA	**Yes**	ASL
	57-12-5	**CYANIDE**	10 J	16.8 J	UG/L	LDCA-MW41S-0615	2/5	10 - 10	16.8	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	9.6 J	137000	UG/L	LDCA-MW24-0615	17/28	200 - 200	137,000	NA	**1400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	0.036 J	2400	UG/L	LDCA-MW25-0615	22/28	1 - 1	2,400	NA	**15**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	3250 J	438000	UG/L	LDCA-MW47-0615	28/28	--	438,000	NA	NA	NA	NA	No	NTX
	7439-96-5	**MANGANESE**	4.1	70000	UG/L	LDCA-MW41D-0615-D	28/28	--	70,000	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	**MERCURY**	0.014 J	0.28 J	UG/L	LDCA-MW25-0615	18/28	0.2 - 0.2	0.28	NA	**0.2 N[(9)]**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	0.61 J	29.4 J	UG/L	LDCA-MW41D-0615-D	27/28	1 - 1	29.4	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	2520	130000	UG/L	LDCA-MW47-0615	28/28	--	130,000	NA	NA	NA	NA	No	NTX
	7782-49-2	SELENIUM	0.27 J	0.72 J	UG/L	LDCA-MW29-0615	7/28	5 - 5	0.72	NA	10 N	NA	NA	No	BSL
	7440-22-4	**SILVER**	0.022 J	25.3	UG/L	LDCA-MW25-0615	3/28	1 - 1	25.3	NA	**9.4 N**	NA	NA	**Yes**	ASL
	7440-23-5	SODIUM	6340 J-	1230000	UG/L	LDCA-MW47-0615	27/28	12500 - 12500	1,230,000	NA	NA	NA	NA	No	NTX
	7440-62-2	**VANADIUM**	0.15 J	52	UG/L	LDCA-MW26D-0615	14/28	2.6 - 2.6	52	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	**ZINC**	1.6 J	1170	UG/L	LDCA-MW25-0615	25/28	2 - 2	1,170	NA	**600 N**	NA	NA	**Yes**	ASL
	FILTERED METALS														
	7429-90-5	ALUMINUM	1.6	14.4 J	UG/L	LDCA-MW16S-0615	28/29	20 - 20	14.4	NA	2000 N	NA	NA	No	BSL
	7440-36-0	**ANTIMONY**	0.11	1.2 J	UG/L	LDCA-MW24-0615	6/29	2 - 2	1.2	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.089	57.3	UG/L	LDCA-MW41S-0615	29/29	--	57.3	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	31.4	1240	UG/L	LDCA-MW26S-0615	29/29	--	1,240	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-41-7	BERYLLIUM	0.028 J-	0.028 J-	UG/L	LDCA-MW18S-0615, LDCA-MW26D-0615	2/29	1 - 1	0.028	NA	2.5 N	NA	NA	No	BSL
	7440-43-9	**CADMIUM**	0.014 J	2.2	UG/L	LDCA-MW41D-0615, LDCA-MW41D-0615-D	22/29	1 - 1	2.2	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	18200	175000	UG/L	LDCA-MW14S-0615	29/29	--	175,000	NA	NA	NA	NA	No	NTX
	7440-47-3	**CHROMIUM**	0.057	3	UG/L	LDCA-MW40-0615	29/29	--	3	NA	**0.035 C[(8)]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.063 J	59.4	UG/L	LDCA-MW41D-0615-D	29/29	--	59.4	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.27	13.9	UG/L	LDCA-MW41D-0615-D	15/29	2 - 2	13.9	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	2.8 J	129000	UG/L	LDCA-MW24-0615	27/29	4000 - 4000	129,000	NA	**1400 N**	NA	NA	**Yes**	ASL

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 3
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill Event 3	7439-92-1	LEAD	0.022 J	0.14 J	UG/L	LDCA-MW15S-0615, LDCA-MW42-0615	29/29	--	0.14	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	9790 J	80800	UG/L	LDCA-MW25-0615	29/29	--	80,800	NA	NA	NA	NA	No	NTX
	7439-96-5	**MANGANESE**	1.3	72000	UG/L	LDCA-MW41D-0615	29/29	--	72,000	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.016 J	0.052 J	UG/L	LDCA-MW38-0615	15/29	0.025 - 0.2	0.052	NA	0.2 N[9]	NA	NA	No	BSL
	7440-02-0	NICKEL	0.52 J	30.2	UG/L	LDCA-MW41D-0615-D	29/29	--	30.2	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	2540	47100	UG/L	LDCA-MW25-0615	27/28	10000 - 10000	47,100	NA	NA	NA	NA	No	NTX
	7782-49-2	SELENIUM	0.2 J	0.53 J	UG/L	LDCA-MW42-0615	7/29	5 - 5	0.53	NA	10 N	NA	NA	No	BSL
	7440-23-5	SODIUM	6790 J	382000	UG/L	LDCA-MW41D-0615-D	29/29	--	382,000	NA	NA	NA	NA	No	NTX
	7440-62-2	VANADIUM	0.15 J	1.4 J	UG/L	LDCA-MW39-0615	17/29	2.6 - 2.6	1.4	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	1.4 J	29.7 J	UG/L	LDCA-MW18S-0615	29/29	--	29.7	NA	600 N	NA	NA	No	BSL
	PERFLUORINATED COMPOUNDS														
	335-67-1	**PENTADECAFLUOROOCTANOIC ACID**	0.031	2.7	UG/L	LDCA-MW14S-0615	8/8	--	2.7	NA	**0.04 N**[11]	NA	NA	**Yes**	ASL
	1763-23-1	**PERFLUOROOCTANE SULFONIC ACID**	0.014 J	0.45	UG/L	LDCA-MW08-0615	7/8	0.041 - 0.041	0.45	NA	**0.04 N**[12]	NA	NA	**Yes**	ASL
	PESTICIDES														
	72-54-8	4,4'-DDD	0.00112	0.00123	UG/L	LDCA-MW14S-0615	2/16	0.00095 - 0.00101	0.00123	NA	0.032 C	NA	NA	No	BSL
	72-55-9	4,4'-DDE	0.00098	0.00216	UG/L	LDCA-MW14S-0615	2/16	0.00095 - 0.00101	0.00216	NA	0.046 C	NA	NA	No	BSL
	5103-71-9	ALPHA-CHLORDANE	0.00129	0.00129	UG/L	LDCA-MW47-0615	1/16	0.00095 - 0.00101	0.00129	NA	0.045 C[10]	NA	NA	No	BSL
	60-57-1	**DIELDRIN**	0.00469 N	0.0564	UG/L	LDCA-MW18S-0615	5/16	0.00095 - 0.00404	0.0564	NA	**0.0018 C**	NA	NA	**Yes**	ASL
	1024-57-3	HEPTACHLOR EPOXIDE	0.00102	0.00102	UG/L	LDCA-MW39-0615	1/16	0.00095 - 0.00403	0.00102	NA	0.0014 C	NA	NA	No	BSL
	SEMIVOLATILES														
	123-91-1	**1,4-DIOXANE**	0.34 J	290	UG/L	LDCA-MW41D-0615	22/29	0.5 - 2	290	NA	**0.46 C**	NA	NA	**Yes**	ASL
	606-20-2	**2,6-DINITROTOLUENE**	8.6	8.6	UG/L	LDCA-MW13S-0615	1/11	5 - 5	8.6	NA	**0.24 C**	NA	NA	**Yes**	ASL
	91-57-6	**2-METHYLNAPHTHALENE**	9.3	9.3	UG/L	LDCA-MW25-0615	1/8	0.1 - 5	9.3	NA	**3.6 N**	NA	NA	**Yes**	ASL
	99-09-2	3-NITROANILINE	4.9 J	4.9 J	UG/L	LDCA-MW13S-0615	1/11	10 - 10	4.9	NA	NA	NA	NA	No	NTX
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.59 J	1.6 J	UG/L	LDCA-MW16S-0615-D	4/11	5 - 5	1.6	NA	5.6 C	NA	NA	No	BSL
	85-68-7	BUTYL BENZYL PHTHALATE	0.47 J	1.6 J	UG/L	LDCA-MW16S-0615-D	3/11	5 - 5	1.6	NA	16 C	NA	NA	No	BSL
	91-20-3	**NAPHTHALENE**	8	8	UG/L	LDCA-MW25-0615	1/8	0.1 - 5	8	NA	**0.17 C**	NA	NA	**Yes**	ASL
	VOLATILES														
	75-35-4	1,1-DICHLOROETHENE	0.3 J	0.44 J	UG/L	LDCA-MW38-0615	2/15	0.5 - 0.5	0.44	NA	28 N	NA	NA	No	BSL
	95-50-1	1,2-DICHLOROBENZENE	0.3 J	4.2	UG/L	LDCA-MW25-0615	2/15	0.5 - 0.5	4.2	NA	30 N	NA	NA	No	BSL
	106-46-7	**1,4-DICHLOROBENZENE**	0.41 J	0.92	UG/L	LDCA-MW26S-0615	3/15	0.5 - 0.5	0.92	NA	**0.48 C**	NA	NA	**Yes**	ASL
	67-64-1	ACETONE	9.2	13	UG/L	LDCA-MW24-0615	2/15	5 - 5	13	NA	1400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	3.5	3.5	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	3.5	NA	**0.46 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.22 J	0.22 J	UG/L	LDCA-MW24-0615	1/15	0.5 - 0.5	0.22	NA	81 N	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	0.43 J	5.8	UG/L	LDCA-MW38-0615	8/15	0.5 - 0.5	5.8	NA	7.8 N	NA	NA	No	BSL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	0.24 J	42	UG/L	LDCA-MW38-0615	6/15	0.5 - 0.5	42	NA	**3.6 N**	NA	NA	**Yes**	ASL
	110-82-7	CYCLOHEXANE	4.2	4.2	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	4.2	NA	1300 N	NA	NA	No	BSL
	100-41-4	**ETHYLBENZENE**	3.4	3.4	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	3.4	NA	**1.5 C**	NA	NA	**Yes**	ASL
	98-82-8	ISOPROPYLBENZENE	2.1	2.1	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	2.1	NA	45 N	NA	NA	No	BSL
	--	**M+P-XYLENES**	26	26	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	26	NA	**19 N**	NA	NA	**Yes**	ASL
	108-87-2	METHYL CYCLOHEXANE	3.8	3.8	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	3.8	NA	NA	NA	NA	No	NTX
	1634-04-4	METHYL TERT-BUTYL ETHER	0.46 J	1.7	UG/L	LDCA-MW26D-0615, LDCA-MW38-0615	7/15	0.5 - 0.5	1.7	NA	14 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.21 J	11	UG/L	LDCA-MW25-0615	2/15	0.5 - 0.5	11	NA	19 N	NA	NA	No	BSL
	127-18-4	TETRACHLOROETHENE	0.65	0.65	UG/L	LDCA-MW08-0615	1/15	0.5 - 0.5	0.65	NA	4.1 N	NA	NA	No	BSL
	108-88-3	TOLUENE	4.8	4.8	UG/L	LDCA-MW25-0615	1/15	0.5 - 0.5	4.8	NA	110 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	0.51	0.51	UG/L	LDCA-MW38-0615	1/15	0.5 - 0.5	0.51	NA	36 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	0.27 J	8.4	UG/L	LDCA-MW38-0615	4/15	0.5 - 0.5	8.4	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**VINYL CHLORIDE**	2.8	2.8	UG/L	LDCA-MW38-0615	1/15	0.5 - 0.5	2.8	NA	**0.019 C**	NA	NA	**Yes**	ASL

TABLE 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 3
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), November 2015. Carcinogenic values represent an incremental cancer risk of $1x10^{-6}$. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for pyrene.
8 - Value is for hexavalent chromium.
9 - Value is for methyl mercury.
10 - Value is for chlordane.
11 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 882-R-16-005.
12 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS), EPA 882-R-16-004.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:

LDCA-MW08-0615	LDCA-MW26D-0615	LDCA-MW39-0615
LDCA-MW13S-0615	LDCA-MW26S-0615	LDCA-MW40-0615
LDCA-MW14S-0615	LDCA-MW27-0615	LDCA-MW41D-0615-D
LDCA-MW15S-0615	LDCA-MW28-0615	LDCA-MW41D-0615
LDCA-MW16S-0615-D	LDCA-MW29-0615	LDCA-MW41S-0615
LDCA-MW16S-0615	LDCA-MW30-0615	LDCA-MW42-0615
LDCA-MW17S-0615	LDCA-MW31-0615	LDCA-MW43-0615
LDCA-MW17S-0615-D	LDCA-MW32-0615	LDCA-MW44-0615
LDCA-MW18S-0615	LDCA-MW33-0615	LDCA-MW46-0615
LDCA-MW24-0615	LDCA-MW35-0615	LDCA-MW47-0615
LDCA-MW25-0615	LDCA-MW38-0615	

TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SHALLOW GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 4
LOWER DARBY CREEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Shallow Groundwater Outside Landfill Event 4	VOLATILES														
	75-34-3	1,1-Dichloroethane	0.11 J	0.11 J	UG/L	LDCA-MW38-0416	1/9	0.5 - 0.5	0.11	NA	2.8 C	NA	NA	No	BSL
	95-50-1	1,2-Dichlorobenzene	0.33 J	4.7	UG/L	LDCA-MW25-0416	2/9	0.5 - 0.5	4.7	NA	30 N	NA	NA	No	BSL
	541-73-1	1,3-Dichlorobenzene	0.18 J	0.18 J	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	0.18	NA	0.48 C[7]	NA	NA	No	BSL
	106-46-7	**1,4-Dichlorobenzene**	0.32 J	0.83	UG/L	LDCA-MW26S-0416	3/9	0.5 - 0.5	0.83	NA	**0.48 C**	NA	NA	**Yes**	ASL
	591-78-6	**2-Hexanone**	5.6 J+	5.6 J+	UG/L	LDCA-MW25-0416	1/9	5 - 5	5.6	NA	**3.8 N**	NA	NA	**Yes**	ASL
	67-64-1	Acetone	5.1	7	UG/L	LDCA-MW25-0416	4/9	5 - 5	7	NA	1400 N	NA	NA	No	BSL
	71-43-2	**Benzene**	5.8	5.8	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	5.8	NA	**0.46 C**	NA	NA	**Yes**	ASL
	108-90-7	Chlorobenzene	0.66	3.9	UG/L	LDCA-MW25-0416	4/9	0.5 - 0.5	3.9	NA	7.8 N	NA	NA	No	BSL
	156-59-2	**cis-1,2-Dichloroethene**	0.11 J	54 J-	UG/L	LDCA-MW38-0416	7/9	0.5 - 0.5	54	NA	**3.6 N**	NA	NA	**Yes**	ASL
	110-82-7	Cyclohexane	4	4	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	4	NA	1300 N	NA	NA	No	BSL
	100-41-4	**Ethylbenzene**	4.4	4.4	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	4.4	NA	**1.5 C**	NA	NA	**Yes**	ASL
	98-82-8	Isopropylbenzene	2.3	2.3	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	2.3	NA	45 N	NA	NA	No	BSL
	--	m+p-Xylenes	18	18	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	18	NA	19 N	NA	NA	No	BSL
	108-87-2	Methyl Cyclohexane	3	3	UG/L	LDCA-MW25-0416	1/9	0.5 - 0.5	3	NA	NA	NA	NA	No	NTX
	1634-04-4	Methyl Tert-Butyl Ether	0.17 J	1.2	UG/L	LDCA-MW26D-0416	4/9	0.5 - 0.5	1.2	NA	14 C	NA	NA	No	BSL
	95-47-6	o-Xylene	0.14 J	15	UG/L	LDCA-MW25-0416	2/9	0.5 - 0.5	15	NA	19 N	NA	NA	No	BSL
	108-88-3	Toluene	0.11 J	7	UG/L	LDCA-MW25-0416	2/9	0.5 - 0.5	7	NA	110 N	NA	NA	No	BSL
	156-60-5	trans-1,2-Dichloroethene	0.11 J	0.2 J	UG/L	LDCA-MW38-0416	2/9	0.5 - 0.5	0.2	NA	36 N	NA	NA	No	BSL
	79-01-6	**Trichloroethene**	0.12 J	6.2	UG/L	LDCA-MW38-0416	3/9	0.5 - 0.5	6.2	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**Vinyl Chloride**	0.25 J	0.4 J	UG/L	LDCA-MW38-0416	2/9	0.5 - 0.5	0.4	NA	**0.019 C**	NA	NA	**Yes**	ASL

Footnotes:
Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of $1x10^{-6}$. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for 1,4-dichlorobenzene.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples
LDCA-MW13S-0416
LDCA-MW13S-0416-D
LDCA-MW14S-0416
LDCA-MW15S-0416
LDCA-MW24-0416
LDCA-MW25-0416
LDCA-MW26D-0416
LDCA-MW26S-0416
LDCA-MW27-0416
LDCA-MW33-0416
LDCA-MW38-0416
LDCA-MW39-0416
LDCA-MW41D-0416
LDCA-MW41S-0416

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 1
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 1	**TOTAL METALS**														
	7429-90-5	**ALUMINUM**	6.1 J	3050 J	UG/L	LDCA-MW13D-0314	12/14	20 - 20	3,050	NA	**2,000 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.18 J	7.8	UG/L	LDCA-MW23I-0314	7/14	1 - 1	7.8	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	BARIUM	31.8 J	341	UG/L	LDCA-MW13D-0314	14/14	--	341	NA	380 N	NA	NA	No	BSL
	7440-41-7	BERYLLIUM	0.15 J	0.15 J	UG/L	LDCA-MW23I-0314, LDCA-MW23S-0314	2/14	1 - 1	0.15	NA	2.5 N	NA	NA	No	BSL
	7440-42-8	BORON	9.9 J	90.2	UG/L	LDCA-MW23D-0314	14/14	--	90	NA	400 N	NA	NA	No	BSL
	7440-43-9	**CADMIUM**	0.097 J	1.4	UG/L	LDCA-MW13I-0314	3/14	1 - 1	1.4	NA	**0.92 N**	NA	NA	**Yes**	ASL
	7440-70-2	CALCIUM	13400	392000	UG/L	LDCA-MW13D-0314	14/14	--	392,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	1.9 J	62.6	UG/L	LDCA-MW13D-0314	11/14	2 - 2	62.6	NA	**0.035 C[9]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.073 J	37.7	UG/L	LDCA-MW21S-0314	14/14	--	37.7	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	2.1	9.1	UG/L	LDCA-MW23D-0314	10/14	2 - 2.8	9.1	NA	80 N	NA	NA	No	BSL
	57-12-5	**CYANIDE**	0.9 J	0.9 J	UG/L	LDCA-MW13I-0314	1/12	10 - 10	0.9	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	234 J	42600 J	UG/L	LDCA-MW23I-0314	14/14	--	42,600	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.29 J	4.3	UG/L	LDCA-MW13D-0314	13/14	1 - 1	4.3	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	2220	28400	UG/L	LDCA-MW13I-0314	14/14	--	28,400	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	19.3	4090	UG/L	LDCA-MW21S-0314	14/14	--	4,090	NA	**43 N**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	1.3	34.1	UG/L	LDCA-MW21S-0314	14/14	--	34.1	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	1890	49900	UG/L	LDCA-MW13D-0314	14/14	--	49,900	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.94 J	1.4 J	UG/L	LDCA-MW21D-0314	2/14	5 - 5	1.4	NA	10 N	NA	NA	No	BSL
	7440-22-4	SILVER	0.072 J	0.28 J	UG/L	LDCA-MW21S-0314	5/14	1 - 1	0.28	NA	9.4 N	NA	NA	No	BSL
	7440-23-5	SODIUM	10300	269000	UG/L	LDCA-MW23D-0314	14/14	--	269,000	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	8.2 J	8.2 J	UG/L	LDCA-MW13D-0314	1/14	5 - 5	8.2	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	4.6	48.6 J	UG/L	LDCA-MW18D-0314	14/14	--	48.6	NA	600 N	NA	NA	No	BSL
	FILTERED METALS														
	7429-90-5	ALUMINUM	63.3	63.3	UG/L	LDCA-MW13I-0314	1/12	20 - 20	63.3	NA	2,000 N	NA	NA	No	BSL
	7440-38-2	**ARSENIC**	3	6.2	UG/L	LDCA-MW23I-0314	2/12	1 - 1	6.2	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	BARIUM	29.5	253	UG/L	LDCA-MW19-0314	12/12	--	253	NA	380 N	NA	NA	No	BSL
	7440-42-8	BORON	9 J	88.8	UG/L	LDCA-MW23D-0314	12/12	--	88.8	NA	400 N	NA	NA	No	BSL
	7440-43-9	CADMIUM	0.12 J	0.12 J	UG/L	LDCA-MW17D-0314	1/12	1 - 1	0.12	NA	0.92 N	NA	NA	No	BSL
	7440-70-2	CALCIUM	12500	59200 J	UG/L	LDCA-MW19-0314	12/12	--	59,200	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	2 J	4.1 J	UG/L	LDCA-MW15D-0314	11/12	2 - 2	4.1	NA	**0.035 C[9]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.38 J	35.7	UG/L	LDCA-MW21S-0314	11/12	1 - 1	35.7	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	2.1	7.1	UG/L	LDCA-MW23D-0314	6/12	2 - 2	7.1	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	603	41500	UG/L	LDCA-MW23S-0314	11/12	200 - 200	41,500	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.18 J	4.6	UG/L	LDCA-MW18D-0314	7/12	1 - 1	4.6	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	3100	34500	UG/L	LDCA-MW13I-0314	12/12	--	34,500	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	64.1 J	3780 J	UG/L	LDCA-MW21S-0314	12/12	--	3,780	NA	**43 N**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	1.5	33	UG/L	LDCA-MW21S-0314	12/12	--	33	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	1750	11900	UG/L	LDCA-MW18D-0314	12/12	--	11,900	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.33 J	0.33 J	UG/L	LDCA-MW21S-0314	1/12	5 - 5	0.33	NA	10 N	NA	NA	No	BSL
	7440-23-5	SODIUM	9970	227000	UG/L	LDCA-MW23D-0314	12/12	--	227,000	NA	NA	NA	NA	No	NUT
	7440-66-6	ZINC	2.4	29.8 J	UG/L	LDCA-MW19-0314	12/12	--	29.8	NA	600 N	NA	NA	No	BSL
	PESTICIDES														
	319-85-7	BETA-BHC	0.024 J	0.024 J	UG/L	LDCA-MW21D-0314	1/14	0.05 - 0.05	0.024	NA	0.025 C	NA	NA	No	BSL
	319-86-8	**DELTA-BHC**	0.013 J	0.013 J	UG/L	LDCA-MW14D-0314	1/14	0.05 - 0.05	0.013	NA	**0.0072 C[10]**	NA	NA	**Yes**	ASL
	53494-70-5	ENDRIN KETONE	0.11	0.11	UG/L	LDCA-MW23D-0314	1/14	0.1 - 0.1	0.11	NA	0.23 N[11]	NA	NA	No	BSL
	72-43-5	METHOXYCHLOR	0.31 J	0.32 J	UG/L	LDCA-MW14D-0314	2/14	0.5 - 0.5	0.32	NA	3.7 N	NA	NA	No	BSL
	SEMIVOLATILES														
	123-91-1	**1,4-DIOXANE**	6.2	22	UG/L	LDCA-MW19-0314	3/14	2 - 2	22	NA	**0.46 C**	NA	NA	**Yes**	ASL
	117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	2.8 J	7	UG/L	LDCA-MW13D-0314	3/14	5 - 5	7	NA	**5.6 C**	NA	NA	**Yes**	ASL
	86-74-8	CARBAZOLE	2.8 J	2.8 J	UG/L	LDCA-MW15D-0314-D	1/14	5 - 5	2.8	NA	NA	NA	NA	No	NTX
	84-66-2	DIETHYL PHTHALATE	3.5 J	20	UG/L	LDCA-MW15D-0314	2/14	5 - 5	20	NA	1,500 N	NA	NA	No	BSL
	VOLATILES														
	75-34-3	1,1-DICHLOROETHANE	2.4 J	2.4 J	UG/L	LDCA-MW19-0314	1/14	0.5 - 5	2.4	NA	2.8 C	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	0.28 J	0.28 J	UG/L	LDCA-MW23S-0314	1/14	0.5 - 5	0.28	NA	7.8 N	NA	NA	No	BSL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	0.21 J	1000	UG/L	LDCA-MW19-0314	4/14	0.5 - 5	1,000	NA	**3.6 N**	NA	NA	**Yes**	ASL
	1634-04-4	METHYL TERT-BUTYL ETHER	0.39 J	0.41 J	UG/L	LDCA-MW23S-0314	2/14	0.5 - 5	0.41	NA	14 C	NA	NA	No	BSL

TABLE 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 1
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 1	127-18-4	TETRACHLOROETHENE	0.45 J	0.45 J	UG/L	LDCA-MW13I-0314	1/14	0.5 - 5	0.45	NA	4.1 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.13 J	1.5 J	UG/L	LDCA-MW15D-0314-D	4/14	0.5 - 5	1.5	NA	110 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	0.34 J	2.6 J	UG/L	LDCA-MW19-0314	2/14	0.5 - 5	2.6	NA	36 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	0.25 J	260	UG/L	LDCA-MW19-0314	4/14	0.5 - 5	260	NA	**0.28 N**	NA	NA	**Yes**	ASL
	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	23	4400	PG/L	LDCA-MW17D-0314	5/11	19 - 22	4,400	NA	NA	NA	NA	No	NTX
	33146-45-1	PCB-10	31	31	PG/L	LDCA-MW17D-0314	1/11	19 - 22	31	NA	NA	NA	NA	No	NTX
	2050-67-1	PCB-11	23	87	PG/L	LDCA-MW14D-0314	5/11	19 - 20	87	NA	NA	NA	NA	No	NTX
	--	PCB-110/115	29	37	PG/L	LDCA-MW22-0314	2/11	19 - 22	37	NA	NA	NA	NA	No	NTX
	--	PCB-129/138/163	26	97	PG/L	LDCA-MW22-0314	2/11	19 - 28	97	NA	NA	NA	NA	No	NTX
	38380-05-1	PCB-132	25	25	PG/L	LDCA-MW22-0314	1/11	19 - 22	25	NA	NA	NA	NA	No	NTX
	--	PCB-135/151/154	34	34	PG/L	LDCA-MW22-0314	1/11	19 - 22	34	NA	NA	NA	NA	No	NTX
	--	PCB-147/149	20	74	PG/L	LDCA-MW22-0314	2/11	19 - 22	74	NA	NA	NA	NA	No	NTX
	--	PCB-153/168	26	75	PG/L	LDCA-MW22-0314	2/11	19 - 24	75	NA	NA	NA	NA	No	NTX
	35065-30-6	PCB-170	47	47	PG/L	LDCA-MW22-0314	1/11	19 - 22	47	NA	NA	NA	NA	No	NTX
	38411-25-5	PCB-174	49	49	PG/L	LDCA-MW22-0314	1/11	19 - 22	49	NA	NA	NA	NA	No	NTX
	52663-70-4	PCB-177	35	35	PG/L	LDCA-MW22-0314	1/11	19 - 22	35	NA	NA	NA	NA	No	NTX
	--	PCB-180/193	23	100	PG/L	LDCA-MW22-0314	2/11	19 - 22	100	NA	NA	NA	NA	No	NTX
	--	PCB-183/185	32	32	PG/L	LDCA-MW22-0314	1/11	19 - 22	32	NA	NA	NA	NA	No	NTX
	52663-68-0	PCB-187	51 J	51 J	PG/L	LDCA-MW22-0314	1/11	19 - 22	51	NA	NA	NA	NA	No	NTX
	38444-73-4	PCB-19	40	40	PG/L	LDCA-MW13D-0314	1/11	19 - 22	40	NA	NA	NA	NA	No	NTX
	35694-08-7	PCB-194	26	26	PG/L	LDCA-MW22-0314	1/11	19 - 22	26	NA	NA	NA	NA	No	NTX
	--	PCB-198/199	34	34	PG/L	LDCA-MW22-0314	1/11	19 - 22	34	NA	NA	NA	NA	No	NTX
	40186-72-9	PCB-206	36	36	PG/L	LDCA-MW22-0314	1/11	19 - 22	36	NA	NA	NA	NA	No	NTX
	2051-24-3	PCB-209	41	41	PG/L	LDCA-MW22-0314	1/11	19 - 22	41	NA	NA	NA	NA	No	NTX
	--	PCB-4	34	860	PG/L	LDCA-MW17D-0314	6/11	19 - 38	860	NA	NA	NA	NA	No	NTX
	--	PCB-44/47/65	22	82	PG/L	LDCA-MW18D-0314	8/11	19 - 22	82	NA	NA	NA	NA	No	NTX
	35693-99-3	PCB-52	23	23	PG/L	LDCA-MW13D-0314	1/11	19 - 22	23	NA	NA	NA	NA	No	NTX
	--	PCB-90/101/113	25	25	PG/L	LDCA-MW13D-0314	1/11	19 - 22	25	NA	NA	NA	NA	No	NTX
	--	PCB-93/95/98/100/102	22	25	PG/L	LDCA-MW22-0314	2/11	19 - 22	25	NA	NA	NA	NA	No	NTX
	--	NONDIOXIN-LIKE PCBS	43	5,346	PG/L	LDCA-MW17D-0314	11/11	--	5,346	NA	44,000 C[13]	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for pyrene.
8 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
9 - Value is for hexavalent chromium.
10 - Value is for alpha-BHC.
11 - Value is for endrin.
12 - Value is for 2,3,7,8-TCDD.
13 - Value is for polychlorinated biphenyls (low risk).
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:

LDCA-MW13D-0314	LDCA-MW18D-0314
LDCA-MW13I-0314	LDCA-MW19-0314
LDCA-MW14D-0314	LDCA-MW21D-0314
LDCA-MW15D-0314	LDCA-MW21S-0314
LDCA-MW15D-0314-D	LDCA-MW22-0314
LDCA-MW16D-0314-D	LDCA-MW23D-0314
LDCA-MW16D-0314	LDCA-MW23I-0314
LDCA-MW17D-0314	LDCA-MW23S-0314

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Resident Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 2	**SEMIVOLATILE ORGANICS - SIM**														
	123-91-1	**1,4-DIOXANE**	0.044 J	29	UG/L	LDCA-MW19-1014	9/14	0.45 - 0.5	29	NA	**0.46 C**	NA	NA	**Yes**	ASL
	91-57-6	2-METHYLNAPHTHALENE	0.0061 J	0.032 J	UG/L	LDCA-MW13D-1014	2/14	0.091 - 0.1	0.032	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	0.0086 J	0.0086 J	UG/L	LDCA-MW17D-1014	1/14	0.091 - 0.1	0.0086	NA	53 N	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.0066 J	0.0066 J	UG/L	LDCA-MW15D-1014-D	1/14	0.091 - 0.1	0.0066	NA	180 N	NA	NA	No	BSL
	191-24-2	BENZO(G,H,I)PERYLENE	0.0073 J	0.0073 J	UG/L	LDCA-MW21D-1014	1/14	0.091 - 0.1	0.0073	NA	12 N[8]	NA	NA	No	BSL
	53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.0057 J	0.0057 J	UG/L	LDCA-MW21D-1014	1/14	0.091 - 0.1	0.0057	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	193-39-5	INDENO(1,2,3-CD)PYRENE	0.006 J	0.006 J	UG/L	LDCA-MW21D-1014	1/14	0.091 - 0.1	0.006	NA	0.034 C	NA	NA	No	BSL
	91-20-3	NAPHTHALENE	0.0063 J	0.045 J	UG/L	LDCA-MW13D-1014	7/14	0.091 - 0.1	0.045	NA	0.17 C	NA	NA	No	BSL
	85-01-8	PHENANTHRENE	0.0075 J	0.011 J	UG/L	LDCA-MW19-1014	2/14	0.091 - 0.1	0.011	NA	12 N[8]	NA	NA	No	BSL
	DIOXIN/FURANS														
	3268-87-9	1,2,3,4,6,7,8,9-OCDD	271	271	PG/L	LDCA-MW16D-1014	1/11	0.406 - 4.43	271	NA	400 C[9]	NA	NA	No	BSL
	35822-46-9	1,2,3,4,6,7,8-HPCDD	2.13 J	6.48 Z	PG/L	LDCA-MW14D-1014	4/11	0.522 - 2.24	6.48	NA	12 C[9]	NA	NA	No	BSL
	67562-39-4	1,2,3,4,6,7,8-HPCDF	2.99 Z	2.99 Z	PG/L	LDCA-MW22-1014	1/11	0.255 - 2.77	3	NA	12 C[9]	NA	NA	No	BSL
	55673-89-7	1,2,3,4,7,8,9-HPCDF	1.22 J	1.22 J	PG/L	LDCA-MW15D-1014-D	1/11	0.379 - 3.04	1	NA	12 C[9]	NA	NA	No	BSL
	39227-28-6	**1,2,3,4,7,8-HXCDD**	1.41 Z	1.41 Z	PG/L	LDCA-MW19-1014	1/11	0.226 - 2.32	1	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	70648-26-9	**1,2,3,4,7,8-HXCDF**	1.05 Z	1.78 J	PG/L	LDCA-MW19-1014	2/11	0.157 - 2.94	1.78	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	57653-85-7	**1,2,3,6,7,8-HXCDD**	1.34 J	1.34 J	PG/L	LDCA-MW19-1014	1/11	0.191 - 2.2	1.34	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	57117-44-9	1,2,3,6,7,8-HXCDF	0.442 Z	1.16 J	PG/L	LDCA-MW19-1014	2/11	0.14 - 2.55	1.16	NA	1.2 C[9]	NA	NA	No	BSL
	19408-74-3	**1,2,3,7,8,9-HXCDD**	0.384 Z	1.4 Z	PG/L	LDCA-MW19-1014	3/11	0.253 - 1.88	1.4	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	72918-21-9	**1,2,3,7,8,9-HXCDF**	1.67 J	1.67 J	PG/L	LDCA-MW19-1014	1/11	0.194 - 3.26	1.67	NA	**1.2 C[9]**	NA	NA	**Yes**	ASL
	40321-76-4	**1,2,3,7,8-PECDD**	0.538 J	0.906 J	PG/L	LDCA-MW19-1014	2/11	0.346 - 3.94	0.906	NA	**0.12 C[9]**	NA	NA	**Yes**	ASL
	57117-41-6	1,2,3,7,8-PECDF	0.976 J	0.976 J	PG/L	LDCA-MW19-1014	1/11	0.191 - 10.6	0.976	NA	4 C[9]	NA	NA	No	BSL
	60851-34-5	2,3,4,6,7,8-HXCDF	0.273 Z	0.845 Z	PG/L	LDCA-MW19-1014	3/11	0.145 - 2.53	0.845	NA	1.2 C[9]	NA	NA	No	BSL
	57117-31-4	**2,3,4,7,8-PECDF**	0.759 Z	0.759 Z	PG/L	LDCA-MW18D-1014	1/11	0.194 - 10.6	0.759	NA	**0.4 C[9]**	NA	NA	**Yes**	ASL
	--	**2,3,7,8-TCDD TEQ**	0.0122	1.896	PG/L	LDCA-MW19-1014	8/11	0.215 - 3.44	1.896	NA	**0.12 C[9]**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	ALUMINUM	8.1 J	350 J	UG/L	LDCA-MW16D-1014	9/14	20 - 1000	350	NA	2,000 N	NA	NA	No	BSL
	7440-38-2	**ARSENIC**	0.097 J	10	UG/L	LDCA-MW23I-1014	10/14	0.5 - 10	10	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	13.2	381	UG/L	LDCA-MW19-1014	14/14	--	381	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-42-8	BORON	5.1 J-	108 J+	UG/L	LDCA-MW19-1014	4/14	100 - 100	108	NA	400 N	NA	NA	No	BSL
	7440-43-9	CADMIUM	0.024 J	0.2 J	UG/L	LDCA-MW17D-1014	2/14	1 - 5	0.2	NA	0.92 N	NA	NA	No	BSL
	7440-70-2	CALCIUM	14100	298000	UG/L	LDCA-MW13D-1014	12/14	25000 - 25000	298,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.17 J	28.7	UG/L	LDCA-MW13D-1014	8/14	2 - 2	28.7	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.053 J	37	UG/L	LDCA-MW21S-1014	6/14	1 - 50	37	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.38 J	4.7	UG/L	LDCA-MW22-1014	9/14	2 - 25	4.7	NA	80 N	NA	NA	No	BSL
	57-12-5	**CYANIDE**	1.6 J-	1.6 J-	UG/L	LDCA-MW15D-1014-D	1/14	10 - 10	1.6	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	230	68400	UG/L	LDCA-MW23I-1014	12/14	200 - 200	68,400	NA	**1,400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.058 J	1.5	UG/L	LDCA-MW14D-1014	5/14	1 - 10	1.5	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	1650	32100	UG/L	LDCA-MW19-1014	13/14	500 - 500	32,100	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	3.1	4490	UG/L	LDCA-MW21S-1014	13/14	75 - 75	4,490	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.019 J-	0.086 J	UG/L	LDCA-MW23I-1014	4/14	0.2 - 0.2	0.086	NA	0.2 N[11]	NA	NA	No	BSL
	7440-02-0	NICKEL	0.19 J	27.8 J	UG/L	LDCA-MW21S-1014	14/14	--	27.8	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	1470	65000	UG/L	LDCA-MW13D-1014	12/14	25000 - 25000	65,000	NA	NA	NA	NA	No	NUT
	7440-23-5	SODIUM	5020	2380000	UG/L	LDCA-MW16D-1014-D	14/14	--	2,380,000	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.22 J	1.7 J	UG/L	LDCA-MW14D-1014	5/14	2.6 - 50	1.7	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	2.3	162	UG/L	LDCA-MW16D-1014	11/14	2 - 60	162	NA	600 N	NA	NA	No	BSL
	FILTERED METALS														
	7429-90-5	ALUMINUM	4 J	71.3	UG/L	LDCA-MW13D-1014	5/14	20 - 200	71.3	NA	2,000 N	NA	NA	No	BSL
	7440-38-2	**ARSENIC**	0.16 J	5.2	UG/L	LDCA-MW23I-1014	12/14	10 - 10	5.2	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	**BARIUM**	13.3	561	UG/L	LDCA-MW19-1014	12/14	200 - 200	561	NA	**380 N**	NA	NA	**Yes**	ASL
	7440-43-9	CADMIUM	0.23 J	0.23 J	UG/L	LDCA-MW17D-1014	1/14	1 - 5	0.23	NA	0.92 N	NA	NA	No	BSL
	7440-70-2	CALCIUM	11400	292000	UG/L	LDCA-MW13D-1014	14/14	--	292,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.28 J	0.36 J	UG/L	LDCA-MW22-1014	2/14	2 - 28.1	0.36	NA	**0.035 C[10]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.041 J	37.2	UG/L	LDCA-MW21S-1014	8/14	1 - 50	37.2	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.15 J	2.9	UG/L	LDCA-MW22-1014	6/14	2 - 25	2.9	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	288	36600 J	UG/L	LDCA-MW23S-1014	9/14	200 - 200	36,600	NA	**1,400 N**	NA	NA	**Yes**	ASL

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Resident Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 2	7439-92-1	LEAD	0.02 J	0.87 J	UG/L	LDCA-MW13D-1014	3/14	1 - 10	0.87	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	1780	45900	UG/L	LDCA-MW19-1014	12/14	500 - 500	45,900	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	0.082 J	4800	UG/L	LDCA-MW21S-1014	13/14	1 - 1	4,800	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.016 J-	0.076 J	UG/L	LDCA-MW15D-1014-D	9/14	0.2 - 0.2	0.076	NA	0.2 N[11]	NA	NA	No	BSL
	7440-02-0	NICKEL	0.22 J	28.5	UG/L	LDCA-MW21S-1014	11/14	1 - 40	28.5	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	1490 J	66000	UG/L	LDCA-MW13D-1014	13/14	5000 - 5000	66,000	NA	NA	NA	NA	No	NUT
	7440-23-5	SODIUM	5170	83800	UG/L	LDCA-MW16D-1014	14/14	--	83,800	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.24 J	1.6 J	UG/L	LDCA-MW14D-1014	5/14	2.6 - 50	1.6	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	2.3	14.1	UG/L	LDCA-MW21S-1014	10/14	2 - 60	14.1	NA	600 N	NA	NA	No	BSL
	PERFLUORINATED COMPOUNDS														
	335-67-1	**PENTADECAFLUOROOCTANOIC ACID**	0.014 J	0.15 J	UG/L	LDCA-MW19-1014	8/14	0.019 - 0.02	0.15	NA	**0.04 N[18]**	NA	NA	**Yes**	ASL
	375-85-9	PERFLUOROHEPTANOIC ACID	0.0082 J	0.057 J	UG/L	LDCA-MW19-1014	4/14	0.0097 - 0.01	0.057	NA	NA	NA	NA	No	NTX
	355-46-4	PERFLUOROHEXANE SULFONIC ACID	0.014 J	0.11 J	UG/L	LDCA-MW19-1014	3/14	0.029 - 0.031	0.11	NA	NA	NA	NA	No	NTX
	375-95-1	PERFLUORONONANOIC ACID	0.018 J	0.018 J	UG/L	LDCA-MW19-1014	1/14	0.019 - 0.021	0.018	NA	NA	NA	NA	No	NTX
	1763-23-1	**PERFLUOROOCTANE SULFONIC ACID**	0.016 J	0.14 J	UG/L	LDCA-MW19-1014	3/14	0.039 - 0.041	0.14	NA	**0.04 N[19]**	NA	NA	**Yes**	ASL
	PESTICIDES														
	72-54-8	4,4'-DDD	0.00016 J	0.0011 J	UG/L	LDCA-MW15D-1014	4/14	0.0091 - 0.1	0.0011	NA	0.032 C	NA	NA	No	BSL
	72-55-9	4,4'-DDE	0.0001 J	0.001 J	UG/L	LDCA-MW23D-1014	4/14	0.0097 - 0.1	0.001	NA	0.046 C	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.0015 J	0.0015 J	UG/L	LDCA-MW23D-1014	1/14	0.0091 - 0.1	0.0015	NA	0.23 C	NA	NA	No	BSL
	309-00-2	ALDRIN	0.00016 J	0.0007 J	UG/L	LDCA-MW13D-1014	5/14	0.0045 - 0.005	0.0007	NA	0.00092 C	NA	NA	No	BSL
	319-84-6	ALPHA-BHC	0.0001 J	0.0019 J	UG/L	LDCA-MW21S-1014	12/14	0.00091 - 0.001	0.0019	NA	0.0072 C	NA	NA	No	BSL
	5103-71-9	ALPHA-CHLORDANE	0.0001 J	0.00064 J	UG/L	LDCA-MW17D-1014	7/14	0.0049 - 0.005	0.00064	NA	0.045 C[12]	NA	NA	No	BSL
	319-85-7	BETA-BHC	0.0007 J	0.002 J	UG/L	LDCA-MW21D-1014	4/14	0.00091 - 0.001	0.002	NA	0.025 C	NA	NA	No	BSL
	319-86-8	DELTA-BHC	0.00016 J	0.00049 J	UG/L	LDCA-MW13I-1014	6/14	0.0045 - 0.005	0.00049	NA	0.0072 C[13]	NA	NA	No	BSL
	60-57-1	DIELDRIN	0.0002 J	0.0015 J	UG/L	LDCA-MW23D-1014	5/14	0.0019 - 0.002	0.0015	NA	0.0018 C	NA	NA	No	BSL
	959-98-8	ENDOSULFAN I	0.00012 J	0.0011 J	UG/L	LDCA-MW19-1014	7/14	0.0045 - 0.005	0.0011	NA	10 N[14]	NA	NA	No	BSL
	33213-65-9	ENDOSULFAN II	0.00048 J	0.0042 J	UG/L	LDCA-MW23D-1014	4/14	0.0097 - 0.01	0.0042	NA	10 N[14]	NA	NA	No	BSL
	1031-07-8	ENDOSULFAN SULFATE	0.0002 J	0.0002 J	UG/L	LDCA-MW19-1014	1/14	0.0091 - 0.01	0.0002	NA	10 N[14]	NA	NA	No	BSL
	72-20-8	ENDRIN	0.00019 J	0.00037 J	UG/L	LDCA-MW13D-1014	3/14	0.0091 - 0.01	0.00037	NA	0.23 N	NA	NA	No	BSL
	7421-93-4	ENDRIN ALDEHYDE	0.00016 J	0.0024 J	UG/L	LDCA-MW21S-1014	7/14	0.0097 - 0.01	0.0024	NA	0.23 N[15]	NA	NA	No	BSL
	53494-70-5	ENDRIN KETONE	0.00019 J	0.00056 J	UG/L	LDCA-MW23D-1014	5/14	0.0091 - 0.01	0.00056	NA	0.23 N[15]	NA	NA	No	BSL
	58-89-9	GAMMA-BHC (LINDANE)	0.00013 J	0.0016 J	UG/L	LDCA-MW21S-1014	11/14	0.0049 - 0.005	0.0016	NA	0.042 C	NA	NA	No	BSL
	5103-74-2	GAMMA-CHLORDANE	0.0001 J	0.00081 J	UG/L	LDCA-MW23D-1014	8/14	0.0049 - 0.005	0.00081	NA	0.045 C[12]	NA	NA	No	BSL
	76-44-8	HEPTACHLOR	0.00056 J	0.00056 J	UG/L	LDCA-MW13D-1014	1/14	0.00091 - 0.0097	0.00056	NA	0.0014 C	NA	NA	No	BSL
	1024-57-3	HEPTACHLOR EPOXIDE	0.00029 J	0.00059 J	UG/L	LDCA-MW13I-1014	4/14	0.0018 - 0.002	0.00059	NA	0.0014 C	NA	NA	No	BSL
	72-43-5	METHOXYCHLOR	0.0005 J	0.0023 J	UG/L	LDCA-MW23S-1014	5/14	0.045 - 0.05	0.0023	NA	3.7 N	NA	NA	No	BSL
	SEMIVOLATILES														
	91-57-6	2-METHYLNAPHTHALENE	0.45 J	0.45 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.45	NA	3.6 N	NA	NA	No	BSL
	83-32-9	ACENAPHTHENE	1.7 J	1.7 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	1.7	NA	53 N	NA	NA	No	BSL
	120-12-7	ANTHRACENE	0.91 J	0.91 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.91	NA	180 N	NA	NA	No	BSL
	100-52-7	BENZALDEHYDE	0.62 J	0.62 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.62	NA	19 C	NA	NA	No	BSL
	191-24-2	BENZO(G,H,I)PERYLENE	0.45 J	0.45 J	UG/L	LDCA-MW16D-1014-D	1/14	4.5 - 5	0.45	NA	12 N[8]	NA	NA	No	NA
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.5 J	4.9 J	UG/L	LDCA-MW13D-1014	2/14	4.5 - 5	4.9	NA	5.6 C	NA	NA	No	BSL
	53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.32 J	0.32 J	UG/L	LDCA-MW16D-1014-D	1/14	4.5 - 5	0.32	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	206-44-0	FLUORANTHENE	0.77 J	0.77 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.77	NA	80 N	NA	NA	No	BSL
	86-73-7	FLUORENE	1.4 J	1.4 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	1.4	NA	29 N	NA	NA	No	BSL
	193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.39 J	0.39 J	UG/L	LDCA-MW16D-1014-D	1/14	4.5 - 5	0.39	NA	**0.034 C**	NA	NA	**Yes**	ASL
	91-20-3	**NAPHTHALENE**	0.36 J	0.36 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.36	NA	**0.17 C**	NA	NA	**Yes**	ASL
	86-30-6	N-NITROSODIPHENYLAMINE	0.99 J	0.99 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.99	NA	12 C	NA	NA	No	BSL
	85-01-8	PHENANTHRENE	2.5 J	2.5 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	2.5	NA	12 N[8]	NA	NA	No	BSL
	129-00-0	PYRENE	0.65 J	0.65 J	UG/L	LDCA-MW13D-1014	1/14	4.5 - 5	0.65	NA	12 N	NA	NA	No	BSL
	VOLATILES														
	75-34-3	**1,1-DICHLOROETHANE**	0.31 J	3.7 J	UG/L	LDCA-MW19-1014	3/14	0.5 - 0.5	3.7	NA	**2.8 C**	NA	NA	**Yes**	ASL
	75-35-4	1,1-DICHLOROETHENE	0.27 J	7.3	UG/L	LDCA-MW19-1014	3/14	0.5 - 0.5	7.3	NA	28 N	NA	NA	No	BSL
	106-46-7	1,4-DICHLOROBENZENE	0.2 J	0.23 J	UG/L	LDCA-MW17D-1014	2/14	0.5 - 5	0.23	NA	0.48 C	NA	NA	No	BSL
	78-93-3	2-BUTANONE	3 J	4.3 J	UG/L	LDCA-MW13D-1014	2/14	5 - 50	4.3	NA	560 N	NA	NA	No	BSL
	67-64-1	ACETONE	1.5 J	4.6 J	UG/L	LDCA-MW16D-1014-D	5/14	5 - 50	5.8	NA	1,400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.089 J	0.88 J	UG/L	LDCA-MW19-1014	5/14	0.5 - 0.5	0.88	NA	**0.46 C**	NA	NA	**Yes**	ASL

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Resident Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 2	75-15-0	CARBON DISULFIDE	0.16 J	0.72 J	UG/L	LDCA-MW19-1014	4/14	0.5 - 0.5	0.72	NA	81 N	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	0.077 J	2.8 J	UG/L	LDCA-MW19-1014	8/14	0.5 - 0.5	2.8	NA	7.8 N	NA	NA	No	BSL
	74-87-3	CHLOROMETHANE	0.15 J	0.2 J	UG/L	LDCA-MW13D-1014	2/14	0.5 - 5	0.2	NA	19 N	NA	NA	No	BSL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	0.22 J	1800	UG/L	LDCA-MW19-1014	6/14	0.5 - 0.5	1,800	NA	**3.6 N**	NA	NA	**Yes**	ASL
	--	M+P-XYLENES	0.24 J	0.24 J	UG/L	LDCA-MW13D-1014	1/14	0.5 - 5	0.24	NA	19 N	NA	NA	No	BSL
	1634-04-4	METHYL TERT-BUTYL ETHER	0.35 J	0.97	UG/L	LDCA-MW13I-1014	6/14	0.5 - 5	2.2	NA	14 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.2 J	0.2 J	UG/L	LDCA-MW13D-1014	1/14	0.5 - 5	0.2	NA	19 N	NA	NA	No	BSL
	127-18-4	TETRACHLOROETHENE	0.38 J	0.38 J	UG/L	LDCA-MW13I-1014	1/14	0.5 - 5	0.38	NA	4.1 N	NA	NA	No	BSL
	108-88-3	TOLUENE	3.1	3.1	UG/L	LDCA-MW13D-1014	1/14	0.5 - 5	3.1	NA	110 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	0.17 J	5.7	UG/L	LDCA-MW19-1014	3/14	0.5 - 0.5	5.7	NA	36 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	0.15 J	420	UG/L	LDCA-MW19-1014	6/14	0.5 - 0.5	420	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**VINYL CHLORIDE**	0.51 J	11	UG/L	LDCA-MW19-1014	3/14	0.5 - 0.5	11	NA	**0.019 C**	NA	NA	**Yes**	ASL
	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	3.2 J	4700	PG/L	LDCA-MW17D-1014	7/11	20 - 21	4,700	NA	NA	NA	NA	No	NA
	33146-45-1	PCB-10	35	35	PG/L	LDCA-MW17D-1014	1/11	20 - 100	35	NA	NA	NA	NA	No	NA
	32598-14-4	PCB-105	7.6 J	100	PG/L	LDCA-MW13D-1014	3/11	20 - 21	100	NA	4,000 C	NA	NA	No	BSL
	74472-35-8	PCB-109	16 J	16 J	PG/L	LDCA-MW23D-1014	1/11	15 - 21	16	NA	NA	NA	NA	No	NA
	2050-67-1	PCB-11	61	1300 Z	PG/L	LDCA-MW15D-1014-D	7/11	20 - 50	1,300	NA	NA	NA	NA	No	NA
	--	PCB-110/115	3.5 Z	400	PG/L	LDCA-MW13D-1014	8/11	20 - 21	400	NA	NA	NA	NA	No	NA
	31508-00-6	PCB-118	6.1 Z	250	PG/L	LDCA-MW13D-1014	6/11	20 - 21	250	NA	4,000 C	NA	NA	No	BSL
	--	PCB-128/166	3.2 J	52	PG/L	LDCA-MW23D-1014	4/11	20 - 21	52	NA	NA	NA	NA	No	NA
	--	PCB-129/138/163	2.4 Z	290	PG/L	LDCA-MW23D-1014	10/11	20 - 21	290	NA	NA	NA	NA	No	NA
	52663-66-8	PCB-130	5.8 J	21	PG/L	LDCA-MW23D-1014	3/11	20 - 21	21	NA	NA	NA	NA	No	NA
	38380-05-1	PCB-132	7.4 J	100	PG/L	LDCA-MW23D-1014	6/11	20 - 21	100	NA	NA	NA	NA	No	NA
	--	PCB-134/143	20	20	PG/L	LDCA-MW23D-1014	1/11	20 - 21	20	NA	NA	NA	NA	No	NA
	--	PCB-135/151	7.4 J	82	PG/L	LDCA-MW22-1014	7/11	20 - 21	82	NA	NA	NA	NA	No	NA
	38411-22-2	PCB-136	3.2 J	36	PG/L	LDCA-MW13D-1014	6/11	20 - 21	36	NA	NA	NA	NA	No	NA
	35694-06-5	PCB-137	3.2 Z	17 J	PG/L	LDCA-MW23D-1014	3/11	20 - 21	17	NA	NA	NA	NA	No	NA
	52712-04-6	PCB-141	4.1 Z	54	PG/L	LDCA-MW23D-1014	6/11	20 - 21	54	NA	NA	NA	NA	No	NA
	68194-14-9	PCB-144	9.1 Z	9.5 J	PG/L	LDCA-MW22-1014	3/11	20 - 21	9.5	NA	NA	NA	NA	No	NA
	51908-16-8	PCB-146	4.1 J	32	PG/L	LDCA-MW23D-1014	5/11	20 - 21	32	NA	NA	NA	NA	No	NA
	--	PCB-147/149	4 Z	190	PG/L	LDCA-MW22-1014	9/11	20 - 21	190	NA	NA	NA	NA	No	NA
	--	PCB-153/168	9.3 Z	160	PG/L	LDCA-MW13D-1014, LDCA-MW23D-1014	8/11	20 - 21	160	NA	NA	NA	NA	No	NA
	--	PCB-156/157	8.4 J	41	PG/L	LDCA-MW13D-1014	3/11	20 - 21	41	NA	4,000 C	NA	NA	No	BSL
	74472-42-7	PCB-158	3.2 Z	31	PG/L	LDCA-MW23D-1014	4/11	20 - 21	31	NA	NA	NA	NA	No	NA
	74472-45-0	PCB-164	10 J	17 J	PG/L	LDCA-MW23D-1014	3/11	20 - 21	17	NA	NA	NA	NA	No	NA
	52663-72-6	PCB-167	10 J	12 Z	PG/L	LDCA-MW13D-1014	2/11	20 - 21	12	NA	4,000 C	NA	NA	No	BSL
	37680-66-3	PCB-17	2.9 Z	10 J	PG/L	LDCA-MW17D-1014	3/11	20 - 21	10	NA	NA	NA	NA	No	NA
	35065-30-6	PCB-170	5.6 Z	77	PG/L	LDCA-MW22-1014	7/11	20 - 21	77	NA	NA	NA	NA	No	NA
	--	PCB-171/173	3.2 J	26	PG/L	LDCA-MW22-1014	6/11	20 - 21	26	NA	NA	NA	NA	No	NA
	52663-74-8	PCB-172	4.2 J	15 J	PG/L	LDCA-MW22-1014	3/11	20 - 21	15	NA	NA	NA	NA	No	NA
	38411-25-5	PCB-174	7.1 J	110	PG/L	LDCA-MW22-1014	7/11	20 - 21	110	NA	NA	NA	NA	No	NA
	52663-65-7	PCB-176	3 J	10 J	PG/L	LDCA-MW22-1014	2/11	20 - 21	10	NA	NA	NA	NA	No	NA
	52663-70-4	PCB-177	4.3 Z	52	PG/L	LDCA-MW22-1014	7/11	20 - 21	52	NA	NA	NA	NA	No	NA
	52663-67-9	PCB-178	4.4 Z	22	PG/L	LDCA-MW22-1014	3/11	20 - 21	22	NA	NA	NA	NA	No	NA
	52663-64-6	PCB-179	4.7 J	45	PG/L	LDCA-MW22-1014	6/11	20 - 21	45	NA	NA	NA	NA	No	NA
	--	PCB-18/30	4.2 Z	25	PG/L	LDCA-MW13I-1014	4/11	20 - 21	25	NA	NA	NA	NA	No	NA
	--	PCB-180/193	17 J	190	PG/L	LDCA-MW22-1014	7/11	20 - 21	190	NA	NA	NA	NA	No	NA
	52663-69-1	PCB-183	5 Z	49	PG/L	LDCA-MW22-1014	7/11	20 - 21	49	NA	NA	NA	NA	No	NA
	52712-05-7	PCB-185	6.6 Z	6.6 Z	PG/L	LDCA-MW22-1014	1/11	20 - 21	6.6	NA	NA	NA	NA	No	NA
	52663-68-0	PCB-187	14 J	130	PG/L	LDCA-MW22-1014	7/11	20 - 21	130	NA	NA	NA	NA	No	NA
	38444-73-4	PCB-19	6 Z	37	PG/L	LDCA-MW13I-1014	3/11	20 - 28	37	NA	NA	NA	NA	No	NA
	41411-64-7	PCB-190	1.7 J	13 J	PG/L	LDCA-MW22-1014	6/11	20 - 21	13	NA	NA	NA	NA	No	NA
	74472-50-7	PCB-191	3.1 Z	3.1 Z	PG/L	LDCA-MW22-1014	1/11	20 - 21	3.1	NA	NA	NA	NA	No	NA
	35694-08-7	PCB-194	4.2 Z	37	PG/L	LDCA-MW22-1014	4/11	20 - 21	37	NA	NA	NA	NA	No	NA
	52663-78-2	PCB-195	13 J	13 J	PG/L	LDCA-MW22-1014	1/11	20 - 21	13	NA	NA	NA	NA	No	NA
	42740-50-1	PCB-196	4 J	25	PG/L	LDCA-MW22-1014	3/11	20 - 21	25	NA	NA	NA	NA	No	NA
	--	PCB-198/199	5.1 J	60	PG/L	LDCA-MW22-1014	6/11	20 - 21	60	NA	NA	NA	NA	No	NA

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Resident Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 2	--	PCB-20/28	4 Z	8.7 Z	PG/L	LDCA-MW17D-1014	3/11	20 - 21	8.7	NA	NA	NA	NA	No	NA
	52663-73-7	PCB-200	5.2 J	5.2 J	PG/L	LDCA-MW22-1014	1/11	20 - 21	5.2	NA	NA	NA	NA	No	NA
	40186-71-8	PCB-201	5.4 J	5.4 J	PG/L	LDCA-MW22-1014	1/11	20 - 21	5.4	NA	NA	NA	NA	No	NA
	2136-99-4	PCB-202	11 J	11 J	PG/L	LDCA-MW22-1014	1/11	20 - 21	11	NA	NA	NA	NA	No	NA
	52663-76-0	PCB-203	5.4 Z	33	PG/L	LDCA-MW22-1014	4/11	20 - 21	33	NA	NA	NA	NA	No	NA
	40186-72-9	PCB-206	3.4 J	59	PG/L	LDCA-MW22-1014	4/11	20 - 21	59	NA	NA	NA	NA	No	NA
	52663-77-1	PCB-208	25	25	PG/L	LDCA-MW22-1014	1/11	20 - 21	25	NA	NA	NA	NA	No	NA
	2051-24-3	PCB-209	3.8 Z	73	PG/L	LDCA-MW22-1014	3/11	20 - 21	73	NA	NA	NA	NA	No	NA
	--	PCB-21/33	6.8 Z	6.8 Z	PG/L	LDCA-MW13D-1014	1/11	20 - 21	6.8	NA	NA	NA	NA	No	NA
	38444-85-8	PCB-22	5.7 J	5.7 J	PG/L	LDCA-MW13D-1014	1/11	20 - 21	5.7	NA	NA	NA	NA	No	NA
	38444-76-7	PCB-27	13 Z	13 Z	PG/L	LDCA-MW23D-1014	1/11	20 - 21	13	NA	NA	NA	NA	No	NA
	2051-62-9	PCB-3	3.8 J	10 J	PG/L	LDCA-MW13I-1014	2/11	20 - 21	10	NA	NA	NA	NA	No	NA
	16606-02-3	PCB-31	3.2 Z	7.1 Z	PG/L	LDCA-MW17D-1014	2/11	20 - 21	7.1	NA	NA	NA	NA	No	NA
	38444-77-8	PCB-32	1.6 J	6 Z	PG/L	LDCA-MW17D-1014	2/11	20 - 21	6	NA	NA	NA	NA	No	NA
	37680-69-6	PCB-35	16 J	16 J	PG/L	LDCA-MW15D-1014-D	1/11	20 - 21	16	NA	NA	NA	NA	No	NA
	38444-87-0	PCB-36	21	21	PG/L	LDCA-MW15D-1014-D	1/11	20 - 21	21	NA	NA	NA	NA	No	NA
	--	PCB-4	57	920	PG/L	LDCA-MW17D-1014	3/11	20 - 130	920	NA	NA	NA	NA	No	NA
	--	PCB-40/71	3.4 Z	21	PG/L	LDCA-MW13D-1014	4/11	20 - 21	21	NA	NA	NA	NA	No	NA
	36559-22-5	PCB-42	6.8 J	8.8 Z	PG/L	LDCA-MW13D-1014	2/11	20 - 21	8.8	NA	NA	NA	NA	No	NA
	--	PCB-44/47/65	10 Z	150	PG/L	LDCA-MW13D-1014, LDCA-MW15D-1014-D	11/11	--	150	NA	NA	NA	NA	No	NA
	70362-47-9	PCB-48	7.7 Z	7.7 Z	PG/L	LDCA-MW13D-1014	1/11	20 - 21	7.7	NA	NA	NA	NA	No	NA
	--	PCB-49/69	2.1 Z	62	PG/L	LDCA-MW13D-1014	10/11	20 - 20	62	NA	NA	NA	NA	No	NA
	--	PCB-50/53	2.7 J	9.1 Z	PG/L	LDCA-MW23D-1014	3/11	20 - 21	9.1	NA	NA	NA	NA	No	NA
	68194-04-7	PCB-51	1.7 Z	46	PG/L	LDCA-MW18D-1014	9/11	20 - 20	46	NA	NA	NA	NA	No	NA
	35693-99-3	PCB-52	4.4 J	400	PG/L	LDCA-MW13D-1014	9/11	20 - 21	400	NA	NA	NA	NA	No	NA
	15968-05-5	PCB-54	2.7 J	3.1 J	PG/L	LDCA-MW13I-1014	2/11	20 - 21	3.1	NA	NA	NA	NA	No	NA
	41464-43-1	PCB-56	9.5 Z	18 J	PG/L	LDCA-MW13D-1014	2/11	20 - 21	18	NA	NA	NA	NA	No	NA
	33025-41-1	PCB-60	6.7 J	6.7 J	PG/L	LDCA-MW13D-1014	1/11	20 - 21	6.7	NA	NA	NA	NA	No	NA
	--	PCB-61/70/74/76	3.5 J	170	PG/L	LDCA-MW13D-1014	5/11	20 - 21	170	NA	NA	NA	NA	No	NA
	52663-58-8	PCB-64	1.7 Z	32	PG/L	LDCA-MW13D-1014	6/11	20 - 21	32	NA	NA	NA	NA	No	NA
	32598-10-0	PCB-66	3.6 Z	48	PG/L	LDCA-MW13D-1014	3/11	20 - 21	48	NA	NA	NA	NA	No	NA
	73575-52-7	PCB-68	5 J	12 J	PG/L	LDCA-MW15D-1014-D	5/11	20 - 21	12	NA	NA	NA	NA	No	NA
	52663-62-4	PCB-82	41 Z	43	PG/L	LDCA-MW13D-1014	2/11	20 - 21	43	NA	NA	NA	NA	No	NA
	60145-20-2	PCB-83	13 J	13 J	PG/L	LDCA-MW23D-1014	1/11	20 - 21	13	NA	NA	NA	NA	No	NA
	52663-60-2	PCB-84	4.2 Z	120	PG/L	LDCA-MW13D-1014	4/11	20 - 21	120	NA	NA	NA	NA	No	NA
	--	PCB-85/116/117	35	42	PG/L	LDCA-MW13D-1014	2/11	20 - 21	42	NA	NA	NA	NA	No	NA
	--	PCB-86/87/97/108/119/125	8 J	260	PG/L	LDCA-MW13D-1014	4/11	20 - 21	260	NA	NA	NA	NA	No	NA
	55215-17-3	PCB-88	35	43	PG/L	LDCA-MW13D-1014	2/11	20 - 21	43	NA	NA	NA	NA	No	NA
	--	PCB-88/91	35	43	PG/L	LDCA-MW13D-1014	2/11	20 - 21	43	NA	NA	NA	NA	No	NA
	--	PCB-90/101/113	3.5 Z	380	PG/L	LDCA-MW13D-1014	8/11	20 - 21	380	NA	NA	NA	NA	No	NA
	68194-05-8	PCB-91	35	43	PG/L	LDCA-MW13D-1014	2/11	20 - 21	43	NA	NA	NA	NA	No	NA
	52663-61-3	PCB-92	5.9 Z	65	PG/L	LDCA-MW13D-1014	3/11	20 - 21	65	NA	NA	NA	NA	No	NA
	38379-99-6	PCB-95	14 J	360	PG/L	LDCA-MW13D-1014	5/11	20 - 21	360	NA	NA	NA	NA	No	NA
	--	PCB-99	4.5 J	150	PG/L	LDCA-MW13D-1014	4/11	20 - 21	150	NA	NA	NA	NA	No	NA
	--	TEQ-DIOXIN-LIKE PCBS	0.0002	0.012	PG/L	LDCA-MW13D-1014	6/11	20 - 21	0.012	NA	0.12 C[16]	NA	NA	No	BSL
	--	**TEQ HALFND-DIOXIN-LIKE PCBS**	1.31	1.37	PG/L	LDCA-MW18D-1014	6/11	20 - 21	1.37	NA	**0.12 C[16]**	NA	NA	**Yes**	ASL
	--	NONDIOXIN-LIKE PCBS	142	6,037	PG/L	LDCA-MW17D-1014	11/11	--	6,037	NA	44,000 C[17]	NA	NA	No	BSL

TABLE 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 2
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Resident Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for acenaphthene.
8 - Value is for pyrene.
9 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
10 - Value is for hexavalent chromium.
11 - Value is for methyl mercury.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for endosulfan.
15 - Value is for endrin.
16 - Value is for 2,3,7,8-TCDD.
17 - Value is for polychlorinated biphenyls (low risk).
18 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 882-R-16-005.
19 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctane Sulfonate(PFOS), EPA 882-R-16-004.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples:
LDCA-MW13D-1014
LDCA-MW13I-1014
LDCA-MW14D-1014
LDCA-MW15D-1014-D
LDCA-MW15D-1014
LDCA-MW16D-1014
LDCA-MW16D-1014-D
LDCA-MW17D-1014
LDCA-MW18D-1014
LDCA-MW19-1014
LDCA-MW21D-1014
LDCA-MW21S-1014
LDCA-MW22-1014
LDCA-MW23D-1014
LDCA-MW23I-1014
LDCA-MW23S-1014

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 3
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 3	**SEMIVOLATILE ORGANICS - SIM**														
	50-32-8	**BENZO(A)PYRENE**	0.077 J	0.077 J	UG/L	LDCA-MW13D-0615	1/9	0.1 - 0.1	0.077	NA	**0.0034 C**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	**ALUMINUM**	3.8 J	36800 J	UG/L	LDCA-MW23D-0615	11/13	20 - 20	36,800	NA	**2000 N**	NA	NA	**Yes**	ASL
	7440-36-0	**ANTIMONY**	5.5	5.5	UG/L	LDCA-MW13D-0615	1/13	2 - 2	6	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.13	5.5 J	UG/L	LDCA-MW23D-0615	13/13	--	5.5	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	BARIUM	30.8 J	363 J	UG/L	LDCA-MW13D-0615	13/13	--	363	NA	380 N	NA	NA	No	BSL
	7440-41-7	**BERYLLIUM**	0.11 J	2.5 J-	UG/L	LDCA-MW23D-0615	4/13	1 - 1	3	NA	**2.5 N**	NA	NA	**Yes**	ASL
	7440-43-9	CADMIUM	0.016 J	0.2 J	UG/L	LDCA-MW23D-0615	6/13	1 - 1	0.2	NA	0.92 N	NA	NA	No	BSL
	7440-70-2	CALCIUM	4940 J	314000 J	UG/L	LDCA-MW13D-0615	13/13	--	314,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.046 J	27.1 J	UG/L	LDCA-MW23D-0615	7/13	2 - 2	27.1	NA	**0.035 C[8]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.026 J	40.9	UG/L	LDCA-MW21S-0615	10/13	1 - 1	40.9	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.82 J	10.9	UG/L	LDCA-MW23D-0615	4/13	2 - 2	10.9	NA	80 N	NA	NA	No	BSL
	57-12-5	**CYANIDE**	11.1 J	11.1 J	UG/L	LDCA-MW16D-0615	1/5	10 - 10	11.1	NA	**0.15 N**	NA	NA	**Yes**	ASL
	7439-89-6	**IRON**	70.2 J	42500	UG/L	LDCA-MW23I-0615	11/13	200 - 200	42,500	NA	**1400 N**	NA	NA	**Yes**	ASL
	7439-92-1	**LEAD**	0.033 J	41.4	UG/L	LDCA-MW23D-0615	9/13	1 - 1	41.4	NA	**15**	NA	NA	**Yes**	ASL
	7439-95-4	MAGNESIUM	394 J	28700	UG/L	LDCA-MW19-0615	12/13	500 - 500	28,700	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	1.1 J	5080	UG/L	LDCA-MW21S-0615	12/13	20 - 20	5,080	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.016 J	0.06 J	UG/L	LDCA-MW19-0615	5/13	0.2 - 0.2	0.06	NA	0.2 N[9]	NA	NA	No	BSL
	7440-02-0	NICKEL	0.16 J-	27.3 J	UG/L	LDCA-MW21S-0615	11/13	1 - 1	27.3	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	1770	71500	UG/L	LDCA-MW13D-0615	13/13	--	71,500	NA	NA	NA	NA	No	NUT
	7782-49-2	SELENIUM	0.22 J	0.26 J	UG/L	LDCA-MW18D-0615	2/13	5 - 5	0.26	NA	10 N	NA	NA	No	BSL
	7440-22-4	SILVER	0.032 J	0.032 J	UG/L	LDCA-MW23D-0615	1/13	1 - 1	0.032	NA	9.4 N	NA	NA	No	BSL
	7440-23-5	SODIUM	10300 J	73700	UG/L	LDCA-MW16D-0615	13/13	--	73,700	NA	--	NA	NA	No	BSL
	7440-62-2	**VANADIUM**	0.03 J	15.4	UG/L	LDCA-MW23D-0615	6/13	2.6 - 2.6	15.4	NA	**8.6 N**	NA	NA	**Yes**	ASL
	7440-66-6	ZINC	2 J+	67.8 J+	UG/L	LDCA-MW23D-0615	13/13	--	67.8	NA	600 N	NA	NA	No	BSL
	FILTERED METALS														
	7429-90-5	ALUMINUM	1	112	UG/L	LDCA-MW13D-0615	14/14	--	112	NA	2000 N	NA	NA	No	BSL
	7440-36-0	**ANTIMONY**	0.15 J	5.3	UG/L	LDCA-MW13D-0615	2/14	2 - 2	5.3	NA	**0.78 N**	NA	NA	**Yes**	ASL
	7440-38-2	**ARSENIC**	0.12	4	UG/L	LDCA-MW23I-0615	14/14	--	4	NA	**0.052 C**	NA	NA	**Yes**	ASL
	7440-39-3	BARIUM	29.9	351	UG/L	LDCA-MW13D-0615	14/14	--	351	NA	380 N	NA	NA	No	BSL
	7440-41-7	BERYLLIUM	0.078 J	0.14 J	UG/L	LDCA-MW19-0615	3/14	1 - 1	0.14	NA	2.5 N	NA	NA	No	BSL
	7440-43-9	CADMIUM	0.016 J	0.17 J	UG/L	LDCA-MW17D-0615	3/14	1 - 1	0.17	NA	0.92 N	NA	NA	No	BSL
	7440-70-2	CALCIUM	5350	305000	UG/L	LDCA-MW13D-0615	14/14	--	305,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**CHROMIUM**	0.041	25.3	UG/L	LDCA-MW13D-0615	14/14	--	25.3	NA	**0.035 C[7]**	NA	NA	**Yes**	ASL
	7440-48-4	**COBALT**	0.023	40.5	UG/L	LDCA-MW21S-0615	11/14	1 - 1	40.5	NA	**0.6 N**	NA	NA	**Yes**	ASL
	7440-50-8	COPPER	0.17	2.4	UG/L	LDCA-MW13D-0615	3/14	2 - 2	2.4	NA	80 N	NA	NA	No	BSL
	7439-89-6	**IRON**	9.8 J	41100	UG/L	LDCA-MW23S-0615	14/14	--	41,100	NA	**1400 N**	NA	NA	**Yes**	ASL
	7439-92-1	LEAD	0.026 J	1.6	UG/L	LDCA-MW13D-0615	11/14	1 - 1	1.6	NA	15	NA	NA	No	BSL
	7439-95-4	MAGNESIUM	16.4 J	29900	UG/L	LDCA-MW19-0615	14/14	--	29,900	NA	NA	NA	NA	No	NUT
	7439-96-5	**MANGANESE**	0.076 J-	4630	UG/L	LDCA-MW21S-0615	13/14	1 - 1	4,630	NA	**43 N**	NA	NA	**Yes**	ASL
	7439-97-6	MERCURY	0.015 J	0.035	UG/L	LDCA-MW22-0615	10/14	0.025 - 0.2	0.035	NA	0.2 N[9]	NA	NA	No	BSL
	7440-02-0	NICKEL	0.097 J	26.8	UG/L	LDCA-MW21S-0615	12/14	1 - 1	26.8	NA	39 N	NA	NA	No	BSL
	7440-09-7	POTASSIUM	1740	74700	UG/L	LDCA-MW13D-0615	14/14	--	74,700	NA	NA	NA	NA	No	NUT
	7440-23-5	SODIUM	10000	75400 J	UG/L	LDCA-MW16D-0615	13/14	50000 - 50000	75,400	NA	NA	NA	NA	No	NUT
	7440-62-2	VANADIUM	0.044 J-	1.2 J	UG/L	LDCA-MW14D-0615	4/14	2.6 - 2.6	1.2	NA	8.6 N	NA	NA	No	BSL
	7440-66-6	ZINC	0.59 J	14.1 J	UG/L	LDCA-MW21S-0615	14/14	--	14.1	NA	600 N	NA	NA	No	BSL
	PERFLUORINATED COMPOUNDS														
	335-67-1	**PENTADECAFLUOROOCTANOIC ACID**	0.031	0.049	UG/L	LDCA-MW13I-0615	2/2	--	0.049	NA	**0.04 N[10]**	NA	NA	**Yes**	ASL
	1763-23-1	PERFLUOROOCTANE SULFONIC ACID	0.024 J	0.028 J	UG/L	LDCA-MW13D-0615	2/2	--	0.028	NA	0.04 N[11]	NA	NA	No	BSL
	PESTICIDES														
	60-57-1	**DIELDRIN**	0.00224 J	0.00224 J	UG/L	LDCA-MW14D-0615	1/11	0.00095 - 0.001	0.00224	NA	**0.0018 C**	NA	NA	**Yes**	ASL
	SEMIVOLATILES														
	123-91-1	**1,4-DIOXANE**	0.24 J	32	UG/L	LDCA-MW19-0615	6/14	0.5 - 2	32	NA	**0.46 C**	NA	NA	**Yes**	ASL
	100-52-7	BENZALDEHYDE	1.1 J	1.1 J	UG/L	LDCA-MW19-0615	1/9	10 - 10	1.1	NA	19 N	NA	NA	No	BSL
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.74 J	1.2 J	UG/L	LDCA-MW13I-0615	4/9	5 - 5	1.2	NA	5.6 C	NA	NA	No	BSL
	85-68-7	BUTYL BENZYL PHTHALATE	0.55 J	0.59 J	UG/L	LDCA-MW13I-0615	2/9	5 - 5	0.59	NA	16 C	NA	NA	No	BSL
	108-95-2	PHENOL	1.7 J	1.7 J	UG/L	LDCA-MW13D-0615	1/9	10 - 10	1.7	NA	580 N	NA	NA	No	BSL

TABLE 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 3
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Intermediate/ Deep Groundwater Outside Landfill Event 3	VOLATILES														
	75-34-3	**1,1-DICHLOROETHANE**	0.22 J	2.9 J+	UG/L	LDCA-MW19-0615	3/9	0.5 - 0.5	2.9	NA	**2.8 C**	NA	NA	**Yes**	ASL
	75-35-4	1,1-DICHLOROETHENE	0.27 J	4.7 J+	UG/L	LDCA-MW19-0615	3/9	0.5 - 0.5	4.7	NA	28 N	NA	NA	No	BSL
	67-64-1	ACETONE	6.4	18	UG/L	LDCA-MW13D-0615	2/9	5 - 5	18	NA	1400 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.23 J	0.65 J+	UG/L	LDCA-MW19-0615	2/9	0.5 - 0.5	0.65	NA	**0.46 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.31 J+	0.51 J-	UG/L	LDCA-MW22-0615	2/9	0.5 - 0.5	0.51	NA	81 N	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	0.34 J	3.2 J+	UG/L	LDCA-MW19-0615	4/9	0.5 - 0.5	3.2	NA	7.8 N	NA	NA	No	BSL
	67-66-3	**CHLOROFORM**	1.2	1.2	UG/L	LDCA-MW22-0615	1/9	0.5 - 0.5	1.2	NA	**0.22 C**	NA	NA	**Yes**	ASL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	1.7	1500	UG/L	LDCA-MW19-0615	5/9	0.5 - 0.5	1,500	NA	**3.6 N**	NA	NA	**Yes**	ASL
	1634-04-4	METHYL TERT-BUTYL ETHER	0.27 J	1.3 J+	UG/L	LDCA-MW19-0615	5/9	0.5 - 0.5	1.3	NA	14 C	NA	NA	No	BSL
	127-18-4	TETRACHLOROETHENE	0.31 J	0.31 J	UG/L	LDCA-MW13I-0615	1/9	0.5 - 0.5	0.31	NA	4.1 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.55	1.6	UG/L	LDCA-MW14D-0615	2/9	0.5 - 0.5	1.6	NA	110 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	6.3 J+	6.3 J+	UG/L	LDCA-MW19-0615	1/9	0.5 - 0.5	6.3	NA	36 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	3.5	330	UG/L	LDCA-MW19-0615	3/9	0.5 - 0.5	330	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**VINYL CHLORIDE**	8.5 J+	8.5 J+	UG/L	LDCA-MW19-0615	1/9	0.5 - 0.5	8.5	NA	**0.019 C**	NA	NA	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6. Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for pyrene.
8 - Value is for hexavalent chromium.
9 - Value is for methyl mercury.
10 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 882-R-16-005.
11 - Value calculated using RfD from USEPA's Drinking Water Health Advisory for Perfluorooctane Sulfonate(PFOS), EPA 882-R-16-004.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples:
LDCA-MW13D-0615
LDCA-MW13I-0615
LDCA-MW14D-0615
LDCA-MW15D-0615-D
LDCA-MW15D-0615
LDCA-MW16D-0615
LDCA-MW17D-0615
LDCA-MW18D-0615
LDCA-MW19-0615
LDCA-MW21D-0615
LDCA-MW21S-0615
LDCA-MW22-0615
LDCA-MW23D-0615
LDCA-MW23I-0615
LDCA-MW23S-0615

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH INTERMEDIATE/DEEP GROUNDWATER LOCATIONS OUTSIDE LANDFILL - EVENT 4
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL - Tapwater[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Intermediate/	**VOLATILES**														
Deep	75-34-3	**1,1-Dichloroethane**	0.28 J	3.6	UG/L	LDCA-MW19-0416, LDCA-MW19-0416-D	3/5	0.5 - 0.5	3.6	NA	**2.8 C**	NA	NA	**Yes**	ASL
Groundwater	75-35-4	1,1-Dichloroethene	4.2	5	UG/L	LDCA-MW19-0416	1/5	0.5 - 0.5	5	NA	28 N	NA	NA	No	BSL
Outside	95-50-1	1,2-Dichlorobenzene	0.13 J	0.17 J	UG/L	LDCA-MW21S-0416	2/5	0.5 - 0.5	0.17	NA	30 N	NA	NA	No	BSL
Landfill	106-46-7	1,4-Dichlorobenzene	0.17 J	0.2 J	UG/L	LDCA-MW21S-0416	2/5	0.5 - 0.5	0.2	NA	0.48 C	NA	NA	No	BSL
Event 4	67-64-1	Acetone	5.2	27	UG/L	LDCA-MW13D-0416	3/5	5 - 5	27	NA	1400 N	NA	NA	No	BSL
	71-43-2	**Benzene**	0.73	0.76	UG/L	LDCA-MW19-0416	1/5	0.5 - 0.5	0.76	NA	**0.46 C**	NA	NA	**Yes**	ASL
	108-90-7	Chlorobenzene	0.37 J	4.4	UG/L	LDCA-MW19-0416, LDCA-MW19-0416-D	4/5	0.5 - 0.5	4.4	NA	7.8 N	NA	NA	No	BSL
	74-87-3	Chloromethane	0.16 J	0.16 J	UG/L	LDCA-MW13D-0416	1/5	0.5 - 0.5	0.16	NA	19 N	NA	NA	No	BSL
	156-59-2	**cis-1,2-Dichloroethene**	2.4	2000	UG/L	LDCA-MW19-0416	5/5	-	2000	NA	**3.6 N**	NA	NA	**Yes**	ASL
	110-82-7	Cyclohexane	0.2 J	0.21 J	UG/L	LDCA-MW19-0416	1/5	0.5 - 0.5	0.21	NA	1300 N	NA	NA	No	BSL
	--	m+p-Xylenes	0.11 J	0.11 J	UG/L	LDCA-MW13D-0416	1/5	0.5 - 0.5	0.11	NA	19 N	NA	NA	No	BSL
	1634-04-4	Methyl Tert-Butyl Ether	0.29 J	2.5	UG/L	LDCA-MW19-0416-D	5/5	-	2.5	NA	14 C	NA	NA	No	BSL
	127-18-4	Tetrachloroethene	0.17 J	0.17 J	UG/L	LDCA-MW13I-0416	1/5	0.5 - 0.5	0.17	NA	4.1 N	NA	NA	No	BSL
	108-88-3	Toluene	0.1 J	0.31 J	UG/L	LDCA-MW13D-0416	2/5	0.5 - 0.5	0.31	NA	110 N	NA	NA	No	BSL
	156-60-5	trans-1,2-Dichloroethene	0.13 J	7	UG/L	LDCA-MW19-0416-D	3/5	0.5 - 0.5	7	NA	36 N	NA	NA	No	BSL
	79-01-6	**Trichloroethene**	0.13 J	310	UG/L	LDCA-MW19-0416-D	5/5	-	310	NA	**0.28 N**	NA	NA	**Yes**	ASL
	75-01-4	**Vinyl Chloride**	0.38 J	9.8	UG/L	LDCA-MW19-0416	3/5	0.5 - 0.5	9.8	NA	**0.019 C**	NA	NA	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA regional screening level (RSL), May 2016. Carcinogenic values represent an incremental cancer risk of 1x10-6.
Noncarcinogenic values correspond to a target hazard quotient (HQ) of 0.1.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
chemical was retained as a COPC.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples
LDCA-MW13D-0416
LDCA-MW13I-0416
LDCA-MW14D-0416
LDCA-MW15D-0416
LDCA-MW19-0416
LDCA-MW19-0416-AVG
LDCA-MW19-0416-D
LDCA-MW21D-0416
LDCA-MW21S-0416

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill All Events	**SEMIVOLATILE ORGANICS - SIM**														
	123-91-1	1,4-DIOXANE	1.7 J	220 J	UG/L	LDCA-MW01D-1014	19/20	0.5 - 0.5	220	NA	2,900 C	NA	NA	No	BSL
	91-57-6	2-METHYLNAPHTHALENE	0.011 J	0.6	UG/L	LDCA-MW11-1014	22/50	0.091 - 0.1	0.6	NA	NA	NA	NA	No	NTX
	83-32-9	ACENAPHTHENE	0.0055 J	12 J	UG/L	LDCA-MW37-1014	25/46	0.091 - 0.1	12	NA	NA	NA	NA	No	NTX
	208-96-8	ACENAPHTHYLENE	0.0085 J	0.38	UG/L	LDCA-MW37-0615	20/51	0.1 - 0.1	0.38	NA	NA	NA	NA	No	NTX
	120-12-7	ANTHRACENE	0.048 J	1.2	UG/L	LDCA-MW11-0615	34/49	0.1 - 0.1	1.2	NA	NA	NA	NA	No	NTX
	56-55-3	BENZO(A)ANTHRACENE	0.015 J	1.1	UG/L	LDCA-MW11-0615	13/40	0.091 - 0.1	1.1	NA	NA	NA	NA	No	NV
	50-32-8	BENZO(A)PYRENE	0.022 J	0.83	UG/L	LDCA-MW11-0314	4/50	0.091 - 0.1	0.83	NA	NA	NA	NA	No	NV
	205-99-2	BENZO(B)FLUORANTHENE	0.0064 J	0.52	UG/L	LDCA-MW11-0615	6/45	0.091 - 0.1	0.52	NA	NA	NA	NA	No	NV
	191-24-2	BENZO(G,H,I)PERYLENE	0.0057 J	0.57 J	UG/L	LDCA-MW11-0314	5/48	0.091 - 0.1	0.57	NA	NA	NA	NA	No	NTX
	207-08-9	BENZO(K)FLUORANTHENE	0.0056 J	0.53	UG/L	LDCA-MW11-0314	7/46	0.091 - 0.1	0.53	NA	NA	NA	NA	No	NV
	218-01-9	CHRYSENE	0.0061 J	0.73	UG/L	LDCA-MW11-0615	7/46	0.091 - 0.1	0.73	NA	NA	NA	NA	No	NV
	53-70-3	DIBENZO(A,H)ANTHRACENE	0.024 J	0.061 J	UG/L	LDCA-MW11-0615	2/46	0.091 - 0.1	0.061	NA	NA	NA	NA	No	NV
	206-44-0	FLUORANTHENE	0.0066 J	2.3	UG/L	LDCA-MW11-0615	27/49	0.091 - 0.1	2.3	NA	NA	NA	NA	No	NV
	86-73-7	FLUORENE	0.098 J-	6.6	UG/L	LDCA-MW37-0615	26/46	0.091 - 0.1	6.6	NA	NA	NA	NA	No	NTX
	193-39-5	INDENO(1,2,3-CD)PYRENE	0.013 J	0.48	UG/L	LDCA-MW11-0314	4/49	0.091 - 0.1	0.48	NA	NA	NA	NA	No	NV
	91-20-3	NAPHTHALENE	0.019 J	0.47	UG/L	LDCA-MW20S-1014	19/44	0.1 - 0.1	0.47	NA	NA	NA	NA	No	NV
	87-86-5	PENTACHLOROPHENOL	0.11 J	0.61	UG/L	LDCA-MW07D-0615	6/31	0.2 - 0.2	0.61	NA	NA	NA	NA	No	NV
	85-01-8	PHENANTHRENE	0.0064 J	4.1	UG/L	LDCA-MW11-0615	27/47	0.091 - 0.1	4.1	NA	NA	NA	NA	No	NTX
	129-00-0	PYRENE	0.019 J	1.7	UG/L	LDCA-MW11-0615	20/50	0.091 - 0.1	1.7	NA	NA	NA	NA	No	NTX
	DIOXIN/FURANS														
	3268-87-9	**1,2,3,4,6,7,8,9-OCDD**	25.4	870,000	PG/L	LDCA-MW11-0314	19/40	0.105 - 35.8	870,000	NA	**120,000 C[7]**	NA	NA	**Yes**	ASL
	39001-02-0	1,2,3,4,6,7,8,9-OCDF	0.916 Z	5,400	PG/L	LDCA-MW11-0314	6/40	3.8	5,400	NA	120,000 C[7]	NA	NA	No	ASL
	35822-46-9	**1,2,3,4,6,7,8-HPCDD**	18.4	190,000	PG/L	LDCA-MW11-0314	7/40	0.0958 - 4.05	190,000	NA	**3,600 C[7]**	NA	NA	**Yes**	ASL
	67562-39-4	1,2,3,4,6,7,8-HPCDF	2.52 Z	3,200	PG/L	LDCA-MW11-0314	3/40	0.0981 - 1.52	3,200	NA	3,600 C[7]	NA	NA	No	ASL
	55673-89-7	1,2,3,4,7,8,9-HPCDF	300	300	PG/L	LDCA-MW11-0314	1/40	0.129 - 126	300	NA	3,600 C[7]	NA	NA	No	ASL
	39227-28-6	**1,2,3,4,7,8-HXCDD**	0.716 Z	730	PG/L	LDCA-MW11-0314	7/40	0.124 - 2.51	730	NA	**360 C[7]**	NA	NA	**Yes**	ASL
	70648-26-9	1,2,3,4,7,8-HXCDF	0.441 Z	340	PG/L	LDCA-MW11-0314	10/40	0.0895 - 18.6	340	NA	360 C[7]	NA	NA	No	ASL
	57653-85-7	**1,2,3,6,7,8-HXCDD**	0.915 Z	4,900	PG/L	LDCA-MW11-0314	6/40	0.125 - 2.28	4,900	NA	**360 C[7]**	NA	NA	**Yes**	ASL
	57117-44-9	1,2,3,6,7,8-HXCDF	0.366 Z	210	PG/L	LDCA-MW11-0314	8/40	0.0796 - 16.4	210	NA	360 C[7]	NA	NA	No	ASL
	19408-74-3	**1,2,3,7,8,9-HXCDD**	0.427 J	5,800	PG/L	LDCA-MW11-0314	8/40	0.133 - 1.99	5,800	NA	**360 C[7]**	NA	NA	**Yes**	ASL
	72918-21-9	1,2,3,7,8,9-HXCDF	1.07 Z	1.4 J	PG/L	LDCA-MW03-1014	3/40	0.107 - 22.7	1.4	NA	360 C[7]	NA	NA	No	ASL
	40321-76-4	**1,2,3,7,8-PECDD**	1.32 Z	540	PG/L	LDCA-MW11-0314	2/40	0.128 - 33.8	540	NA	**36 C[7]**	NA	NA	**Yes**	ASL
	57117-41-6	1,2,3,7,8-PECDF	0.72 J	84	PG/L	LDCA-MW11-0314	2/40	0.154 - 10.2	84	NA	1,200 C[7]	NA	NA	No	ASL
	60851-34-5	2,3,4,6,7,8-HXCDF	0.724 Z	110	PG/L	LDCA-MW11-0314	5/40	0.0872 - 17	110	NA	360 C[7]	NA	NA	No	ASL
	57117-31-4	2,3,4,7,8-PECDF	0.72 Z	110	PG/L	LDCA-MW11-0314	3/40	0.146 - 17	110	NA	120 C[7]	NA	NA	No	ASL
	1746-01-6	**2,3,7,8-TCDD**	1.22 Z	110	PG/L	LDCA-MW11-0314	3/40	0.128 - 3.27	110	NA	**36 C**	NA	NA	**Yes**	ASL
	51207-31-9	2,3,7,8-TCDF	100 J	190 J	PG/L	LDCA-MW11-0314	2/40	0.1 - 3.68	190	NA	360 C[7]	NA	NA	No	ASL
	--	**TEQ (0 DL)**	0.022	4,111	PG/L	LDCA-MW11-0314	25/40	0.128 - 0.299	4,111	NA	**36 C**	NA	NA	**Yes**	ASL
	--	**TEQ (1/2 DL)**	0.354	4,111	PG/L	LDCA-MW11-0314	25/40	0.128 - 0.299	4,111	NA	**36 C**	NA	NA	**Yes**	ASL
	TOTAL METALS														
	7429-90-5	ALUMINUM	2.8 J	30,500	UG/L	LDCA-MW11-0314	34/58	20 - 1000	30,500	NA	NA	NA	NA	No	NV
	7440-36-0	ANTIMONY	0.14 J	27.8	UG/L	LDCA-MW11-0314	11/58	2 - 60	28	NA	NA	NA	NA	No	NV
	7440-38-2	ARSENIC	0.45	72.1	UG/L	LDCA-MW01S-1014	50/58	1 - 10	72.1	NA	NA	NA	NA	No	NV
	7440-39-3	BARIUM	24.2	3,960	UG/L	LDCA-MW11-0314	58/58	--	3,960	NA	NA	NA	NA	No	NV
	7440-41-7	BERYLLIUM	0.036 J	8	UG/L	LDCA-MW20D-1014-D	11/58	1 - 5	8	NA	NA	NA	NA	No	NV
	7440-42-8	BORON	20.5 J-	4,080	UG/L	LDCA-MW05S-0314	37/40	100 - 100	4,080	NA	NA	NA	NA	No	NV
	7440-43-9	CADMIUM	0.014 J	21.9	UG/L	LDCA-MW11-0314	14/58	1 - 5	21.9	NA	NA	NA	NA	No	NV
	7440-70-2	CALCIUM	13200	183,000	UG/L	LDCA-MW34S-1014	58/58	--	183,000	NA	NA	NA	NA	No	NV
	7440-47-3	CHROMIUM	0.51 J	399	UG/L	LDCA-MW11-0314	53/58	2 - 2	399	NA	NA	NA	NA	No	NV
	7440-48-4	COBALT	0.14 J	50.2	UG/L	LDCA-MW11-0314	47/58	1 - 50	50.2	NA	NA N	NA	NA	No	NV
	7440-50-8	COPPER	0.33 J	753	UG/L	LDCA-MW11-0314	35/58	2 - 25	753	NA	NA	NA	NA	No	NV
	57-12-5	**CYANIDE**	1.6 J-	367	UG/L	LDCA-MW11-0314	31/55	10 - 10	367	NA	**0.084 N**	NA	NA	**Yes**	ASL
	7439-89-6	IRON	489 J	157,000 J	UG/L	LDCA-MW11-0314	57/58	200 - 200	157,000	NA	NA	NA	NA	No	NV
	7439-92-1	LEAD	0.033 J	4,470	UG/L	LDCA-MW11-0314	37/58	1 - 10	4,470	NA	NA	NA	NA	No	NV

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill All Events	7439-95-4	MAGNESIUM	736 J	191,000	UG/L	LDCA-MW03-1014	57/58	500 - 500	191,000	NA	NA	NA	NA	No	NV
	7439-96-5	MANGANESE	4.3	13,000	UG/L	LDCA-MW34D-0615	58/58	--	13,000	NA	NA	NA	NA	No	NV
	7439-97-6	**MERCURY**	0.014 J	8.2	UG/L	LDCA-MW11-0314	27/56	0.2 - 0.2	8.2	NA	**0.089 N[8]**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	0.64 J	464	UG/L	LDCA-MW11-0314	58/58	--	464	NA	NA	NA	NA	No	NV
	7440-09-7	POTASSIUM	2940	117,000	UG/L	LDCA-MW11-0615	57/58	25000 - 25000	117,000	NA	NA	NA	NA	No	NV
	7782-49-2	SELENIUM	0.2 J	6.1	UG/L	LDCA-MW01D-0314	24/58	5 - 35	6.1	NA	NA	NA	NA	No	NV
	7440-22-4	SILVER	0.011 J	26.3	UG/L	LDCA-MW11-0314	8/58	1 - 10	26.3	NA	NA	NA	NA	No	NV
	7440-23-5	SODIUM	4670	7,190,000 J	UG/L	LDCA-MW12-0615	58/58	--	7,190,000	NA	NA	NA	NA	No	NV
	7440-28-0	THALLIUM	2.9 J	2.9 J	UG/L	LDCA-MW20D-1014	1/58	1 - 25	2.9	NA	NA	NA	NA	No	NV
	7440-62-2	VANADIUM	0.15 J	327 J	UG/L	LDCA-MW11-0314	46/58	2.6 - 5	327	NA	NA	NA	NA	No	NV
	7440-66-6	ZINC	1.1 J	5,660	UG/L	LDCA-MW11-0314	48/58	2 - 60	5,660	NA	NA	NA	NA	No	NV
	FILTERED METALS														
	7429-90-5	ALUMINUM	0.97 J	516	UG/L	LDCA-MW20S-0314	25/60	20 - 200	516	NA	NA	NA	NA	No	NV
	7440-36-0	ANTIMONY	0.11 J	3.6 J	UG/L	LDCA-MW05D-1014	7/60	2 - 60	3.6	NA	NA	NA	NA	No	NV
	7440-38-2	ARSENIC	0.44	40.9	UG/L	LDCA-MW01S-0615	56/60	1 - 1	40.9	NA	NA	NA	NA	No	NV
	7440-39-3	BARIUM	22.6	2,080	UG/L	LDCA-MW11-0615	59/60	200 - 200	2,080	NA	NA	NA	NA	No	NV
	7440-41-7	BERYLLIUM	0.032	0.19 J	UG/L	LDCA-MW01D-0615	3/60	1 - 5	0.19	NA	NA	NA	NA	No	NV
	7440-42-8	BORON	24.1	3,950	UG/L	LDCA-MW05S-0314	20/20	--	3,950	NA	NA	NA	NA	No	NV
	7440-70-2	CALCIUM	2450	230,000	UG/L	LDCA-MW02-1014	60/60	--	230,000	NA	NA	NA	NA	No	NV
	7440-47-3	CHROMIUM	0.25 J	30.2	UG/L	LDCA-MW04-0314	55/60	2 - 10	30.2	NA	NA	NA	NA	No	NV
	7440-48-4	COBALT	0.038 J	15.9	UG/L	LDCA-MW01D-0314	52/60	1 - 50	15.9	NA	NA	NA	NA	No	NV
	7440-50-8	COPPER	0.072	22.1	UG/L	LDCA-MW37-0314	30/60	2 - 25	22.1	NA	NA	NA	NA	No	NV
	7439-89-6	IRON	16.5 J	102,000	UG/L	LDCA-MW05D-1014	58/60	200 - 200	102,000	NA	NA	NA	NA	No	NV
	7439-92-1	LEAD	0.02 J	12.6	UG/L	LDCA-MW01D-0314	37/60	1 - 10	12.6	NA	NA	NA	NA	No	NV
	7439-95-4	MAGNESIUM	501	158,000	UG/L	LDCA-MW05S-1014	58/60	500 - 500	158,000	NA	NA	NA	NA	No	NV
	7439-96-5	MANGANESE	0.24 J	13,600	UG/L	LDCA-MW34D-1014	60/60	--	13,600	NA	NA	NA	NA	No	NV
	7439-97-6	**MERCURY**	0.014 J+	0.32	UG/L	LDCA-MW04-1014	34/58	0.025 - 0.2	0.32	NA	**0.089 N[8]**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	0.39	25 J	UG/L	LDCA-MW01D-1014	57/60	40 - 40	25	NA	NA	NA	NA	No	NV
	7440-09-7	POTASSIUM	3220	115,000	UG/L	LDCA-MW11-0615	60/60	--	115,000	NA	NA	NA	NA	No	NV
	7782-49-2	SELENIUM	0.42 J	6.4	UG/L	LDCA-MW01D-0314	9/60	5 - 35	6.4	NA	NA	NA	NA	No	NV
	7440-22-4	SILVER	0.076 J	0.076 J	UG/L	LDCA-MW07D-0314	1/60	1 - 10	0.076	NA	NA	NA	NA	No	NV
	7440-23-5	SODIUM	4390	540000	UG/L	LDCA-MW06-1014	60/60	--	540000	NA	NA	NA	NA	No	NV
	7440-62-2	VANADIUM	0.27 J-	12.5	UG/L	LDCA-MW37-1014	37/60	2.6 - 50	12.5	NA	NA	NA	NA	No	NV
	7440-66-6	ZINC	0.87 J	981 J	UG/L	LDCA-MW12-0314	51/60	2 - 60	981	NA	NA	NA	NA	No	NV
	PERFLUORINATED COMPOUNDS														
	335-67-1	PENTADECAFLUOROOCTANOIC ACID	0.026 J	0.56	UG/L	LDCA-MW05S-1014	19/20	0.02 - 0.02	0.56	NA	NTX	NA	NA	No	NTX
	375-85-9	PERFLUOROHEPTANOIC ACID	0.011 J	0.27 J	UG/L	LDCA-MW04-1014	18/20	0.01 - 0.1	0.27	NA	NTX	NA	NA	No	NTX
	375-95-1	PERFLUORONONANOIC ACID	0.011 J	0.16 J	UG/L	LDCA-MW01S-1014	10/20	0.02 - 0.21	0.16	NA	NTX	NA	NA	No	NTX
	355-46-4	PERFLUOROHEXANE SULFONIC ACID	0.022 J	0.2 J	UG/L	LDCA-MW04-1014	7/20	0.03 - 0.32	0.2	NA	NTX	NA	NA	No	NTX
	1763-23-1	PERFLUOROOCTANE SULFONIC ACID	0.02 J	1.2	UG/L	LDCA-MW01S-1014	14/20	0.04 - 0.42	1.2	NA	NTX	NA	NA	No	NTX
	PESTICIDES														
	72-54-8	4,4'-DDD	0.00025 J	0.0334	UG/L	LDCA-MW01S-0615	24/60	0.00094 - 0.1	0.0334	NA	NA	NA	NA	No	NV
	72-55-9	4,4'-DDE	0.00017 J	0.063 J	UG/L	LDCA-MW11-1014	23/60	0.00094 - 0.1	0.063	NA	17 C	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.00028 J	0.089 J	UG/L	LDCA-MW11-1014	7/60	0.00094 - 0.1	0.089	NA	NA	NA	NA	No	NV
	309-00-2	ALDRIN	0.00018 J	0.047 J	UG/L	LDCA-MW12-0314	20/60	0.00094 - 0.05	0.047	NA	0.32 C	NA	NA	No	BSL
	319-84-6	ALPHA-BHC	0.0001 J	0.00436 J	UG/L	LDCA-MW36-0615	22/60	0.00094 - 0.05	0.00436	NA	NA	NA	NA	No	NV
	5103-71-9	ALPHA-CHLORDANE	0.0001 J	0.02 J	UG/L	LDCA-MW04-1014	20/60	0.00094 - 0.05	0.02	NA	9.8 C[9]	NA	NA	No	BSL
	319-85-7	BETA-BHC	0.0007 J,	0.081 J	UG/L	LDCA-MW12-0314	17/59	0.00094 - 0.05	0.081	NA	NA	NA	NA	No	NV
	319-86-8	DELTA-BHC	0.00015 J	0.034 J	UG/L	LDCA-MW07D-0314	20/60	0.00094 - 0.05	0.034	NA	NA	NA	NA	No	NV
	60-57-1	DIELDRIN	0.0001 J	0.053 J	UG/L	LDCA-MW11-1014	16/60	0.00094 - 0.1	0.053	NA	NA	NA	NA	No	NV
	959-98-8	ENDOSULFAN I	0.00017 J	0.005 J	UG/L	LDCA-MW05D-1014	17/60	0.00094 - 0.05	0.005	NA	NA	NA	NA	No	BSL
	33213-65-9	ENDOSULFAN II	0.00026 J	0.025 J	UG/L	LDCA-MW04-0314, LDCA-MW07D-0314	10/60	0.00094 - 0.1	0.025	NA	NA	NA	NA	No	BSL
	1031-07-8	ENDOSULFAN SULFATE	0.00017 J	0.0017 J	UG/L	LDCA-MW37-1014	11/58	0.00094 - 0.1	0.0017	NA	NA	NA	NA	No	BSL
	72-20-8	ENDRIN	0.00016 J	0.058 J	UG/L	LDCA-MW04-0314	16/60	0.00094 - 0.1	0.058	NA	NA	NA	NA	No	NV
	7421-93-4	ENDRIN ALDEHYDE	0.00019 J	0.039 J	UG/L	LDCA-MW04-0314	11/60	0.00094 - 0.1	0.039	NA	NA	NA	NA	No	NV
	53494-70-5	ENDRIN KETONE	0.0001 J	0.021 J	UG/L	LDCA-MW11-1014	13/59	0.00094 - 0.1	0.021	NA	NA	NA	NA	No	NV

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill All Events	58-89-9	GAMMA-BHC (LINDANE)	0.00015 J	0.044 J	UG/L	LDCA-MW12-0314	20/60	0.00094 - 0.05	0.044	NA	NA	NA	NA	No	NV
	5103-74-2	GAMMA-CHLORDANE	0.0002 J	0.035 J	UG/L	LDCA-MW04-0314	20/59	0.00094 - 0.05	0.035	NA	9.8 C[9]	NA	NA	No	BSL
	76-44-8	HEPTACHLOR	0.00023 J	0.01 J	UG/L	LDCA-MW06-1014	18/60	0.00094 - 0.05	0.01	NA	0.18 C	NA	NA	No	BSL
	1024-57-3	HEPTACHLOR EPOXIDE	0.00018 J	0.0023 J	UG/L	LDCA-MW11-1014	12/60	0.00094 - 0.05	0.0023	NA	1.3 C	NA	NA	No	BSL
	72-43-5	METHOXYCHLOR	0.0008 J	0.079 J	UG/L	LDCA-MW07S-0314	13/59	0.00094 - 0.5	0.079	NA	NA	NA	NA	No	NV
	SEMIVOLATILES														
	123-91-1	1,4-DIOXANE	1.3	150	UG/L	LDCA-MW11-0615, LDCA-MW12-0615	37/40	0.5 - 2	150	NA	2,900 C	NA	NA	No	BSL
	105-67-9	2,4-DIMETHYLPHENOL	2.7 J	2.7 J	UG/L	LDCA-MW20S-1014	1/57	4.5 - 5	3	NA	NA	NA	NA	No	NV
	91-57-6	2-METHYLNAPHTHALENE	0.48 J	2.5 J	UG/L	LDCA-MW01S-0615	4/39	4.5 - 5	2.5	NA	NA	NA	NA	No	NTX
	95-48-7	2-METHYLPHENOL	0.35 J	0.35 J	UG/L	LDCA-MW20S-1014	1/57	4.5 - 10	0.35	NA	NA	NA	NA	No	NV
	106-44-5	4-METHYLPHENOL	0.3 J	12	UG/L	LDCA-MW20S-1014	3/57	4.5 - 10	12	NA	NA	NA	NA	No	NV
	83-32-9	ACENAPHTHENE	0.55 J	15	UG/L	LDCA-MW37-0615	20/43	1.5 - 5	15	NA	NA	NA	NA	No	NTX
	98-86-2	ACETOPHENONE	0.36 J	4.2 J	UG/L	LDCA-MW07S-0314	3/57	4.5 - 10	4.2	NA	NA	NA	NA	No	NTX
	120-12-7	ANTHRACENE	0.44 J	2.8 J	UG/L	LDCA-MW01S-0615	11/41	0.44 - 5	2.8	NA	NA	NA	NA	No	NTX
	100-52-7	BENZALDEHYDE	0.47 J	1.2 J	UG/L	LDCA-MW36-0615	4/57	4.5 - 10	1.2	NA	NA	NA	NA	No	NTX
	56-55-3	BENZO(A)ANTHRACENE	0.79 J	2.3 J	UG/L	LDCA-MW01S-0615	2/51	4.5 - 5	2.3	NA	NA	NA	NA	No	NV
	205-99-2	BENZO(B)FLUORANTHENE	1.4 J	1.4 J	UG/L	LDCA-MW01S-0615	1/44	4.5 - 5	1.4	NA	NA	NA	NA	No	NV
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.28 J	48	UG/L	LDCA-MW11-0314	14/57	4.5 - 5	48	NA	NA	NA	NA	No	NV
	85-68-7	BUTYL BENZYL PHTHALATE	0.49 J	3.5 J	UG/L	LDCA-MW20I-0615	6/57	4.5 - 5	4	NA	NA	NA	NA	No	NV
	218-01-9	CHRYSENE	0.72 J	2.1 J	UG/L	LDCA-MW01S-0615	2/43	4.5 - 5	2	NA	NA	NA	NA	No	NV
	132-64-9	DIBENZOFURAN	0.41 J	7.4 J	UG/L	LDCA-MW37-0615	5/57	4.5 - 5	7	NA	NA	NA	NA	No	NTX
	84-66-2	DIETHYL PHTHALATE	3.2 J	4 J	UG/L	LDCA-MW06-0314	2/57	4.5 - 5	4	NA	NA	NA	NA	No	NV
	206-44-0	FLUORANTHENE	0.3 J	12 J	UG/L	LDCA-MW01S-0615	7/40	4.5 - 10	12	NA	NA	NA	NA	No	NV
	86-73-7	FLUORENE	0.35 J	6.8	UG/L	LDCA-MW01S-0615	15/44	4.5 - 5	7	NA	NA	NA	NA	No	NTX
	91-20-3	NAPHTHALENE	0.45 J	3 J	UG/L	LDCA-MW01S-0615	7/57	4.5 - 5	3	NA	4.6 C	NA	NA	No	ASL
	86-30-6	N-NITROSODIPHENYLAMINE	0.36 J	3.1 J	UG/L	LDCA-MW11-0314	3/45	4.5 - 5	3	NA	NA	NA	NA	No	NV
	85-01-8	PHENANTHRENE	0.69 J	22 J	UG/L	LDCA-MW01S-0615	12/42	4.5 - 5	22	NA	NA	NA	NA	No	NTX
	108-95-2	PHENOL	61	61	UG/L	LDCA-MW20S-1014	1/57	4.5 - 10	61	NA	NA	NA	NA	No	NV
	129-00-0	PYRENE	0.49 J	7.1	UG/L	LDCA-MW01S-0615	6/40	4.5 - 5	7.1	NA	NA	NA	NA	No	NTX
	VOLATILES														
	75-35-4	1,1-DICHLOROETHENE	0.092 J	0.092 J	UG/L	LDCA-MW01D-1014	1/60	0.5 - 5	0.092	NA	20 N	NA	NA	No	BSL
	87-61-6	1,2,3-TRICHLOROBENZENE	0.33 J	0.33 J	UG/L	LDCA-MW12-0314	1/60	0.5 - 5	0.33	NA	NA	NA	NA	No	NTX
	120-82-1	1,2,4-TRICHLOROBENZENE	0.27 J	0.27 J	UG/L	LDCA-MW12-0314	1/60	0.5 - 5	0.27	NA	3.6 N	NA	NA	No	BSL
	95-50-1	1,2-DICHLOROBENZENE	0.14 J	0.69	UG/L	LDCA-MW07D-1014	16/60	0.5 - 5	0.69	NA	270 N	NA	NA	No	BSL
	541-73-1	1,3-DICHLOROBENZENE	0.2 J	1	UG/L	LDCA-MW04-0615, LDCA-MW12-0615, LDCA-MW12-1014	11/60	0.5 - 5	1	NA	2.6 C[10]	NA	NA	No	BSL
	106-46-7	**1,4-DICHLOROBENZENE**	0.11 J	4.8	UG/L	LDCA-MW34S-1014	28/60	0.5 - 5	4.8	NA	**2.6 C**	NA	NA	**Yes**	ASL
	78-93-3	2-BUTANONE	2.9 J	6	UG/L	LDCA-MW20S-1014	2/60	5 - 10	6	NA	220,000 N	NA	NA	No	BSL
	67-64-1	ACETONE	4.9 J,	47	UG/L	LDCA-MW20S-1014	13/60	5 - 10	47	NA	2,300,000 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.11 J,	3	UG/L	LDCA-MW20S-1014	21/60	0.5 - 5	3	NA	**1.6 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.071 J	19	UG/L	LDCA-MW20S-1014	11/60	0.5 - 5	19	NA	120 N	NA	NA	No	BSL
	108-90-7	**CHLOROBENZENE**	0.24 J	93	UG/L	LDCA-MW12-1014	41/60	0.5 - 5	93	NA	**41 N**	NA	NA	**Yes**	ASL
	124-48-1	CHLORODIBROMOMETHANE	0.1 J	0.1 J	UG/L	LDCA-MW11-1014	1/60	0.5 - 5	0.1	NA	NA	NA	NA	No	NTX
	156-59-2	CIS-1,2-DICHLOROETHENE	0.074 J	0.14 J	UG/L	LDCA-MW01D-1014	10/60	0.5 - 5	0.14	NA	NA	NA	NA	No	NTX
	10061-01-5	CIS-1,3-DICHLOROPROPENE	0.23 J	0.23 J	UG/L	LDCA-MW11-1014	1/60	0.5 - 5	0.23	NA	4.8 C[11]	NA	NA	No	BSL
	110-82-7	CYCLOHEXANE	0.23 J	0.88	UG/L	LDCA-MW34S-1014	6/60	0.5 - 5	0.88	NA	100 N	NA	NA	No	BSL
	100-41-4	ETHYLBENZENE	0.056 J	0.22 J	UG/L	LDCA-MW20S-1014	3/60	0.5 - 5	0.22	NA	3.5 C	NA	NA	No	BSL
	98-82-8	ISOPROPYLBENZENE	0.96	6.4	UG/L	LDCA-MW04-0314	18/60	0.5 - 5	6.4	NA	89 N	NA	NA	No	BSL
	--	M+P-XYLENES	0.16 J	0.36 J	UG/L	LDCA-MW11-1014	11/60	0.5 - 5	0.36	NA	36 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.077 J	0.92	UG/L	LDCA-MW12-0615	15/60	0.5 - 5	0.92	NA	NA	NA	NA	No	NTX
	1634-04-4	METHYL TERT-BUTYL ETHER	0.061 J	3.8	UG/L	LDCA-MW37-1014	20/60	0.5 - 5	3.8	NA	450 C	NA	NA	No	BSL
	75-09-2	METHYLENE CHLORIDE	0.3 J	1.8 J	UG/L	LDCA-MW01S-0314	5/60	0.5 - 5	1.8	NA	470 N	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.14 J	0.6	UG/L	LDCA-MW37-0615	16/60	0.5 - 5	0.6	NA	49 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.062 J	1.6 J	UG/L	LDCA-MW20I-0314	22/60	0.5 - 5	1.6	NA	1,900 N	NA	NA	No	BSL
	79-01-6	**TRICHLOROETHENE**	2.3 J	2.3 J	UG/L	LDCA-MW06-0314	1/60	0.5 - 5	2.3	NA	**0.52 N**	NA	NA	**Yes**	ASL

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill All Events	**TOTAL PCB CONGENERS**														
	2051-60-7	PCB-1	62	2,400,000	PG/L	LDCA-MW11-0314	30/30	--	2,400,000	NA	NA	NA	NA	No	NTX
	33146-45-1	PCB-10	34	180,000	PG/L	LDCA-MW11-0314	26/30	20 - 28	180,000	NA	NA	NA	NA	No	NTX
	--	PCB-103	5.8 Z	140,000	PG/L	LDCA-MW11-0314	14/30	19 - 4400	140,000	NA	NA	NA	NA	No	NTX
	--	PCB-104	6.6 J	28,000	PG/L	LDCA-MW11-0314	11/30	19 - 24	28,000	NA	NA	NA	NA	No	NTX
	32598-14-4	**PCB-105**	4.6 Z	690,000	PG/L	LDCA-MW11-0314	15/30	19 - 230	690,000	NA	**220,000 C**	NA	NA	**Yes**	ASL
	70424-68-9	PCB-107	22	180,000	PG/L	LDCA-MW11-0314	6/15	19 - 21	180,000	NA	NA	NA	NA	No	NTX
	--	PCB-107/124	5200	5,200	PG/L	LDCA-MW11-1014	1/15	20 - 180	5,200	NA	NA	NA	NA	No	NTX
	--	PCB-108/124	56	65,000	PG/L	LDCA-MW11-0314	3/15	19 - 21	65,000	NA	NA	NA	NA	No	NTX
	74472-35-8	PCB-109	14 J	12,000	PG/L	LDCA-MW11-1014	7/15	20 - 24	12,000	NA	NA	NA	NA	No	NTX
	2050-67-1	PCB-11	20	180,000	PG/L	LDCA-MW11-0314	12/30	20 - 13000	180,000	NA	NA	NA	NA	No	NTX
	--	PCB-110/115	7.4 J	3,100,000	PG/L	LDCA-MW11-0314	25/30	20 - 21	3,100,000	NA	NA	NA	NA	No	NTX
	39635-32-0	PCB-111	67	67	PG/L	LDCA-MW12-0314	1/30	19 - 15000	67	NA	NA	NA	NA	No	NTX
	74472-37-0	PCB-114	42	42,000	PG/L	LDCA-MW11-0314	2/30	19 - 4000	42,000	NA	680,000 C	NA	NA	No	ASL
	31508-00-6	**PCB-118**	3.1 J	1,700,000	PG/L	LDCA-MW11-0314	22/30	19 - 21	1,700,000	NA	**220,000 C**	NA	NA	**Yes**	ASL
	--	PCB-12/13	28	1,400,000	PG/L	LDCA-MW11-0314	19/30	20 - 660	1,400,000	NA	NA	NA	NA	No	NTX
	68194-12-7	PCB-120	20	15,000	PG/L	LDCA-MW11-0314	4/30	19 - 3400	15,000	NA	NA	NA	NA	No	NTX
	56558-18-0	PCB-121	21	25,000	PG/L	LDCA-MW11-0314	4/30	19 - 3300	25,000	NA	NA	NA	NA	No	NTX
	76842-07-4	PCB-122	26	17,000	PG/L	LDCA-MW11-0314	2/30	19 - 4000	17,000	NA	NA	NA	NA	No	NTX
	65510-44-3	PCB-123	37	34,000	PG/L	LDCA-MW11-0314	3/30	19 - 3600	34,000	NA	330,000 C	NA	NA	No	ASL
	--	PCB-128/166	8.3 J	510,000	PG/L	LDCA-MW11-0314	15/30	19 - 24	510,000	NA	NA	NA	NA	No	NTX
	--	PCB-129/138/163	3.6 Z	4,600,000	PG/L	LDCA-MW11-0314	26/30	19 - 21	4,600,000	NA	NA	NA	NA	No	NTX
	52663-66-8	PCB-130	7.9 Z	220,000	PG/L	LDCA-MW11-0314	12/30	19 - 99	220,000	NA	NA	NA	NA	No	NTX
	61798-70-7	PCB-131	41	38,000	PG/L	LDCA-MW11-0314	3/30	19 - 3200	38,000	NA	NA	NA	NA	No	NTX
	38380-05-1	PCB-132	4.5 J	1,300,000	PG/L	LDCA-MW11-0314	23/30	19 - 21	1,300,000	NA	NA	NA	NA	No	NTX
	35694-04-3	PCB-133	22	69,000	PG/L	LDCA-MW11-0314	10/30	19 - 24	69,000	NA	NA	NA	NA	No	NTX
	--	PCB-134/143	9 Z	190,000	PG/L	LDCA-MW11-0314	12/30	19 - 24	190,000	NA	NA	NA	NA	No	NTX
	--	PCB-135/151	11 Z	200,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	200,000	NA	NA	NA	NA	No	NTX
	--	PCB-135/151/154	20	2,200,000	PG/L	LDCA-MW11-0314	12/15	19 - 21	2,200,000	NA	NA	NA	NA	No	NTX
	38411-22-2	PCB-136	3.5 Z	770,000	PG/L	LDCA-MW11-0314	21/30	19 - 21	770,000	NA	NA	NA	NA	No	NTX
	35694-06-5	PCB-137	26	110,000	PG/L	LDCA-MW11-0314	6/30	19 - 99	110,000	NA	NA	NA	NA	No	NTX
	--	PCB-139/140	180	54,000	PG/L	LDCA-MW11-0314	5/30	19 - 99	54,000	NA	NA	NA	NA	No	NTX
	52712-04-6	PCB-141	3.7 J	1,100,000	PG/L	LDCA-MW11-0314	18/30	19 - 21	1,100,000	NA	NA	NA	NA	No	NTX
	68194-14-9	PCB-144	5.6 Z	280,000	PG/L	LDCA-MW11-0314	11/30	19 - 2300	280,000	NA	NA	NA	NA	No	NTX
	51908-16-8	PCB-146	3.8 Z	810,000	PG/L	LDCA-MW11-0314	22/30	19 - 21	810,000	NA	NA	NA	NA	No	NTX
	--	PCB-147/149	2.7 Z	4,600,000	PG/L	LDCA-MW11-0314	27/30	19 - 21	4,600,000	NA	NA	NA	NA	No	NTX
	74472-41-6	PCB-148	23	1,000	PG/L	LDCA-MW12-1014	6/30	19 - 15000	1,000	NA	NA	NA	NA	No	NTX
	2050-68-2	PCB-15	22	4,800,000	PG/L	LDCA-MW11-0314	25/30	21 - 47	4,800,000	NA	NA	NA	NA	No	NTX
	68194-08-1	PCB-150	16 J	20,000	PG/L	LDCA-MW11-0314	6/30	19 - 1600	20,000	NA	NA	NA	NA	No	NTX
	68194-09-2	PCB-152	15 Z	760	PG/L	LDCA-MW12-1014	4/30	19 - 15000	760	NA	NA	NA	NA	No	NTX
	--	PCB-153/168	3.2 Z	5,000,000	PG/L	LDCA-MW11-0314	26/30	19 - 21	5,000,000	NA	NA	NA	NA	No	NTX
	--	PCB-154	8.4 J	2,800	PG/L	LDCA-MW12-1014	6/15	20 - 2000	2,800	NA	NA	NA	NA	No	NTX
	33979-03-2	PCB-155	30 Z	240	PG/L	LDCA-MW12-1014	3/30	19 - 15000	240	NA	NA	NA	NA	No	NTX
	--	PCB-156/157	4.8 J	330,000	PG/L	LDCA-MW11-0314	12/30	20 - 43	330,000	NA	NA	NA	NA	No	ASL
	74472-42-7	PCB-158	4.4 Z	460,000	PG/L	LDCA-MW11-0314	15/30	19 - 24	460,000	NA	NA	NA	NA	No	NTX
	39635-35-3	PCB-159	9.3 J	110,000	PG/L	LDCA-MW11-0314	5/30	19 - 2000	110,000	NA	NA	NA	NA	No	NTX
	38444-78-9	PCB-16	8.6 J	2,400,000	PG/L	LDCA-MW11-0314	24/30	20 - 24	2,400,000	NA	NA	NA	NA	No	NTX
	41411-62-5	PCB-160	160	160	PG/L	LDCA-MW34S-1014	1/15	20 - 2000	160	NA	NA	NA	NA	No	NTX
	39635-34-2	PCB-162	8.9 J	1,300	PG/L	LDCA-MW11-1014	5/30	19 - 15000	1,300	NA	NA	NA	NA	No	NTX
	74472-45-0	PCB-164	4.4 J	340,000	PG/L	LDCA-MW11-0314	15/30	19 - 24	340,000	NA	NA	NA	NA	No	NTX
	74472-46-1	PCB-165	92	92	PG/L	LDCA-MW12-0314	1/30	19 - 15000	92	NA	NA	NA	NA	No	NTX
	52663-72-6	PCB-167	5.6 Z	120,000	PG/L	LDCA-MW11-0314	8/30	19 - 99	120,000	NA	910,000 C	NA	NA	No	ASL
	37680-66-3	PCB-17	9.8 J	5,300,000	PG/L	LDCA-MW11-0314	28/30	20 - 21	5,300,000	NA	NA	NA	NA	No	NTX
	35065-30-6	PCB-170	4.4 Z	1,800,000	PG/L	LDCA-MW11-0314	20/30	19 - 21	1,800,000	NA	NA	NA	NA	No	NTX
	--	PCB-171/173	2.7 Z	640,000	PG/L	LDCA-MW11-0314	18/30	19 - 24	640,000	NA	NA	NA	NA	No	NTX
	52663-74-8	PCB-172	5.1 Z	360,000	PG/L	LDCA-MW11-0314	13/30	19 - 99	360,000	NA	NA	NA	NA	No	NTX
	38411-25-5	PCB-174	4.6 J	2,500,000	PG/L	LDCA-MW11-0314	21/30	19 - 21	2,500,000	NA	NA	NA	NA	No	NTX

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill All Events	40186-70-7	PCB-175	16 J	110,000	PG/L	LDCA-MW11-0314	7/30	19 - 99	110,000	NA	NA	NA	NA	No	NTX
	52663-65-7	PCB-176	4.4 J	340,000	PG/L	LDCA-MW11-0314	14/30	19 - 24	340,000	NA	NA	NA	NA	No	NTX
	52663-70-4	PCB-177	3.8 J	1,300,000	PG/L	LDCA-MW11-0314	20/30	19 - 21	1,300,000	NA	NA	NA	NA	No	NTX
	52663-67-9	PCB-178	4.5 J	530,000	PG/L	LDCA-MW11-0314	17/30	19 - 24	530,000	NA	NA	NA	NA	No	NTX
	52663-64-6	PCB-179	2.4 Z	1,200,000	PG/L	LDCA-MW11-0314	19/30	19 - 21	1,200,000	NA	NA	NA	NA	No	NTX
	--	PCB-18/30	9.9 J	7,400,000	PG/L	LDCA-MW11-0314	30/30	--	7,400,000	NA	NA	NA	NA	No	NTX
	--	PCB-180/193	4.6 Z	4,800,000	PG/L	LDCA-MW11-0314	24/30	19 - 21	4,800,000	NA	NA	NA	NA	No	NTX
	74472-47-2	PCB-181	38	140	PG/L	LDCA-MW12-1014	3/30	19 - 15000	140	NA	NA	NA	NA	No	NTX
	60145-23-5	PCB-182	42	80	PG/L	LDCA-MW12-0314	2/30	19 - 15000	80	NA	NA	NA	NA	No	NTX
	52663-69-1	PCB-183	2 Z	110,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	110,000	NA	NA	NA	NA	No	NTX
	--	PCB-183/185	56	1,800,000	PG/L	LDCA-MW11-0314	8/15	19 - 21	1,800,000	NA	NA	NA	NA	No	NTX
	52712-05-7	PCB-185	6.1 J	24,000	PG/L	LDCA-MW11-1014	7/15	20 - 99	24,000	NA	NA	NA	NA	No	NTX
	52663-68-0	PCB-187	6.1 Z	3,200,000	PG/L	LDCA-MW11-0314	23/30	19 - 21	3,200,000	NA	NA	NA	NA	No	NTX
	--	PCB-188	2.8 Z	130	PG/L	LDCA-MW12-1014	5/30	19 - 15000	130	NA	NA	NA	NA	No	NTX
	39635-31-9	PCB-189	8.6 J	64,000	PG/L	LDCA-MW11-0314	7/30	19 - 99	64,000	NA	NA	NA	NA	No	NTX
	38444-73-4	PCB-19	14 J	2,000,000	PG/L	LDCA-MW11-0314	29/30	22 - 22	2,000,000	NA	NA	NA	NA	No	NTX
	41411-64-7	PCB-190	2.4 J	410,000	PG/L	LDCA-MW11-0314	12/30	19 - 99	410,000	NA	NA	NA	NA	No	NTX
	74472-50-7	PCB-191	2.4 Z	95,000	PG/L	LDCA-MW11-0314	9/30	19 - 99	95,000	NA	NA	NA	NA	No	NTX
	35694-08-7	PCB-194	9 Z	1,200,000	PG/L	LDCA-MW11-0314	19/30	19 - 24	1,200,000	NA	NA	NA	NA	No	NTX
	52663-78-2	PCB-195	4 J	480,000	PG/L	LDCA-MW11-0314	14/30	19 - 99	480,000	NA	NA	NA	NA	No	NTX
	42740-50-1	PCB-196	11 J	770,000	PG/L	LDCA-MW11-0314	17/30	19 - 24	770,000	NA	NA	NA	NA	No	NTX
	--	PCB-197	6.7 J	3,400	PG/L	LDCA-MW11-1014	4/15	20 - 99	3,400	NA	NA	NA	NA	No	NTX
	--	PCB-197/200	30 J	250,000	PG/L	LDCA-MW11-0314	5/15	19 - 21	250,000	NA	NA	NA	NA	No	NTX
	--	PCB-198/199	3.5 Z	1,600,000	PG/L	LDCA-MW11-0314	20/30	19 - 21	1,600,000	NA	NA	NA	NA	No	NTX
	2051-61-8	PCB-2	6.5 J	170,000	PG/L	LDCA-MW11-0314	17/30	20 - 810	170,000	NA	NA	NA	NA	No	NTX
	--	PCB-20/28	14 Z	7,200,000	PG/L	LDCA-MW11-0314	25/30	20 - 23	7,200,000	NA	NA	NA	NA	No	NTX
	52663-73-7	PCB-200	4.9 J	16,000	PG/L	LDCA-MW11-1014	8/15	20 - 24	16,000	NA	NA	NA	NA	No	NTX
	40186-71-8	PCB-201	3.5 Z	210,000	PG/L	LDCA-MW11-0314	13/30	19 - 24	210,000	NA	NA	NA	NA	No	NTX
	2136-99-4	PCB-202	7.1 Z	290,000	PG/L	LDCA-MW11-0314	15/30	19 - 24	290,000	NA	NA	NA	NA	No	NTX
	52663-76-0	PCB-203	6.8 Z	980,000	PG/L	LDCA-MW11-0314	19/30	19 - 24	980,000	NA	NA	NA	NA	No	NTX
	74472-53-0	PCB-205	10 Z	65,000	PG/L	LDCA-MW11-0314	7/30	19 - 99	65,000	NA	NA	NA	NA	No	NTX
	40186-72-9	PCB-206	10 J	510,000	PG/L	LDCA-MW11-0314	16/30	19 - 24	510,000	NA	NA	NA	NA	No	NTX
	52663-79-3	PCB-207	2.9 Z	60,000	PG/L	LDCA-MW11-0314	8/30	19 - 99	60,000	NA	NA	NA	NA	No	NTX
	52663-77-1	PCB-208	4.1 J	150,000	PG/L	LDCA-MW11-0314	14/30	19 - 24	150,000	NA	NA	NA	NA	No	NTX
	2051-24-3	PCB-209	4.3 J	390,000	PG/L	LDCA-MW11-0314	14/30	19 - 24	390,000	NA	NA	NA	NA	No	NTX
	--	PCB-21/33	8.3 J	2,300,000	PG/L	LDCA-MW11-0314	23/30	20 - 24	2,300,000	NA	NA	NA	NA	No	NTX
	38444-85-8	PCB-22	4.8 Z	2,100,000	PG/L	LDCA-MW11-0314	23/30	20 - 25	2,100,000	NA	NA	NA	NA	No	NTX
	55702-45-9	PCB-24	53	87,000	PG/L	LDCA-MW11-0314	6/30	20 - 12000	87,000	NA	NA	NA	NA	No	NTX
	55712-37-3	PCB-25	5.8 J	1,400,000	PG/L	LDCA-MW11-0314	25/30	20 - 21	1,400,000	NA	NA	NA	NA	No	NTX
	--	PCB-26/29	9.1 Z	2,200,000	PG/L	LDCA-MW11-0314	26/30	20 - 21	2,200,000	NA	NA	NA	NA	No	NTX
	38444-76-7	PCB-27	2.7 Z	1,300,000	PG/L	LDCA-MW11-0314	27/30	20 - 21	1,300,000	NA	NA	NA	NA	No	NTX
	2051-62-9	PCB-3	7.8 J	960,000	PG/L	LDCA-MW11-0314	28/30	20 - 21	960,000	NA	NA	NA	NA	No	NTX
	16606-02-3	PCB-31	13 J	6,700,000	PG/L	LDCA-MW11-0314	26/30	20 - 21	6,700,000	NA	NA	NA	NA	No	NTX
	38444-77-8	PCB-32	4.7 J	3,200,000	PG/L	LDCA-MW11-0314	28/30	20 - 21	3,200,000	NA	NA	NA	NA	No	NTX
	--	PCB-34	22	88,000	PG/L	LDCA-MW11-0314	6/30	20 - 15000	88,000	NA	NA	NA	NA	No	NTX
	37680-69-6	PCB-35	14 Z	40,000	PG/L	LDCA-MW11-0314	4/30	19 - 17000	40,000	NA	NA	NA	NA	No	NTX
	38444-87-0	PCB-36	26	1,000	PG/L	LDCA-MW12-1014	4/30	19 - 16000	1,000	NA	NA	NA	NA	No	NTX
	38444-90-5	PCB-37	21	700,000	PG/L	LDCA-MW11-0314	14/30	20 - 210	700,000	NA	NA	NA	NA	No	NTX
	38444-88-1	PCB-39	27	58,000	PG/L	LDCA-MW11-0314	3/30	19 - 15000	58,000	NA	NA	NA	NA	No	NTX
	--	PCB-4	77 Z	6,400,000	PG/L	LDCA-MW11-0314	30/30	--	6,400,000	NA	NA	NA	NA	No	NTX
	--	PCB-40/71	2.5 Z	260,000	PG/L	LDCA-MW11-1014	14/15	20 - 20	260,000	NA	NA	NA	NA	No	NTX
	52663-59-9	PCB-41	16 J	31,000	PG/L	LDCA-MW11-1014	3/15	20 - 480	31,000	NA	NA	NA	NA	No	NTX
	--	PCB-41/40/71	34	3,100,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	3,100,000	NA	NA	NA	NA	No	NTX
	36559-22-5	PCB-42	2.8 J	1,500,000	PG/L	LDCA-MW11-0314	24/30	20 - 21	1,500,000	NA	NA	NA	NA	No	NTX
	70362-46-8	PCB-43	18 J	240,000	PG/L	LDCA-MW11-0314	13/30	20 - 470	240,000	NA	NA	NA	NA	No	NTX
	--	PCB-44/47/65	20	6,800,000	PG/L	LDCA-MW11-0314	30/30	--	6,800,000	NA	NA	NA	NA	No	NTX
	70362-45-7	PCB-45	9.4 J	72,000	PG/L	LDCA-MW11-1014	8/15	20 - 470	72,000	NA	NA	NA	NA	No	NTX

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Inside Landfill All Events	--	PCB-45/51	32	2,200,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	2,200,000	NA	NA	NA	NA	No	NTX
	41464-47-5	PCB-46	3.6 Z	580,000	PG/L	LDCA-MW11-0314	24/30	20 - 21	580,000	NA	NA	NA	NA	No	NTX
	70362-47-9	PCB-48	10 J	910,000	PG/L	LDCA-MW11-0314	16/30	20 - 390	910,000	NA	NA	NA	NA	No	NTX
	--	PCB-49/69	3.9 J	4,800,000	PG/L	LDCA-MW11-0314	28/30	20 - 21	4,800,000	NA	NA	NA	NA	No	NTX
	16605-91-7	PCB-5	72	80,000	PG/L	LDCA-MW11-0314	12/30	20 - 860	80,000	NA	NA	NA	NA	No	NTX
	TTNUS815	PCB-50/53	3.1 J	2,200,000	PG/L	LDCA-MW11-0314	27/30	20 - 21	2,200,000	NA	NA	NA	NA	No	NTX
	68194-04-7	PCB-51	11 J	220,000	PG/L	LDCA-MW12-1014	15/15	--	220,000	NA	NA	NA	NA	No	NTX
	35693-99-3	PCB-52	8 J	5,500,000	PG/L	LDCA-MW11-0314	27/30	20 - 21	5,500,000	NA	NA	NA	NA	No	NTX
	15968-05-5	PCB-54	23	300,000	PG/L	LDCA-MW11-0314	22/30	19 - 21	300,000	NA	NA	NA	NA	No	NTX
	74338-24-2	PCB-55	24	24	PG/L	LDCA-MW04-0314	1/30	19 - 15000	24	NA	NA	NA	NA	No	NTX
	41464-43-1	PCB-56	7.5 J, Z	1,200,000	PG/L	LDCA-MW11-0314	19/30	20 - 24	1,200,000	NA	NA	NA	NA	No	NTX
	70424-67-8	PCB-57	4.7 J	27,000	PG/L	LDCA-MW11-0314	9/30	19 - 2800	27,000	NA	NA	NA	NA	No	NTX
	41464-49-7	PCB-58	9.6 J	24,000	PG/L	LDCA-MW11-0314	6/30	19 - 2800	24,000	NA	NA	NA	NA	No	NTX
	--	PCB-59/62/75	5.3 J	490,000	PG/L	LDCA-MW11-0314	20/30	20 - 24	490,000	NA	NA	NA	NA	No	NTX
	25569-80-6	PCB-6	35	3,700,000	PG/L	LDCA-MW11-0314	27/30	20 - 34	3,700,000	NA	NA	NA	NA	No	NTX
	33025-41-1	PCB-60	13 J	540,000	PG/L	LDCA-MW11-0314	10/30	19 - 24	540,000	NA	NA	NA	NA	No	NTX
	--	PCB-61/70/74/76	4.5 Z	5,300,000	PG/L	LDCA-MW11-0314	26/30	20 - 21	5,300,000	NA	NA	NA	NA	No	NTX
	74472-34-7	PCB-63	9.9 J	140,000	PG/L	LDCA-MW11-0314	13/30	19 - 24	140,000	NA	NA	NA	NA	No	NTX
	52663-58-8	PCB-64	1.9 J	1,800,000	PG/L	LDCA-MW11-0314	24/30	20 - 270	1,800,000	NA	NA	NA	NA	No	NTX
	32598-10-0	PCB-66	10 Z	3,000,000	PG/L	LDCA-MW11-0314	24/30	20 - 21	3,000,000	NA	NA	NA	NA	No	NTX
	73575-53-8	PCB-67	6.9 J	110,000	PG/L	LDCA-MW11-0314	13/30	19 - 24	110,000	NA	NA	NA	NA	No	NTX
	73575-52-7	PCB-68	4 J	150,000	PG/L	LDCA-MW11-0314	18/30	19 - 24	150,000	NA	NA	NA	NA	No	NTX
	33284-50-3	PCB-7	65	170,000	PG/L	LDCA-MW11-0314	16/30	20 - 11000	170,000	NA	NA	NA	NA	No	NTX
	41464-42-0	PCB-72	4.6 J	95,000	PG/L	LDCA-MW11-0314	13/30	19 - 2700	95,000	NA	NA	NA	NA	No	NTX
	74338-23-1	PCB-73	13 J	8,600	PG/L	LDCA-MW12-1014	11/30	19 - 15000	8,600	NA	NA	NA	NA	No	NTX
	32598-13-3	PCB-77	38	180,000	PG/L	LDCA-MW11-0314	10/30	19 - 24	180,000	NA	NA	NA	NA	No	NV
	41464-48-6	PCB-79	53	40,000	PG/L	LDCA-MW11-0314	3/30	19 - 2900	40,000	NA	NA	NA	NA	No	NTX
	34883-43-7	PCB-8	30	8,100,000	PG/L	LDCA-MW11-0314	29/30	32 - 32	8,100,000	NA	NA	NA	NA	No	NTX
	70362-50-4	PCB-81	6000	6,000	PG/L	LDCA-MW11-0314	1/30	19 - 6200	6,000	NA	28,000 C	NA	NA	No	ASL
	52663-62-4	PCB-82	35	280,000	PG/L	LDCA-MW11-0314	9/30	19 - 270	280,000	NA	NA	NA	NA	No	NTX
	60145-20-2	PCB-83	18 J	54	PG/L	LDCA-MW04-1014	2/15	20 - 7700	54	NA	NA	NA	NA	No	NTX
	--	PCB-83/99	21	1,900,000	PG/L	LDCA-MW11-0314	12/15	20 - 21	1,900,000	NA	NA	NA	NA	No	NTX
	52663-60-2	PCB-84	11 J	850,000	PG/L	LDCA-MW11-0314	21/30	19 - 21	850,000	NA	NA	NA	NA	No	NTX
	--	PCB-85/116/117	4.7 J	440,000	PG/L	LDCA-MW11-0314	14/30	19 - 24	440,000	NA	NA	NA	NA	No	NTX
	--	PCB-86/87/97/108/119/125	13 J	140,000	PG/L	LDCA-MW11-1014	11/15	20 - 20	140,000	NA	NA	NA	NA	No	NTX
	--	PCB-86/87/97/109/119/125	21	1,800,000	PG/L	LDCA-MW11-0314	11/15	19 - 21	1,800,000	NA	NA	NA	NA	No	NTX
	55215-17-3	PCB-88	9.5 J	42,000	PG/L	LDCA-MW11-1014	9/12	20 - 20	42,000	NA	NA	NA	NA	No	NTX
	--	PCB-88/91	9.5 J	610,000	PG/L	LDCA-MW11-0314	20/30	19 - 21	610,000	NA	NA	NA	NA	No	NTX
	73575-57-2	PCB-89	26	46,000	PG/L	LDCA-MW11-0314	3/30	19 - 5200	46,000	NA	NA	NA	NA	No	NTX
	34883-39-1	PCB-9	26	290,000	PG/L	LDCA-MW11-0314	20/30	20 - 60	290,000	NA	NA	NA	NA	No	NTX
	--	PCB-90/101/113	14 Z	3,300,000	PG/L	LDCA-MW11-0314	26/30	20 - 21	3,300,000	NA	NA	NA	NA	No	NTX
	68194-05-8	PCB-91	9.5 J	42,000	PG/L	LDCA-MW11-1014	9/12	20 - 20	42,000	NA	NA	NA	NA	No	NTX
	52663-61-3	PCB-92	10 J	680,000	PG/L	LDCA-MW11-0314	20/30	19 - 21	680,000	NA	NA	NA	NA	No	NTX
	--	PCB-93/100	3.9 J	28,000	PG/L	LDCA-MW12-1014	8/15	20 - 22	28,000	NA	NA	NA	NA	No	NTX
	--	PCB-93/95/98/100/102	30	3,400,000	PG/L	LDCA-MW11-0314	13/15	20 - 21	3,400,000	NA	NA	NA	NA	No	NTX
	73575-55-0	PCB-94	2.9 Z	83,000	PG/L	LDCA-MW11-0314	14/30	19 - 5000	83,000	NA	NA	NA	NA	No	NTX
	38379-99-6	PCB-95	3.2 J	220,000	PG/L	LDCA-MW11-1014	13/15	20 - 20	220,000	NA	NA	NA	NA	No	NTX
	73575-54-9	PCB-96	1.4 Z	65,000	PG/L	LDCA-MW11-0314	15/30	19 - 24	65,000	NA	NA	NA	NA	No	NTX
	--	PCB-98/102	5.4 J	18,000	PG/L	LDCA-MW11-1014	9/15	20 - 22	18,000	NA	NA	NA	NA	No	NTX
	--	PCB-99	5.4 Z	120,000	PG/L	LDCA-MW11-1014	12/15	20 - 20	120,000	NA	NA	NA	NA	No	NTX
	--	**TEQ-DIOXIN-LIKE PCBS**	0.00009	109	PG/L	LDCA-MW11-0314	23/30	109	NA	NA	**36 C[12]**	NA	NA	**Yes**	ASL
	--	NONDIOXIN-LIKE PCBS	318	180,194,000	PG/L	LDCA-MW11-0314	30/30	--	180,194,000	NA	NA	NA	NA	No	NTX

TABLE 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - INSIDE LANDFILL - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA's Vapor Intrusion Screening Level (VISL) Calculator Version 3.5.1, May 2016. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
8 - Value is for elemental mercury.
9 - Value is for chlordane.
10 - Value is for 1,4-dichlorobenzene.
11 - Value is for 1,3-dichloropropene.
12 - Value is for 2,3,7,8-TCDD.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NV = Not volatile
NTX = No toxicity criteria

Associated Samples:

LDCA-MW01D-0615	LDCA-MW06-1014	LDCA-MW20D-0314-DUP
LDCA-MW01D-1014	LDCA-MW06-0615	LDCA-MW20D-0615-D
LDCA-MW01D-0314	LDCA-MW06-0314	LDCA-MW20I-0314
LDCA-MW01S-0314	LDCA-MW07D-0314	LDCA-MW20I-1014
LDCA-MW01S-1014	LDCA-MW07D-1014	LDCA-MW20I-0615
LDCA-MW01S-0615	LDCA-MW07D-0615	LDCA-MW20S-0314
LDCA-MW02-0314	LDCA-MW07S-0615	LDCA-MW20S-1014
LDCA-MW02-1014	LDCA-MW07S-0314	LDCA-MW20S-0615
LDCA-MW02-0615	LDCA-MW07S-1014	LDCA-MW34D-1014
LDCA-MW03-1014	LDCA-MW09-1014	LDCA-MW34D-0615-D
LDCA-MW03-0314	LDCA-MW09-0314	LDCA-MW34D-0615
LDCA-MW03-0615	LDCA-MW09-0615	LDCA-MW34D-0314
LDCA-MW04-0615-D	LDCA-MW11-1014	LDCA-MW34S-0615
LDCA-MW04-0615	LDCA-MW11-0615	LDCA-MW34S-0314
LDCA-MW04-1014	LDCA-MW11-0314	LDCA-MW34S-1014
LDCA-MW04-0314	LDCA-MW12-0314	LDCA-MW36-0314
LDCA-MW05D-1014	LDCA-MW12-0615	LDCA-MW36-0615
LDCA-MW05D-0314	LDCA-MW12-1014	LDCA-MW36-1014
LDCA-MW05D-0615	LDCA-MW20D-1014	LDCA-MW37-1014
LDCA-MW05S-1014	LDCA-MW20D-0615	LDCA-MW37-0314
LDCA-MW05S-0314	LDCA-MW20D-1014-D	LDCA-MW37-0615
LDCA-MW05S-0615	LDCA-MW20D-0314	

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - OUTSIDE LANDFILL - SHALLOW GROUNDWATER - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill All Events	**SEMIVOLATILE ORGANICS - SIM**														
	123-91-1	1,4-DIOXANE	0.12 J	150	UG/L	LDCA-MW41D-1014	24/29	0.5 - 0.5	150	NA	2,900 C	NA	NA	No	BSL
	91-57-6	2-METHYLNAPHTHALENE	0.0064 J	3.3	UG/L	LDCA-MW25-1014	5/53	0.091 - 0.1	3.3	NA	NA	NA	NA	No	NTX
	83-32-9	ACENAPHTHENE	0.019 J	0.43	UG/L	LDCA-MW38-0314	7/58	0.091 - 0.1	0.43	NA	NA	NA	NA	No	NTX
	208-96-8	ACENAPHTHYLENE	0.0057 J	0.086 J+	UG/L	LDCA-MW41D-0615-D	10/55	0.091 - 0.1	0.086	NA	NA	NA	NA	No	NTX
	120-12-7	ANTHRACENE	0.029 J	1.6	UG/L	LDCA-MW41D-0615	14/53	0.091 - 0.1	1.6	NA	NA	NA	NA	No	NTX
	56-55-3	BENZO(A)ANTHRACENE	0.0078 J	0.26	UG/L	LDCA-MW16S-0615	4/55	0.091 - 0.1	0.26	NA	NA	NA	NA	No	NV
	50-32-8	BENZO(A)PYRENE	0.073 J	0.12	UG/L	LDCA-MW25-0615	2/52	0.091 - 0.1	0.12	NA	NA	NA	NA	No	NV
	205-99-2	BENZO(B)FLUORANTHENE	0.0054 J	0.0077 J	UG/L	LDCA-MW17S-1014-D	3/53	0.091 - 0.1	0.0077	NA	NA	NA	NA	No	NV
	191-24-2	BENZO(G,H,I)PERYLENE	0.1	0.1	UG/L	LDCA-MW25-0615	1/58	0.091 - 0.1	0.1	NA	NA	NA	NA	No	NTX
	207-08-9	BENZO(K)FLUORANTHENE	0.0072 J	0.0072 J	UG/L	LDCA-MW17S-1014-D	1/58	0.091 - 0.1	0.0072	NA	NA	NA	NA	No	NV
	218-01-9	CHRYSENE	0.21	0.21	UG/L	LDCA-MW16S-0615	1/53	0.091 - 0.1	0.21	NA	NA	NA	NA	No	NV
	206-44-0	FLUORANTHENE	0.0052 J	0.21	UG/L	LDCA-MW25-0615	8/51	0.091 - 0.1	0.21	NA	NA	NA	NA	No	NV
	86-73-7	FLUORENE	0.048 J	0.47	UG/L	LDCA-MW25-0615	7/57	0.091 - 0.1	0.47	NA	NA	NA	NA	No	NTX
	91-20-3	**NAPHTHALENE**	0.0075 J	5.2	UG/L	LDCA-MW25-1014	17/54	0.091 - 0.1	5.2	NA	NA	NA	NA	**Yes**	ASL
	87-86-5	PENTACHLOROPHENOL	0.094 J	0.49	UG/L	LDCA-MW16S-0615-D	5/39	0.2 - 0.2	0.49	NA	NA	NA	NA	No	NV
	85-01-8	PHENANTHRENE	0.0052 J	0.67	UG/L	LDCA-MW25-0615	9/53	0.091 - 0.1	0.67	NA	NA	NA	NA	No	NTX
	129-00-0	PYRENE	0.015 J	0.47	UG/L	LDCA-MW25-0615	8/56	0.091 - 0.16	0.47	NA	NA	NA	NA	No	NTX
	DIOXIN/FURANS														
	3268-87-9	1,2,3,4,6,7,8,9-OCDD	120	510	PG/L	LDCA-MW15S-0314	4/26	0.119 - 4.88	510	NA	120,000 C[7]	NA	NA	No	BSL
	39001-02-0	1,2,3,4,6,7,8,9-OCDF	14.9 J	14.9 J	PG/L	LDCA-MW24-1014	1/26	0.0851 - 2.45	14.9	NA	120,000 C[7]	NA	NA	No	BSL
	35822-46-9	1,2,3,4,6,7,8-HPCDD	2.21 Z	39.1 J	PG/L	LDCA-MW24-1014	5/26	0.123 - 1.15	39.1	NA	3,600 C[7]	NA	NA	No	BSL
	67562-39-4	1,2,3,4,6,7,8-HPCDF	5.09 Z	18 J	PG/L	LDCA-MW24-1014	2/26	0.064 - 1.38	18	NA	3,600 C[7]	NA	NA	No	BSL
	39227-28-6	1,2,3,4,7,8-HXCDD	1.07 Z	1.07 Z	PG/L	LDCA-MW26S-1014	1/26	0.129 - 2.55	1	NA	360 C[7]	NA	NA	No	BSL
	70648-26-9	1,2,3,4,7,8-HXCDF	1.42 J	5.32 Z	PG/L	LDCA-MW24-1014	2/26	0.076 - 2.73	5.32	NA	360 C[7]	NA	NA	No	BSL
	57653-85-7	1,2,3,6,7,8-HXCDD	0.901 Z	1.49 J	PG/L	LDCA-MW26S-1014	2/26	0.134 - 2.23	1.49	NA	360 C[7]	NA	NA	No	BSL
	57117-44-9	1,2,3,6,7,8-HXCDF	1.28 Z	3.57 J	PG/L	LDCA-MW24-1014	2/26	0.0698 - 2.43	3.57	NA	360 C[7]	NA	NA	No	BSL
	19408-74-3	1,2,3,7,8,9-HXCDD	0.478 Z	1.22 J	PG/L	LDCA-MW26S-1014	4/26	0.139 - 1.98	1.22	NA	360 C[7]	NA	NA	No	BSL
	72918-21-9	1,2,3,7,8,9-HXCDF	1.34 J	1.34 J	PG/L	LDCA-MW26S-1014	1/26	0.0938 - 3.46	1.34	NA	360 C[7]	NA	NA	No	BSL
	40321-76-4	1,2,3,7,8-PECDD	0.844 Z	0.844 Z	PG/L	LDCA-MW26S-1014	1/26	0.0383 - 3.8	0.844	NA	36 C[7]	NA	NA	No	BSL
	57117-41-6	1,2,3,7,8-PECDF	0.948 J	0.948 J	PG/L	LDCA-MW26S-1014	1/26	0.131 - 9.1	0.948	NA	1,200 C[7]	NA	NA	No	BSL
	60851-34-5	2,3,4,6,7,8-HXCDF	1.35 Z	5.65 Z	PG/L	LDCA-MW24-1014	2/26	0.0787 - 2.37	5.65	NA	360 C[7]	NA	NA	No	BSL
	57117-31-4	2,3,4,7,8-PECDF	1.04 Z	1.04 Z	PG/L	LDCA-MW26S-1014	1/26	0.112 - 9.34	1.04	NA	120 C[7]	NA	NA	No	BSL
	1746-01-6	2,3,7,8-TCDD	0.449 Z	0.449 Z	PG/L	LDCA-MW17S-1014-D	1/26	0.0849 - 3.03	0.449	NA	36 C	NA	NA	No	BSL
	--	TEQ (0 DL)	0.022	2.12	PG/L	LDCA-MW24-1014	11/26	0.0849 - 0.686	2.12	NA	36 C	NA	NA	No	BSL
	--	TEQ (1/2 DL)	0.371	7.35	PG/L	LDCA-MW24-1014	11/26	0.0849 - 0.686	7.35	NA	36 C	NA	NA	No	BSL
	TOTAL METALS														
	7429-90-5	ALUMINUM	2.8 J	29,300 J	UG/L	LDCA-MW26D-0615	44/83	20 - 1000	29,300	NA	NA	NA	NA	No	NV
	7440-36-0	ANTIMONY	0.11 J	10	UG/L	LDCA-MW25-0615	7/83	2 - 60	10	NA	NA	NA	NA	No	NV
	7440-38-2	ARSENIC	0.1	84.1	UG/L	LDCA-MW41S-0615	56/83	0.5 - 10	84.1	NA	NA	NA	NA	No	NV
	7440-39-3	BARIUM	30.9	1,220 J	UG/L	LDCA-MW26S-0615, LDCA-MW26S-1014	83/83	--	1,220	NA	NA	NA	NA	No	NV
	7440-41-7	BERYLLIUM	0.031 J	1.5 J-	UG/L	LDCA-MW26S-0615	8/83	1 - 5	2	NA	NA	NA	NA	No	NV
	7440-42-8	BORON	28.9 J-	2,920	UG/L	LDCA-MW25-1014	50/55	100 - 100	2,920	NA	NA	NA	NA	No	NV
	7440-43-9	CADMIUM	0.018 J	8.3	UG/L	LDCA-MW25-0615	42/83	1 - 5	8.3	NA	NA	NA	NA	No	NV
	7440-70-2	CALCIUM	5,720 J	605,000	UG/L	LDCA-MW47-0615	82/83	25000 - 25000	605,000	NA	NA	NA	NA	No	NV
	7440-47-3	CHROMIUM	0.15 J	31.3 J	UG/L	LDCA-MW26D-0615	52/83	2 - 3.2	31.3	NA	NA	NA	NA	No	NV
	7440-48-4	COBALT	0.066 J	65.6	UG/L	LDCA-MW41D-1014	67/83	1 - 50	65.6	NA	NA	NA	NA	No	NV
	7440-50-8	COPPER	0.14 J-	94.6	UG/L	LDCA-MW25-0615	57/83	2 - 25	94.6	NA	NA	NA	NA	No	NV
	57-12-5	**CYANIDE**	0.91 J-	16.8 J	UG/L	LDCA-MW41S-0615	12/60	10 - 10	16.8	NA	**0.084 N**	NA	NA	**Yes**	ASL
	7439-89-6	IRON	9.6 J	137,000	UG/L	LDCA-MW24-0615	53/83	100 - 200	137,000	NA	NA	NA	NA	No	NV
	7439-92-1	LEAD	0.036 J	2,400	UG/L	LDCA-MW25-0615	45/83	0.36 - 10	2,400	NA	NA N	NA	NA	No	NV
	7439-95-4	MAGNESIUM	3,250 J	438,000	UG/L	LDCA-MW47-0615	83/83	--	438,000	NA	NA	NA	NA	No	NV
	7439-96-5	MANGANESE	2.5	71,800	UG/L	LDCA-MW41D-1014-D	83/83	--	71,800	NA	NA	NA	NA	No	NV
	7439-97-6	**MERCURY**	0.014 J	0.28 J	UG/L	LDCA-MW25-0615	24/83	0.2 - 0.2	0.28	NA	**0.089 N**[8]	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	0.61 J	32	UG/L	LDCA-MW41D-1014	82/83	1 - 1	32	NA	NA	NA	NA	No	NV

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - OUTSIDE LANDFILL - SHALLOW GROUNDWATER - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill All Events	7440-09-7	POTASSIUM	2,360	130,000	UG/L	LDCA-MW47-0615	80/83	25000 - 25000	130,000	NA	NA	NA	NA	No	NV
	7782-49-2	SELENIUM	0.27 J	9.7	UG/L	LDCA-MW41D-0314	24/83	5 - 35	9.7	NA	NA	NA	NA	No	NV
	7440-22-4	SILVER	0.022 J	25.3	UG/L	LDCA-MW25-0615	3/83	1 - 10	25.3	NA	NA	NA	NA	No	NV
	7440-23-5	SODIUM	6,340 J-	2,620,000	UG/L	LDCA-MW25-1014	82/83	12500 - 12500	2,620,000	NA	NA	NA	NA	No	NV
	7440-28-0	THALLIUM	3.9 J	3.9 J		LDCA-MW46-1014	1/83	1 - 25	3.9	NA	NA	NA	NA	No	NV
	7440-62-2	VANADIUM	0.15 J	52	UG/L	LDCA-MW26D-0615	38/83	2.6 - 50	52	NA	NA	NA	NA	No	NV
	7440-66-6	ZINC	1.6 J	1,170	UG/L	LDCA-MW25-0615	70/83	2 - 60	1,170	NA	NA	NA	NA	No	NV
	FILTERED METALS														
	7429-90-5	ALUMINUM	1.6	21.3 J	UG/L	LDCA-MW18S-0314	30/84	20 - 200	21.3	NA	NA	NA	NA	No	NV
	7440-36-0	ANTIMONY	0.11	2 J-	UG/L	LDCA-MW15S-1014	7/84	2 - 60	2	NA	NA	NA	NA	No	NV
	7440-38-2	ARSENIC	0.089	58.8	UG/L	LDCA-MW41S-0314	59/84	0.5 - 10	58.8	NA	NA	NA	NA	No	NV
	7440-39-3	BARIUM	31.4	1,240	UG/L	LDCA-MW26S-0615	80/84	200 - 200	1,240	NA	NA	NA	NA	No	NV
	7440-41-7	BERYLLIUM	0.028 J-	0.052 J	UG/L	LDCA-MW18S-1014	3/84	1 - 5	0.052	NA	NA	NA	NA	No	NV
	7440-42-8	BORON	33.1	1,600	UG/L	LDCA-MW16S-0314	28/28	--	1,600	NA	NA	NA	NA	No	NV
	7440-43-9	CADMIUM	0.014 J	2.3	UG/L	LDCA-MW41D-0314-D	31/84	1 - 5	2.3	NA	NA	NA	NA	No	NV
	7440-70-2	CALCIUM	17,400	278,000	UG/L	LDCA-MW38-1014	84/84	--	278,000	NA	NA	NA	NA	No	NV
	7440-47-3	CHROMIUM	0.057	6.2 J	UG/L	LDCA-MW47-0314	62/84	2 - 10	6.2	NA	NA	NA	NA	No	NV
	7440-48-4	COBALT	0.063 J	59.6 J	UG/L	LDCA-MW41D-1014	71/84	1 - 50	59.6	NA	NA	NA	NA	No	NV
	7440-50-8	COPPER	0.17 J	39.4	UG/L	LDCA-MW41D-0314	53/84	2 - 25	39.4	NA	NA	NA	NA	No	NV
	7439-89-6	IRON	2.8 J	129,000	UG/L	LDCA-MW24-0615	64/84	100 - 4000	129,000	NA	NA	NA	NA	No	NV
	7439-92-1	LEAD	0.022 J	45.7	UG/L	LDCA-MW26D-0314	43/84	1 - 10	45.7	NA	NA	NA	NA	No	NV
	7439-95-4	MAGNESIUM	9,790 J	145,000	UG/L	LDCA-MW38-1014	84/84	--	145,000	NA	NA	NA	NA	No	NV
	7439-96-5	MANGANESE	1.3	77,000	UG/L	LDCA-MW41D-1014-D	83/84	1 - 1	77,000	NA	NA	NA	NA	No	NV
	7439-97-6	**MERCURY**	0.016 J	0.14 J	UG/L	LDCA-MW38-1014	24/84	0.025 - 0.2	0.14	NA	**0.089 N[8]**	NA	NA	**Yes**	ASL
	7440-02-0	NICKEL	0.52 J	34 J	UG/L	LDCA-MW41D-1014	78/84	40 - 40	34	NA	NA	NA	NA	No	NV
	7440-09-7	POTASSIUM	2,350	63,000 J	UG/L	LDCA-MW38-1014	82/83	10000 - 10000	63,000	NA	NA	NA	NA	No	NV
	7782-49-2	SELENIUM	0.2 J	10.3	UG/L	LDCA-MW41D-0314	17/84	5 - 35	10.3	NA	NA	NA	NA	No	NV
	7440-22-4	SILVER	0.054 J	0.093 J	UG/L	LDCA-MW45-0314	6/84	1 - 10	0.093	NA	NA	NA	NA	No	NV
	7440-23-5	SODIUM	6,610	492,000	UG/L	LDCA-MW38-1014	84/84	--	492,000	NA	NA	NA	NA	No	NV
	7440-62-2	VANADIUM	0.14 J	5.6	UG/L	LDCA-MW47-0314	34/84	2.6 - 50	5.6	NA	NA	NA	NA	No	NV
	7440-66-6	ZINC	1.4 J	38.4 J	UG/L	LDCA-MW31-0314	73/84	2 - 60	38.4	NA	NA	NA	NA	No	NV
	PERFLUORINATED COMPOUNDS														
	335-67-1	PENTADECAFLUOROOCTANOIC ACID	0.012 J	2.7	UG/L	LDCA-MW14S-0615	35/37	0.02 - 0.2	2.7	NA	NA	NA	NA	No	NTX
	375-85-9	PERFLUOROHEPTANOIC ACID	0.0049 J	0.17	UG/L	LDCA-MW24-1014	24/29	0.01 - 0.1	0.17	NA	NA	NA	NA	No	NTX
	355-46-4	PERFLUOROHEXANE SULFONIC ACID	0.012 J	0.36	UG/L	LDCA-MW24-1014	13/29	0.029 - 0.31	0.36	NA	NA	NA	NA	No	NTX
	375-95-1	PERFLUORONONANOIC ACID	0.014 J	0.055	UG/L	LDCA-MW08-1014	15/29	0.02 - 0.2	0.055	NA	NA	NA	NA	No	NTX
	1763-23-1	PERFLUOROOCTANE SULFONIC ACID	0.014 J	0.45	UG/L	LDCA-MW08-0615	27/37	0.039 - 0.41	0.45	NA	NA	NA	NA	No	NTX
	PESTICIDES														
	72-54-8	4,4'-DDD	0.00017 J	0.0056 J	UG/L	LDCA-MW25-1014	20/75	0.00095 - 0.1	0.0056	NA	NA	NA	NA	No	NV
	72-55-9	4,4'-DDE	0.0001 J	0.00216	UG/L	LDCA-MW14S-0615	27/75	0.00095 - 0.1	0.00216	NA	17 C	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.00017 J	0.00057 J	UG/L	LDCA-MW26D-1014	3/75	0.00095 - 0.1	0.00057	NA	NA	NA	NA	No	NV
	309-00-2	ALDRIN	0.00015 J	0.0059 J	UG/L	LDCA-MW25-1014	21/75	0.00095 - 0.05	0.0059	NA	0.32 C	NA	NA	No	BSL
	319-84-6	ALPHA-BHC	0.0001 J	0.0026 J	UG/L	LDCA-MW41D-1014	18/75	0.00095 - 0.05	0.0026	NA	NA	NA	NA	No	NV
	5103-71-9	ALPHA-CHLORDANE	0.0001 J	0.0035 J	UG/L	LDCA-MW33-1014	20/75	0.00095 - 0.05	0.0035	NA	9.8 C[9]	NA	NA	No	BSL
	319-85-7	BETA-BHC	0.0002 J	0.036 J	UG/L	LDCA-MW16S-0314	17/75	0.00095 - 0.05	0.036	NA	NA	NA	NA	No	NV
	319-86-8	DELTA-BHC	0.00013 J	0.0069	UG/L	LDCA-MW24-1014	20/75	0.00095 - 0.05	0.0069	NA	NA	NA	NA	No	NV
	60-57-1	DIELDRIN	0.00019 J	0.0564	UG/L	LDCA-MW18S-0615	29/75	0.00095 - 0.1	0.0564	NA	NA	NA	NA	No	NV
	959-98-8	ENDOSULFAN I	0.0001 J	0.0019 J	UG/L	LDCA-MW25-1014	16/75	0.00095 - 0.05	0.0019	NA	NA	NA	NA	No	NTX
	33213-65-9	ENDOSULFAN II	0.00021 J	0.0031 J	UG/L	LDCA-MW26D-1014	4/75	0.00095 - 0.1	0.0031	NA	NA	NA	NA	No	NTX
	1031-07-8	ENDOSULFAN SULFATE	0.00025 J	0.0013 J	UG/L	LDCA-MW41D-1014	13/75	0.00095 - 0.1	0.0013	NA	NA	NA	NA	No	NTX
	72-20-8	ENDRIN	0.00019 J	0.0027 J	UG/L	LDCA-MW25-1014	12/75	0.00095 - 0.1	0.0027	NA	NA	NA	NA	No	NV
	7421-93-4	ENDRIN ALDEHYDE	0.00016 J	0.0041 J	UG/L	LDCA-MW25-1014	11/75	0.00095 - 0.1	0.0041	NA	NA	NA	NA	No	NV
	53494-70-5	ENDRIN KETONE	0.00019 J	0.0053 J	UG/L	LDCA-MW18S-1014	17/75	0.00095 - 0.1	0.0053	NA	NA	NA	NA	No	NV
	58-89-9	GAMMA-BHC (LINDANE)	0.0001 J	0.002 J	UG/L	LDCA-MW25-1014, LDCA-MW46-1014	27/75	0.00095 - 0.05	0.002	NA	NA	NA	NA	No	NV
	5103-74-2	GAMMA-CHLORDANE	0.00019 J	0.0031 J	UG/L	LDCA-MW38-1014	23/75	0.00095 - 0.05	0.0031	NA	9.8 C[9]	NA	NA	No	BSL
	76-44-8	HEPTACHLOR	0.0003 J	0.0028 J	UG/L	LDCA-MW25-1014	15/75	0.00091 - 0.05	0.0028	NA	0.18 C	NA	NA	No	BSL

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - OUTSIDE LANDFILL - SHALLOW GROUNDWATER - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill All Events	1024-57-3	HEPTACHLOR EPOXIDE	0.00022 J	0.0039 J	UG/L	LDCA-MW25-1014	20/75	0.00095 - 0.05	0.0039	NA	1.3 C	NA	NA	No	BSL
	72-43-5	METHOXYCHLOR	0.0003 J	0.0069 J	UG/L	LDCA-MW25-1014	15/75	0.00095 - 0.5	0.0069	NA	NA	NA	NA	No	NV
	SEMIVOLATILES														
	123-91-1	1,4-DIOXANE	0.34 J	290	UG/L	LDCA-MW41D-0615	35/59	0.5 - 2	290	NA	2,900 C	NA	NA	No	BSL
	105-67-9	2,4-DIMETHYLPHENOL	4.3 J	4.3 J	UG/L	LDCA-MW25-0314	1/70	4.5 - 5	4.3	NA	NA	NA	NA	No	NV
	606-20-2	2,6-DINITROTOLUENE	8.6	8.6	UG/L	LDCA-MW13S-0615	1/70	4.5 - 5	8.6	NA	NA	NA	NA	No	NV
	91-57-6	2-METHYLNAPHTHALENE	3.3 J	9.3	UG/L	LDCA-MW25-0615	2/54	0.1 - 5	9.3	NA	NA	NA	NA	No	NTX
	99-09-2	3-NITROANILINE	4.9 J	4.9 J	UG/L	LDCA-MW13S-0615	1/70	9.1 - 10	4.9	NA	NA	NA	NA	No	NTX
	120-12-7	ANTHRACENE	0.91 J	0.91 J	UG/L	LDCA-MW41D-1014	1/53	0.1 - 5	0.91	NA	NA	NA	NA	No	NTX
	111-44-4	BIS(2-CHLOROETHYL)ETHER	1.2 J	1.2 J	UG/L	LDCA-MW14S-1014	1/70	4.5 - 10	1.2	NA	12 C	NA	NA	No	BSL
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.32 J	4.9 J	UG/L	LDCA-MW26S-0314	7/70	4.5 - 5	4.9	NA	NA	NA	NA	No	NV
	85-68-7	BUTYL BENZYL PHTHALATE	0.47 J	1.6 J	UG/L	LDCA-MW16S-0615-D	3/70	4.5 - 5	1.6	NA	NA	NA	NA	No	NV
	86-74-8	CARBAZOLE	2.5 J	2.5 J	UG/L	LDCA-MW43-0314	1/70	4.5 - 10	2.5	NA	NA	NA	NA	No	NTX
	84-66-2	DIETHYL PHTHALATE	2 J	23	UG/L	LDCA-MW31-0314	3/70	4.5 - 5	23	NA	NA	NA	NA	No	NV
	91-20-3	**NAPHTHALENE**	5.2	8	UG/L	LDCA-MW25-0615	2/53	0.1 - 5	8	NA	**4.6 C**	NA	NA	**Yes**	ASL
	VOLATILES														
	79-00-5	1,1,2-TRICHLOROETHANE	0.12 J	0.12 J	UG/L	LDCA-MW25-1014	1/74	0.5 - 5	0.12	NA	0.62 N	NA	NA	No	BSL
	75-34-3	1,1-DICHLOROETHANE	0.2 J	0.27 J	UG/L	LDCA-MW38-1014	2/74	0.5 - 5	0.27	NA	7.6 C	NA	NA	No	BSL
	75-35-4	1,1-DICHLOROETHENE	0.3 J	0.46 J	UG/L	LDCA-MW38-1014	4/74	0.5 - 5	0.46	NA	20 N	NA	NA	No	BSL
	87-61-6	1,2,3-TRICHLOROBENZENE	0.56	0.56	UG/L	LDCA-MW25-0314	1/74	0.5 - 5	0.56	NA	NA	NA	NA	No	NTX
	96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE**	0.23 J	0.23 J	UG/L	LDCA-MW39-1014	1/74	0.5 - 5	0.23	NA	**0.028 C**	NA	NA	**Yes**	ASL
	95-50-1	1,2-DICHLOROBENZENE	0.22 J	4.2	UG/L	LDCA-MW25-0615	5/74	0.5 - 5	4.2	NA	270 N	NA	NA	No	BSL
	107-06-2	1,2-DICHLOROETHANE	1.1	1.1	UG/L	LDCA-MW14S-1014	1/74	0.5 - 5	1.1	NA	2.2 C	NA	NA	No	BSL
	106-46-7	1,4-DICHLOROBENZENE	0.1 J	0.92	UG/L	LDCA-MW26S-0615	9/74	0.5 - 5	0.92	NA	2.6 C	NA	NA	No	BSL
	78-93-3	2-BUTANONE	6	13	UG/L	LDCA-MW24-1014	3/74	5 - 10	13	NA	220,000 N	NA	NA	No	BSL
	67-64-1	ACETONE	1.5 J	69	UG/L	LDCA-MW25-0314	19/74	5 - 10	69	NA	2,300,000 N	NA	NA	No	BSL
	71-43-2	**BENZENE**	0.1 J	5.9	UG/L	LDCA-MW25-1014	7/74	0.5 - 5	5.9	NA	**1.6 C**	NA	NA	**Yes**	ASL
	75-15-0	CARBON DISULFIDE	0.089 J	1.7	UG/L	LDCA-MW25-0314	9/74	0.5 - 5	1.7	NA	120 N	NA	NA	No	BSL
	108-90-7	CHLOROBENZENE	0.13 J	7.5	UG/L	LDCA-MW38-1014	20/74	0.5 - 5	7.5	NA	41 N	NA	NA	No	BSL
	67-66-3	CHLOROFORM	0.17 J	0.17 J	UG/L	LDCA-MW39-1014	1/74	0.5 - 5	0.17	NA	0.81 C	NA	NA	No	BSL
	74-87-3	CHLOROMETHANE	0.14 J	0.14 J	UG/L	LDCA-MW16S-1014	1/74	0.5 - 5	0.14	NA	26 N	NA	NA	No	BSL
	156-59-2	CIS-1,2-DICHLOROETHENE	0.073 J	94	UG/L	LDCA-MW38-1014	26/74	0.5 - 5	94	NA	NA	NA	NA	No	NTX
	110-82-7	CYCLOHEXANE	0.31 J	4.2	UG/L	LDCA-MW25-0615	2/74	0.5 - 5	4.2	NA	100 N	NA	NA	No	BSL
	100-41-4	ETHYLBENZENE	1.4	3.5	UG/L	LDCA-MW25-1014	3/74	0.5 - 5	3.5	NA	3.5 C	NA	NA	No	BSL
	98-82-8	ISOPROPYLBENZENE	0.32 J	2.1	UG/L	LDCA-MW25-0615	3/74	0.5 - 5	2.1	NA	89 N	NA	NA	No	BSL
	--	M+P-XYLENES	5.8	26	UG/L	LDCA-MW25-0615	3/74	0.5 - 5	26	NA	36 N	NA	NA	No	BSL
	108-87-2	METHYL CYCLOHEXANE	0.35 J	3.8	UG/L	LDCA-MW25-0615	3/74	0.5 - 5	3.8	NA	NA	NA	NA	No	NTX
	1634-04-4	METHYL TERT-BUTYL ETHER	0.11 J	2.6	UG/L	LDCA-MW38-1014	25/74	0.5 - 5	2.6	NA	450 C	NA	NA	No	BSL
	95-47-6	O-XYLENE	0.21 J	13	UG/L	LDCA-MW25-1014	5/74	0.5 - 5	13	NA	49 N	NA	NA	No	BSL
	127-18-4	TETRACHLOROETHENE	0.16 J	0.65	UG/L	LDCA-MW08-0615	5/74	0.5 - 5	0.65	NA	5.8 N	NA	NA	No	BSL
	108-88-3	TOLUENE	0.093 J	9.3	UG/L	LDCA-MW25-1014	9/74	0.5 - 5	9.3	NA	1,900 N	NA	NA	No	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	0.2 J	0.51	UG/L	LDCA-MW38-0615	5/74	0.5 - 5	0.51	NA	NA	NA	NA	No	NTX
	79-01-6	**TRICHLOROETHENE**	0.16 J	14	UG/L	LDCA-MW38-1014	14/74	0.5 - 5	14	NA	**0.52 NC**	NA	NA	**Yes**	ASL
	75-01-4	**VINYL CHLORIDE**	0.14 J	4.2	UG/L	LDCA-MW25-0314	9/74	0.5 - 5	4.2	NA	**0.15 C**	NA	NA	**Yes**	ASL
	TOTAL PCB CONGENERS														
	2051-60-7	PCB-1	6.2 Z	68,000	PG/L	LDCA-MW26S-1014	20/24	20 - 22	68,000	NA	NA	NA	NA	No	NTX
	33146-45-1	PCB-10	61	3,600	PG/L	LDCA-MW26S-0314	9/24	20 - 56	3,600	NA	NA	NA	NA	No	NTX
	60145-21-3	PCB-103	5.6 J	6 J	PG/L	LDCA-MW26D-1014	1/24	19 - 29	6	NA	NA	NA	NA	No	NTX
	--	PCB-104	3.1 Z	3.1 Z	PG/L	LDCA-MW26S-1014	1/24	19 - 22	3.1	NA	NA	NA	NA	No	NTX
	32598-14-4	PCB-105	2 Z	380	PG/L	LDCA-MW24-1014	9/24	19 - 22	380	NA	220,000 C	NA	NA	No	BSL
	--	PCB-107/124	32	32	PG/L	LDCA-MW24-1014	1/12	19 - 21	32	NA	NA	NA	NA	No	NTX
	74472-35-8	PCB-109	4 Z	69	PG/L	LDCA-MW24-1014	3/12	19 - 21	69	NA	NA	NA	NA	No	NTX
	2050-67-1	PCB-11	23	1,300 J+	PG/L	LDCA-MW26S-1014	11/24	20 - 1100	1,300	NA	NA	NA	NA	No	NTX
	--	PCB-110/115	8.9 J	1,700	PG/L	LDCA-MW24-1014	17/24	20 - 22	1,700	NA	NA	NA	NA	No	NTX
	31508-00-6	PCB-118	2.8 Z	1,000	PG/L	LDCA-MW24-1014	17/24	19 - 22	1,000	NA	220,000 C	NA	NA	No	BSL
	--	PCB-12/13	30	980	PG/L	LDCA-MW26S-0314	6/24	19 - 54	980	NA	NA	NA	NA	No	NTX
	--	PCB-128/166	4 Z	230	PG/L	LDCA-MW24-1014	8/24	19 - 22	230	NA	NA	NA	NA	No	NTX

TABLE 2.13
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LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill All Events	--	PCB-129/138/163	4.8 J	1,700	PG/L	LDCA-MW24-1014	20/24	21 - 21	1,700	NA	NA	NA	NA	No	NTX
	52663-66-8	PCB-130	13 Z	99	PG/L	LDCA-MW24-1014	2/24	19 - 22	99	NA	NA	NA	NA	No	NTX
	38380-05-1	PCB-132	11 J	600	PG/L	LDCA-MW24-1014	14/24	19 - 22	600	NA	NA	NA	NA	No	NTX
	--	PCB-134/143	7.4 J	91	PG/L	LDCA-MW24-1014	4/24	19 - 22	91	NA	NA	NA	NA	No	NTX
	--	PCB-135/151	2.5 Z	690	PG/L	LDCA-MW24-1014	10/12	20 - 21	690	NA	NA	NA	NA	No	NTX
	--	PCB-135/151/154	23	210	PG/L	LDCA-MW41S-0314	7/12	20 - 22	210	NA	NA	NA	NA	No	NTX
	38411-22-2	PCB-136	1.8 Z	280	PG/L	LDCA-MW24-1014	13/24	19 - 22	280	NA	NA	NA	NA	No	NTX
	35694-06-5	PCB-137	5 J	74	PG/L	LDCA-MW24-1014	3/24	19 - 22	74	NA	NA	NA	NA	No	NTX
	--	PCB-139/140	25	25	PG/L	LDCA-MW24-1014	1/24	19 - 22	25	NA	NA	NA	NA	No	NTX
	52712-04-6	PCB-141	11 J	350	PG/L	LDCA-MW24-1014	10/24	19 - 22	350	NA	NA	NA	NA	No	NTX
	68194-14-9	PCB-144	3.3 Z	96	PG/L	LDCA-MW24-1014	7/24	19 - 22	96	NA	NA	NA	NA	No	NTX
	51908-16-8	PCB-146	5.1 Z	230	PG/L	LDCA-MW24-1014	11/24	19 - 22	230	NA	NA	NA	NA	No	NTX
	--	PCB-147/149	4.2 J	1,600	PG/L	LDCA-MW24-1014	18/24	20 - 22	1,600	NA	NA	NA	NA	No	NTX
	2050-68-2	PCB-15	23	4,100	PG/L	LDCA-MW26S-0314	10/24	19 - 72	4,100	NA	NA	NA	NA	No	NTX
	--	PCB-153/168	4.8 Z	1,400	PG/L	LDCA-MW24-1014	20/24	21 - 21	1,400	NA	NA	NA	NA	No	NTX
	--	PCB-156/157	7.3 J	180	PG/L	LDCA-MW24-1014	5/24	19 - 45	180	NA	NA	NA	NA	No	NTX
	74472-42-7	PCB-158	2.5 Z	170	PG/L	LDCA-MW24-1014	8/24	19 - 22	170	NA	NA	NA	NA	No	NTX
	39635-35-3	PCB-159	16 Z	16 Z	PG/L	LDCA-MW24-1014	1/24	19 - 22	16	NA	NA	NA	NA	No	NTX
	38444-78-9	PCB-16	4.5 J	1,300	PG/L	LDCA-MW26S-0314	13/24	20 - 22	1,300	NA	NA	NA	NA	No	NTX
	74472-43-8	PCB-161	15 Z	15 Z	PG/L	LDCA-MW39-1014	1/24	19 - 22	15	NA	NA	NA	NA	No	NTX
	39635-34-2	PCB-162	2.9 Z	2.9 Z	PG/L	LDCA-MW24-1014	1/24	19 - 22	2.9	NA	NA	NA	NA	No	NTX
	74472-45-0	PCB-164	5.6 Z	110	PG/L	LDCA-MW24-1014	8/24	19 - 22	110	NA	NA	NA	NA	No	NTX
	52663-72-6	PCB-167	4.8 J	52	PG/L	LDCA-MW24-1014	3/24	19 - 22	52	NA	910,000 C	NA	NA	No	BSL
	37680-66-3	PCB-17	7.4 J	4,200	PG/L	LDCA-MW26S-0314	17/24	20 - 22	4,200	NA	NA	NA	NA	No	NTX
	35065-30-6	PCB-170	3.5 Z	400	PG/L	LDCA-MW24-1014	11/24	19 - 22	400	NA	NA	NA	NA	No	NTX
	--	PCB-171/173	3.4 J	160	PG/L	LDCA-MW24-1014	7/24	19 - 22	160	NA	NA	NA	NA	No	NTX
	52663-74-8	PCB-172	2.1 J	73	PG/L	LDCA-MW24-1014	8/24	19 - 22	73	NA	NA	NA	NA	No	NTX
	38411-25-5	PCB-174	2.8 Z	620	PG/L	LDCA-MW24-1014	13/24	19 - 22	620	NA	NA	NA	NA	No	NTX
	40186-70-7	PCB-175	18 J	18 J	PG/L	LDCA-MW24-1014	1/24	19 - 22	18	NA	NA	NA	NA	No	NTX
	52663-65-7	PCB-176	11 J	65	PG/L	LDCA-MW24-1014	4/24	19 - 22	65	NA	NA	NA	NA	No	NTX
	52663-70-4	PCB-177	1.7 Z	320	PG/L	LDCA-MW24-1014	10/24	19 - 22	320	NA	NA	NA	NA	No	NTX
	52663-67-9	PCB-178	6.1 Z	93	PG/L	LDCA-MW24-1014	6/24	19 - 22	93	NA	NA	NA	NA	No	NTX
	52663-64-6	PCB-179	3.7 J	240	PG/L	LDCA-MW24-1014	10/24	19 - 22	240	NA	NA	NA	NA	No	NTX
	--	PCB-18/30	5.8 J	3,700	PG/L	LDCA-MW26S-0314	20/24	20 - 22	3,700	NA	NA	NA	NA	No	NTX
	--	PCB-180/193	2.2 Z	1,000	PG/L	LDCA-MW24-1014	18/24	21 - 21	1,000	NA	NA	NA	NA	No	NTX
	52663-69-1	PCB-183	2.1 Z	300	PG/L	LDCA-MW24-1014	10/12	19 - 21	300	NA	NA	NA	NA	No	NTX
	--	PCB-183/185	23	160	PG/L	LDCA-MW41S-0314	3/12	19 - 22	160	NA	NA	NA	NA	No	NTX
	52712-05-7	PCB-185	6.3 J	55 Z	PG/L	LDCA-MW24-1014	3/12	19 - 21	55	NA	NA	NA	NA	No	NTX
	52663-68-0	PCB-187	3.2 Z	580	PG/L	LDCA-MW24-1014	14/24	19 - 22	580	NA	NA	NA	NA	No	NTX
	39635-31-9	PCB-189	14 J	14 J	PG/L	LDCA-MW24-1014	1/24	19 - 22	14	NA	NA	NA	NA	No	NTX
	38444-73-4	PCB-19	14 Z	5,700	PG/L	LDCA-MW26S-0314	20/24	20 - 22	5,700	NA	NA	NA	NA	No	NTX
	41411-64-7	PCB-190	1.5 Z	75	PG/L	LDCA-MW24-1014	7/24	19 - 22	75	NA	NA	NA	NA	No	NTX
	74472-50-7	PCB-191	2.9 Z	14 J	PG/L	LDCA-MW24-1014	2/24	19 - 22	14	NA	NA	NA	NA	No	NTX
	35694-08-7	PCB-194	4.5 J	210	PG/L	LDCA-MW24-1014	7/24	19 - 22	210	NA	NA	NA	NA	No	NTX
	52663-78-2	PCB-195	6.2 J	67	PG/L	LDCA-MW24-1014	6/24	19 - 22	67	NA	NA	NA	NA	No	NTX
	42740-50-1	PCB-196	20	130	PG/L	LDCA-MW24-1014	6/24	19 - 22	130	NA	NA	NA	NA	No	NTX
	--	PCB-197	10 J	10 J	PG/L	LDCA-MW24-1014	1/12	19 - 21	10	NA	NA	NA	NA	No	NTX
	--	PCB-197/200	30 J	30 J	PG/L	LDCA-MW41S-0314	1/12	19 - 22	30	NA	NA	NA	NA	No	NTX
	--	PCB-198/199	4.6 Z	320	PG/L	LDCA-MW24-1014	7/24	19 - 22	320	NA	NA	NA	NA	No	NTX
	2051-61-8	PCB-2	12 Z	2,000	PG/L	LDCA-MW26S-0314	6/24	20 - 160	2,000	NA	NA	NA	NA	No	NTX
	--	PCB-20/28	12 Z	1,900	PG/L	LDCA-MW26S-0314	15/24	20 - 22	1,900	NA	NA	NA	NA	No	NTX
	52663-73-7	PCB-200	7.2 J	37	PG/L	LDCA-MW24-1014	3/12	19 - 21	37	NA	NA	NA	NA	No	NTX
	40186-71-8	PCB-201	3.5 J	42	PG/L	LDCA-MW24-1014	4/24	19 - 22	42	NA	NA	NA	NA	No	NTX
	2136-99-4	PCB-202	7.1 J	65	PG/L	LDCA-MW24-1014	5/24	19 - 22	65	NA	NA	NA	NA	No	NTX
	52663-76-0	PCB-203	1.8 Z	200	PG/L	LDCA-MW24-1014	7/24	19 - 22	200	NA	NA	NA	NA	No	NTX
	74472-53-0	PCB-205	8.3 J	8.3 J	PG/L	LDCA-MW24-1014	1/24	19 - 22	8.3	NA	NA	NA	NA	No	NTX
	40186-72-9	PCB-206	4.1 Z	370	PG/L	LDCA-MW41S-0314	7/24	19 - 22	370	NA	NA	NA	NA	No	NTX

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LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill All Events	52663-79-3	PCB-207	3.9 Z	27	PG/L	LDCA-MW41S-0314	5/24	19 - 22	27	NA	NA	NA	NA	No	NTX
	52663-77-1	PCB-208	12 J	170	PG/L	LDCA-MW41S-0314	5/24	19 - 22	170	NA	NA	NA	NA	No	NTX
	2051-24-3	PCB-209	6.1 J	440	PG/L	LDCA-MW41S-0314	6/24	19 - 22	440	NA	NA	NA	NA	No	NTX
	--	PCB-21/33	5.9 J	700	PG/L	LDCA-MW26S-0314	12/24	20 - 22	700	NA	NA	NA	NA	No	NTX
	38444-85-8	PCB-22	4.3 Z	510	PG/L	LDCA-MW26S-0314	11/24	20 - 22	510	NA	NA	NA	NA	No	NTX
	55702-45-9	PCB-24	2.1 Z	67	PG/L	LDCA-MW26S-0314	2/24	19 - 22	67	NA	NA	NA	NA	No	NTX
	55712-37-3	PCB-25	32	420	PG/L	LDCA-MW26S-0314	9/24	19 - 22	420	NA	NA	NA	NA	No	NTX
	--	PCB-26/29	3.1 J	790	PG/L	LDCA-MW26S-0314	11/24	19 - 22	790	NA	NA	NA	NA	No	NTX
	38444-76-7	PCB-27	3.9 Z, J	1,200	PG/L	LDCA-MW26S-0314	14/24	20 - 22	1,200	NA	NA	NA	NA	No	NTX
	2051-62-9	PCB-3	5.2 Z	11,000	PG/L	LDCA-MW26S-0314	14/24	20 - 22	11,000	NA	NA	NA	NA	No	NTX
	16606-02-3	PCB-31	9.5 Z	2,100	PG/L	LDCA-MW26S-0314	15/24	20 - 22	2,100	NA	NA	NA	NA	No	NTX
	38444-77-8	PCB-32	3.9 J	2,000	PG/L	LDCA-MW26S-0314	16/24	20 - 22	2,000	NA	NA	NA	NA	No	NTX
	--	PCB-34	35	35	PG/L	LDCA-MW26S-0314	1/24	19 - 31	35	NA	NA	NA	NA	No	NTX
	38444-87-0	PCB-36	27	27	PG/L	LDCA-MW24-1014	1/24	19 - 33	27	NA	NA	NA	NA	No	NTX
	38444-90-5	PCB-37	31	170	PG/L	LDCA-MW26S-0314	5/24	19 - 22	170	NA	NA	NA	NA	No	NTX
	--	PCB-4	120	74,000	PG/L	LDCA-MW26S-0314	17/24	20 - 75	74,000	NA	NA	NA	NA	No	NTX
	--	PCB-40/71	5.4 Z	440	PG/L	LDCA-MW26S-1014	9/12	20 - 21	440	NA	NA	NA	NA	No	NTX
	52663-59-9	PCB-41	2 Z	31	PG/L	LDCA-MW24-1014	4/12	19 - 21	31	NA	NA	NA	NA	No	NTX
	--	PCB-41/40/71	23	630	PG/L	LDCA-MW26S-0314	8/12	20 - 22	630	NA	NA	NA	NA	No	NTX
	36559-22-5	PCB-42	3.9 Z	230	PG/L	LDCA-MW26S-0314	12/24	20 - 22	230	NA	NA	NA	NA	No	NTX
	70362-46-8	PCB-43	18 Z	52	PG/L	LDCA-MW26S-0314, LDCA-MW26S-1014	5/24	19 - 22	52	NA	NA	NA	NA	No	NTX
	TTNUS618	PCB-44/47/65	24	1,300	PG/L	LDCA-MW26S-0314	23/24	20 - 22	1,300	NA	NA	NA	NA	No	NTX
	70362-45-7	PCB-45	2.1 Z	200	PG/L	LDCA-MW26S-1014	8/12	19 - 21	200	NA	NA	NA	NA	No	NTX
	TTNUS814	PCB-45/51	32	590	PG/L	LDCA-MW26S-0314	9/12	20 - 22	590	NA	NA	NA	NA	No	NTX
	41464-47-5	PCB-46	22	160	PG/L	LDCA-MW26S-0314	10/24	19 - 22	160	NA	NA	NA	NA	No	NTX
	70362-47-9	PCB-48	2.6 Z	160	PG/L	LDCA-MW26S-0314	8/24	19 - 22	160	NA	NA	NA	NA	No	NTX
	--	PCB-49/69	8.6 Z,	890	PG/L	LDCA-MW26S-0314	17/24	20 - 22	890	NA	NA	NA	NA	No	NTX
	16605-91-7	PCB-5	42	720	PG/L	LDCA-MW26S-1014	3/24	19 - 50	720	NA	NA	NA	NA	No	NTX
	--	PCB-50/53	6.2 J	600	PG/L	LDCA-MW26S-0314	18/24	20 - 22	600	NA	NA	NA	NA	No	NTX
	68194-04-7	PCB-51	16 J	340	PG/L	LDCA-MW26S-1014	11/12	20 - 20	340	NA	NA	NA	NA	No	NTX
	35693-99-3	PCB-52	12 J	1,500	PG/L	LDCA-MW26S-0314	20/24	20 - 22	1,500	NA	NA	NA	NA	No	NTX
	15968-05-5	PCB-54	1.6 Z	120	PG/L	LDCA-MW26S-0314	15/24	20 - 22	120	NA	NA	NA	NA	No	NTX
	41464-43-1	PCB-56	4.4 Z	160	PG/L	LDCA-MW26S-0314	8/24	19 - 22	160	NA	NA	NA	NA	No	NTX
	70424-67-8	PCB-57	30	30	PG/L	LDCA-MW24-1014	1/24	19 - 22	30	NA	NA	NA	NA	No	NTX
	--	PCB-59/62/75	22	89	PG/L	LDCA-MW26S-0314	5/24	19 - 22	89	NA	NA	NA	NA	No	NTX
	25569-80-6	PCB-6	34	3,500	PG/L	LDCA-MW26S-1014	11/24	19 - 50	3,500	NA	NA	NA	NA	No	NTX
	33025-41-1	PCB-60	25 Z	73	PG/L	LDCA-MW24-1014	4/24	19 - 22	73	NA	NA	NA	NA	No	NTX
	--	PCB-61/70/74/76	13 J	940	PG/L	LDCA-MW24-1014	13/24	19 - 22	940	NA	NA	NA	NA	No	NTX
	74472-34-7	PCB-63	4.5 J	26	PG/L	LDCA-MW26S-0314	4/24	19 - 22	26	NA	NA	NA	NA	No	NTX
	52663-58-8	PCB-64	4.5 J	310	PG/L	LDCA-MW26S-0314	12/24	19 - 22	310	NA	NA	NA	NA	No	NTX
	32598-10-0	PCB-66	5 Z	430	PG/L	LDCA-MW24-1014	13/24	19 - 22	430	NA	NA	NA	NA	No	NTX
	73575-53-8	PCB-67	11 Z	11 Z	PG/L	LDCA-MW26S-1014	1/24	19 - 22	11	NA	NA	NA	NA	No	NTX
	73575-52-7	PCB-68	3.7 Z	13 Z	PG/L	LDCA-MW26S-1014	6/24	19 - 22	13	NA	NA	NA	NA	No	NTX
	33284-50-3	PCB-7	25	940	PG/L	LDCA-MW26S-0314	9/24	19 - 49	940	NA	NA	NA	NA	No	NTX
	41464-42-0	PCB-72	12 Z	12 Z	PG/L	LDCA-MW26S-1014	1/24	19 - 22	12	NA	NA	NA	NA	No	NTX
	74338-23-1	PCB-73	18 J	18 J	PG/L	LDCA-MW26S-1014	1/24	19 - 22	18	NA	NA	NA	NA	No	NTX
	32598-13-3	PCB-77	26	26	PG/L	LDCA-MW24-1014	1/24	19 - 22	26	NA	NA	NA	NA	No	NTX
	34883-43-7	PCB-8	68	13,000	PG/L	LDCA-MW26S-0314	12/24	20 - 48	13,000	NA	NA	NA	NA	No	NTX
	52663-62-4	PCB-82	11 J	160	PG/L	LDCA-MW24-1014	7/24	19 - 22	160	NA	NA	NA	NA	No	NTX
	--	PCB-83/99	23	290	PG/L	LDCA-MW26D-0314	6/12	19 - 22	290	NA	NA	NA	NA	No	NTX
	52663-60-2	PCB-84	2.9 J	470	PG/L	LDCA-MW24-1014	14/24	19 - 22	470	NA	NA	NA	NA	No	NTX
	--	PCB-85/116/117	13 J	180	PG/L	LDCA-MW24-1014	8/24	19 - 22	180	NA	NA	NA	NA	No	NTX
	--	PCB-86/87/97/108/119/125	3.7 J	970	PG/L	LDCA-MW24-1014	11/12	20 - 20	970	NA	NA	NA	NA	No	NTX
	--	PCB-86/87/97/109/119/125	31	250	PG/L	LDCA-MW26D-0314	6/12	19 - 22	250	NA	NA	NA	NA	No	NTX
	55215-17-3	PCB-88	7.5 Z	200	PG/L	LDCA-MW24-1014	6/9	19 - 20	200	NA	NA	NA	NA	No	NTX
	--	PCB-88/91	7.5 Z	200	PG/L	LDCA-MW24-1014	11/24	19 - 22	200	NA	NA	NA	NA	No	NTX
	73575-57-2	PCB-89	12 J	12 J	PG/L	LDCA-MW42-1014	1/24	19 - 34	12	NA	NA	NA	NA	No	NTX

TABLE 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION - OUTSIDE LANDFILL - SHALLOW GROUNDWATER - ALL EVENTS
LOWER DARBY CREEEK AREA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Background Value[4]	USEPA VISL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Shallow Groundwater Outside Landfill All Events	34883-39-1	PCB-9	24	1,000	PG/L	LDCA-MW26S-0314, LDCA-MW26S-1014	7/24	19 - 54	1,000	NA	NA	NA	NA	No	NTX
	--	PCB-90/101/113	5 J	1,700	PG/L	LDCA-MW24-1014	18/24	20 - 22	1,700	NA	NA	NA	NA	No	NTX
	68194-05-8	PCB-91	7.5 Z	200	PG/L	LDCA-MW24-1014	6/9	20 - 20	200	NA	NA	NA	NA	No	NTX
	52663-61-3	PCB-92	8.5 Z	300	PG/L	LDCA-MW24-1014	12/24	19 - 22	300	NA	NA	NA	NA	No	NTX
	--	PCB-93/100	14 Z	21	PG/L	LDCA-MW26S-1014	2/12	19 - 31	21	NA	NA	NA	NA	No	NTX
	--	PCB-93/95/98/100/102	30	580	PG/L	LDCA-MW26D-0314	8/12	20 - 22	580	NA	NA	NA	NA	No	NTX
	38379-99-6	PCB-95	4.6 J	1,600	PG/L	LDCA-MW24-1014	11/12	20 - 20	1,600	NA	NA	NA	NA	No	NTX
	73575-54-9	PCB-96	4.4 Z	50	PG/L	LDCA-MW42-1014	5/24	19 - 22	50	NA	NA	NA	NA	No	NTX
	--	PCB-98/102	3.4 Z	24	PG/L	LDCA-MW26S-1014	4/12	19 - 28	24	NA	NA	NA	NA	No	NTX
	--	PCB-99	2.5 Z	730	PG/L	LDCA-MW24-1014	10/12	20 - 21	730	NA	NA	NA	NA	No	NTX
	--	TEQ-DIOXIN-LIKE PCBS	0.00008	0.051	PG/L	LDCA-MW24-1014	17/24	0.05	0.05	NA	36 C[10]	NA	NA	No	BSL
	--	NONDIOXIN-LIKE PCBS	100	213,644	PG/L	LDCA-MW26S-0314	24/24	213,644	213,644	NA	NA	NA	NA	No	NTX

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background values are not available for this site.
5 - USEPA's Vapor Intrusion Screening Level (VISL) Calculator Version 3.5.1, May 2016. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is derived by dividing criteria for 2,3,7,8-TCDD by World Health Organization Toxicity Equivalent Factor.
8 - Value is for elemental mercury.
9 - Value is for chlordane.
10 - Value is for 2,3,7,8-TCDD.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
ug/L = micrograms per liter
pg/L = picograms per liter

Rationale Codes:
For selection as a COPC:
ASL = Above screening level
For elimination as a COPC:
BSL = Below COPC screening level
NTX = No toxicity criteria
NV = Not volatile

Associated Samples:

LDCA-MW08-0314	LDCA-MW18S-1014	LDCA-MW28-1014	LDCA-MW39-1014	LDCA-MW47-1014-D
LDCA-MW08-1014	LDCA-MW18S-0615	LDCA-MW29-0314	LDCA-MW39-0314	LDCA-MW47-0314
LDCA-MW08-0615	LDCA-MW21S-0314	LDCA-MW29-0615	LDCA-MW39-0615	LDCA-MW47-0615
LDCA-MW13S-1014	LDCA-MW21S-0615	LDCA-MW29-1014	LDCA-MW40-0615	LDCA-MW47-1014
LDCA-MW13S-0615	LDCA-MW21S-1014	LDCA-MW30-0314	LDCA-MW40-1014	
LDCA-MW13S-0314	LDCA-MW23S-0615	LDCA-MW30-0615	LDCA-MW40-0314	
LDCA-MW14S-0314	LDCA-MW23S-0314	LDCA-MW30-1014	LDCA-MW41S-1014	
LDCA-MW14S-1014	LDCA-MW23S-1014	LDCA-MW31-1014	LDCA-MW41S-0314	
LDCA-MW14S-0615	LDCA-MW24-1014	LDCA-MW31-0615	LDCA-MW41S-0615	
LDCA-MW15S-0615	LDCA-MW24-0615	LDCA-MW31-0314	LDCA-MW42-1014	
LDCA-MW15S-1014	LDCA-MW24-0314	LDCA-MW32-0314	LDCA-MW42-0314	
LDCA-MW15S-0314	LDCA-MW25-1014	LDCA-MW32-0615	LDCA-MW42-0615	
LDCA-MW16S-0615	LDCA-MW25-0615	LDCA-MW32-1014	LDCA-MW43-0314	
LDCA-MW16S-1014	LDCA-MW25-0314	LDCA-MW33-1014	LDCA-MW43-0615	
LDCA-MW16S-0615-D	LDCA-MW26S-1014	LDCA-MW33-0314	LDCA-MW43-1014	
LDCA-MW16S-0314	LDCA-MW26S-0314	LDCA-MW33-0615	LDCA-MW44-0615	
LDCA-MW17S-1014	LDCA-MW26S-0615	LDCA-MW35-1014	LDCA-MW44-1014	
LDCA-MW17S-1014-D	LDCA-MW27-0314	LDCA-MW35-0615	LDCA-MW44-0314	
LDCA-MW17S-0314	LDCA-MW27-0615	LDCA-MW35-0314	LDCA-MW45-0314	
LDCA-MW17S-0615-D	LDCA-MW27-1014	LDCA-MW38-0314	LDCA-MW46-0615	
LDCA-MW17S-0615	LDCA-MW28-0314	LDCA-MW38-1014	LDCA-MW46-1014	
LDCA-MW18S-0314	LDCA-MW28-0615	LDCA-MW38-0615	LDCA-MW46-0314	

RAGS Part D Table 3

Medium-Specific Exposure Point Concentration Summary

LIST OF TABLES
RAGS PART D TABLE 3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Table No.

3.1.RME Groundwater Inside Landfill - Event 1
3.2.RME Groundwater Inside Landfill - Event 2
3.3.RME Groundwater Inside Landfill - Event 3
3.4.RME Groundwater Inside Landfill - Maximum of Events 1 to 3
3.5.RME Groundwater Outside Landfill - Shallow Wells - Event 1
3.6.RME Groundwater Outside Landfill - Shallow Wells - Event 2
3.7.RME Groundwater Outside Landfill - Shallow Wells - Event 3
3.8.RME Groundwater Outside Landfill - Shallow Wells - Event 4
3.9.RME Groundwater Outside Landfill - Shallow Wells - Maximum of Events 1 to 4
3.10.RME Groundwater Outside Landfill - Deep Wells - Event 1
3.11.RME Groundwater Outside Landfill - Deep Wells - Event 2
3.12.RME Groundwater Outside Landfill - Deep Wells - Event 3
3.13.RME Groundwater Outside Landfill - Deep Wells - Event 4
3.14.RME Groundwater Outside Landfill - Deep Wells - Maximum of Events 1 to 4

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY - INSIDE LANDFILL - SAMPLING EVENT 1
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Inside Landfill Sampling Event 1	1,3-Dichlorobenzene	ug/L	1.19	(1)	0.77	0.77	ug/L	Maximum Detected Concentration	(1)
	1,4-Dichlorobenzene	ug/L	1.77	1.89 (N)	3.1	1.89	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Benzene	ug/L	1.28	(1)	1.6	1.6	ug/L	Maximum Detected Concentration	(1)
	Chlorobenzene	ug/L	10.0	15.8 (AN)	63	15.8	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Trichloroethene	ug/L	1.14	(1)	2.3 J	2.3	ug/L	Maximum Detected Concentration	(1)
	1,4-Dioxane	ug/L	25.6	57.6 (AL)	110	57.6	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Benzo(a)pyrene	ug/L	0.824	(1)	0.83	0.83	ug/L	Maximum Detected Concentration	(1)
	Benzo(k)fluoranthene	ug/L	1.30	(1)	0.53	0.53	ug/L	Maximum Detected Concentration	(1)
	Bis(2-ethylhexyl)phthalate	ug/L	6.89	12.2 (N)	48	12.2	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Indeno(1,2,3-cd)pyrene	ug/L	0.929	(1)	0.48	0.48	ug/L	Maximum Detected Concentration	(1)
	2,3,7,8-TCDD Equivalents	ug/L	0.0002	0.0025 (NP)	0.0041	0.0025	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002
	Aldrin	ug/L	0.027	(1)	0.047 J	0.047	ug/L	Maximum Detected Concentration	(1)
	beta-BHC	ug/L	0.033	0.042 (N)	0.081 J	0.042	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	delta-BHC	ug/L	0.025	(1)	0.034 J	0.034	ug/L	Maximum Detected Concentration	(1)
	Dieldrin	ug/L	0.047	(1)	0.022 J	0.022	ug/L	Maximum Detected Concentration	(1)
	gamma-BHC (Lindane)	ug/L	0.026	(1)	0.044 J	0.044	ug/L	Maximum Detected Concentration	(1)
	Dioxin-Like PCBs	ug/L	0.000011	0.000081 (AL)	0.00011	0.000081	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002
	Nondioxin-Like PCBs	ug/L	12.5	132 (L)	180	132	ug/L	99% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Aluminum	ug/L	1,792	11,530 (NP)	30,500	11,530	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Antimony	ug/L	2.34	(1)	27.8	27.8	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	8.08	17.4 (G)	51.9	17.4	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Barium	ug/L	608	1,025 (G)	3,960	1,025	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Boron	ug/L	1,461	1,974 (AN)	4,080	1,974	ug/L	95% Student's-t UCL	ProUCL 5.1.002
	Cadmium	ug/L	1.56	(1)	21.9	21.9	ug/L	Maximum Detected Concentration	(1)
	Chromium	ug/L	27.8	114 (NP)	399	151	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cobalt	ug/L	8.03	12.6 (G)	50.2	12.6	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Copper	ug/L	46.2	210 (NP)	753	280	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cyanide	ug/L	25.6	108 (L)	367	108	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Iron	ug/L	33,326	52,850 (G)	157,000 J	52,850	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Lead	ug/L	226	1,625 (NP)	4,470	226	ug/L	Arithmetic Mean Concentration	(2)
	Manganese	ug/L	1,501	4,337 (L)	12,800 J	4,337	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Mercury	ug/L	0.505	(1)	8.2	8.2	ug/L	Maximum Detected Concentration	(1)
	Nickel	ug/L	32.2	132 (AL)	464	132	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Silver	ug/L	1.79	(1)	26.3	26.3	ug/L	Maximum Detected Concentration	(1)
	Vanadium	ug/L	19.0	90.7 (L)	327 J	90.7	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Zinc	ug/L	370	1,626 (NP)	5,660	1,626	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002

AG - Approximate gamma
AN - Approximate normal
AL - Approximate lognormal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.

J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY - INSIDE LANDFILL - SAMPLING EVENT 2
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Inside Landfill Sampling Event 2	1,3-Dichlorobenzene	ug/L	0.348	0.43 (N)	1	0.43	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	1,4-Dichlorobenzene	ug/L	1.27	1.84 (N)	4.8	1.84	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Benzene	ug/L	0.398	0.50 (AL)	3	0.5	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Chlorobenzene	ug/L	13.9	30.3 (G)	93	30.3	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	1,4-Dioxane	ug/L	53.5	91.9 (G)	220	91.9	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Benzo(a)anthracene	ug/L	0.057	0.080 (G)	0.23	0.08	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002
	Benzo(a)pyrene	ug/L	0.174	(1)	0.12	0.12	ug/L	Maximum Detected Concentration	(1)
	Benzo(b)fluoranthene	ug/L	0.173	0.047 (N)	0.17	0.047	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Bis(2-ethylhexyl)phthalate	ug/L	2.44	(1)	5.7	5.7	ug/L	Maximum Detected Concentration	(1)
	Dibenzo(a,h)anthracene	ug/L	0.170	(1)	0.024	0.024	ug/L	Maximum Detected Concentration	(1)
	Dibenzofuran	ug/L	2.41	(1)	5.1	5.1	ug/L	Maximum Detected Concentration	(1)
	Naphthalene	ug/L	0.094	0.172 (G)	0.47	0.172	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Phenanthrene	ug/L	0.570	1.38 (G)	3.3	1.35	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	2,3,7,8-TCDD Equivalents	ug/L	0.00009	0.00096 (NP)	0.0017	0.00096	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002
	4,4'-DDE	ug/L	0.004	0.018 (AL)	0.063	0.018	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Aldrin	ug/L	0.002	0.0024 (AG)	0.0047	0.0024	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002
	delta-BHC	ug/L	0.004	0.0081 (NP)	0.016	0.014	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Dieldrin	ug/L	0.004	0.015 (AL)	0.053	0.015	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Heptachlor	ug/L	0.002	0.0049 (NP)	0.01	0.0049	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Heptachlor Epoxide	ug/L	0.0008	0.0009 (G)	0.0023	0.00090	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002
	Dioxin-Like PCBs	ug/L	0.000006	0.000036 (NP)	0.0000098	0.000036	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Nondioxin-Like PCBs	ug/L	1.90	6.20 (AG)	18.7	6.20	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Pentadecafluorooctanoic Acid	ug/L	0.228	0.29 (N)	0.56	0.29	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Perfluorooctane Sulfonic Acid	ug/L	0.215	0.52 (L)	1.2	0.52	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Aluminum	ug/L	2,293	8,180 (G)	24,600	8,180	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Antimony	ug/L	6.59	(1)	12.8	12.8	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	13.8	25.2 (G)	72.1	25.2	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Barium	ug/L	789	1,222 (G)	2,560	1,222	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Beryllium	ug/L	1.02	(1)	8	8	ug/L	Maximum Detected Concentration	(1)
	Boron	ug/L	1,775	2,351 (AN)	3,920	2,351	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Cadmium	ug/L	1.20	(1)	8.4	8.4	ug/L	Maximum Detected Concentration	(1)
	Chromium	ug/L	17.7	56.3 (L)	183	73.1	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cobalt	ug/L	12.5	8.59 (N)	21.7	8.59	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Copper	ug/L	16.8	68.9 (L)	245	68.9	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cyanide	ug/L	27.1	83.8 (G)	227	83.8	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Iron	ug/L	36,421	51,480 (G)	96,100	51,480	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002
	Lead	ug/L	121	1,023 (AG)	2,330	121	ug/L	Arithmetic Mean Concentration	(2)

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY - INSIDE LANDFILL - SAMPLING EVENT 2
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Inside Landfill Sampling Event 2	Manganese	ug/L	1,840	3,440 (G)	12,700	3,440	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Mercury	ug/L	0.259	1.05 (NP)	3.7	1.05	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Nickel	ug/L	15.7	47.5 (L)	152	47.5	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Silver	ug/L	1.75	(1)	10.2	10.2	ug/L	Maximum Detected Concentration	(1)
	Thallium	ug/L	2.36	(1)	2.9	2.9	ug/L	Maximum Detected Concentration	(1)
	Vanadium	ug/L	15.0	54.7 (L)	186	54.7	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Zinc	ug/L	150	748 (NP)	2,720	748	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002

AG - Approximate gamma
AN - Approximate normal
AL - Approximate lognormal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

TABLE 3.3.RME
EXPOSURE POINT CONCENTRATION SUMMARY - INSIDE LANDFILL - SAMPLING EVENT 3
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Inside Landfill Sampling Event 3	1,3-Dichlorobenzene	ug/L	0.350	0.464 (N)	1	0.464	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	1,4-Dichlorobenzene	ug/L	1.15	1.64 (N)	3.3	1.64	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Benzene	ug/L	0.343	0.475 (AL)	1.6	0.475	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Chlorobenzene	ug/L	11.3	17.5 (AN)	51	17.5	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	1,4-Dioxane	ug/L	41.8	74.8 (AG)	150	74.8	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Benzo(a)anthracene	ug/L	0.026	0.555 (N)	2.3	0.555	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Benzo(a)pyrene	ug/L	0.072	(1)	0.42	0.42	ug/L	Maximum Detected Concentration	(1)
	Benzo(b)fluoranthene	ug/L	0.161	(1)	1.4	1.4	ug/L	Maximum Detected Concentration	(1)
	Bis(2-ethylhexyl)phthalate	ug/L	3.41	9.33 (NP)	26 J	9.33	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Dibenzo(a,h)anthracene	ug/L	0.051	(1)	0.061 J	0.061	ug/L	Maximum Detected Concentration	(1)
	Dibenzofuran	ug/L	2.89	(1)	7.4 J	7.4	ug/L	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	ug/L	0.057	(1)	0.17	0.17	ug/L	Maximum Detected Concentration	(1)
	Naphthalene	ug/L	0.311	1.10 (AG)	3	1.1	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002
	Pentachlorophenol	ug/L	0.140	0.191 (AL)	0.61	0.191	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Phenanthrene	ug/L	2.460	8.21 (G) (N)	22	8.21	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002
	2,3,7,8-TCDD Equivalents	ug/L	0.0000006	(1)	0.0000018	0.0000018	ug/L	Maximum Detected Concentration	(1)
	4,4'-DDD	ug/L	0.003	0.010 (L)	0.033	0.01	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	4,4'-DDE	ug/L	0.003	(1)	0.055	0.055	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	680	2,875 (G)	7,510	2,875	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Antimony	ug/L	1.44	4.14 (G)	11.3	4.14	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Arsenic	ug/L	8.64	16.2 (G)	43.4	16.2	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Barium	ug/L	680	1,100 (G)	2,420	1,100	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Cadmium	ug/L	0.551	1.95 (NP)	4.6	1.95	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Chromium	ug/L	9.69	13.9 (AL)	85.9	13.9	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Cobalt	ug/L	4.46	6.13 (N)	15	6.13	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Copper	ug/L	10.2	102 (L)	159	102	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cyanide	ug/L	28.9	85.1 (L)	200 J	85.1	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Iron	ug/L	29,109	38,880 (AN)	92,800 J	38,880	ug/L	95% Student's-t UCL	ProUCL 5.1.002
	Lead	ug/L	65.5	696 (L)	1,130	65.5	ug/L	Arithmetic Mean Concentration	(2)
	Manganese	ug/L	1459	4,642 (L)	13,000	4,642	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Nickel	ug/L	12.8	44.4 (L)	135	44.4	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Vanadium	ug/L	7.36	26.1 (L)	79	26.1	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Zinc	ug/L	89.3	587 (NP)	1,440	587	ug/L	97.5% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002

AN - Approximate normal
AL - Approximate lognormal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.
J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

TABLE 3.4.RME
EXPOSURE POINT CONCENTRATION SUMMARY - INSIDE LANDFILL - MAXIMUM EXPOSURE POINT CONCENTRATION OF ALL SAMPLING EVENTS
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[1]	95% UCL[1] (Distribution)	Maximum Concentration[1] (Qualifier)	Exposure Point Concentration				Sampling Event
						Value[1]	Units	Statistic	Rationale	
Inside Landfill	1,3-Dichlorobenzene	ug/L	1.19	(2)	0.77[4]	0.77	ug/L	Maximum Detected Concentration	(2)	Event 1
	1,4-Dichlorobenzene	ug/L	1.77	1.89 (N)	3.1[5]	1.89	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 1
	Benzene	ug/L	1.28	(2)	1.6	1.6	ug/L	Maximum Detected Concentration	(2)	Event 1
	Chlorobenzene	ug/L	13.9	30.3 (G)	93	30.3	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Trichloroethene (Kidney)	ug/L	1.14	(2)	2.3 J	2.3	ug/L	Maximum Detected Concentration	(2)	Event 1
	Trichloroethene (Non-Kidney)	ug/L	1.14	(2)	2.3 J	2.3	ug/L	Maximum Detected Concentration	(2)	Event 1
	1,4-Dioxane	ug/L	53.5	91.9 (G)	220	91.9	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Benzo(a)anthracene	ug/L	0.026	0.555 (N)	2.3	0.555	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 3
	Benzo(a)pyrene	ug/L	0.824	(2)	0.83	0.83	ug/L	Maximum Detected Concentration	(2)	Event 1
	Benzo(b)fluoranthene	ug/L	0.161	(1)	1.4	1.4	ug/L	Maximum Detected Concentration	(2)	Event 3
	Benzo(k)fluoranthene	ug/L	1.30	(2)	0.53	0.53	ug/L	Maximum Detected Concentration	(2)	Event 1
	Bis(2-ethylhexyl)phthalate	ug/L	6.89	12.2 (N)	48	12.2	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 1
	Dibenzo(a,h)anthracene	ug/L	0.051	(2)	0.061 J	0.061	ug/L	Maximum Detected Concentration	(2)	Event 3
	Dibenzofuran	ug/L	2.89	(2)	7.4 J	7.4	ug/L	Maximum Detected Concentration	(2)	Event 3
	Indeno(1,2,3-cd)pyrene	ug/L	0.929	(2)	0.48	0.48	ug/L	Maximum Detected Concentration	(2)	Event 1
	Naphthalene	ug/L	0.311	1.10 (AG)	3	1.1	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002	Event 3
	Pentachlorophenol	ug/L	0.140	0.191 (AL)	0.61	0.191	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002	Event 3
	Phenanthrene	ug/L	2.460	8.21 (G) (N)	22	8.21	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002	Event 3
	2,3,7,8-TCDD Equivalents	ug/L	0.0002	0.0025 (NP)	0.004	0.0025	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Pentadecafluorooctanoic Acid	ug/L	0.228	0.29 (N)	0.56	0.29	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 2
	Perfluorooctane Sulfonic Acid	ug/L	0.215	0.52 (L)	1.2	0.52	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 2
	4,4'-DDD	ug/L	0.003	0.010 (L)	0.033	0.01	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3
	4,4'-DDE	ug/L	0.003	(2)	0.055[6]	0.055	ug/L	Maximum Detected Concentration	(2)	Event 3
	Aldrin	ug/L	0.027	(2)	0.047 J	0.047	ug/L	Maximum Detected Concentration	(2)	Event 1
	beta-BHC	ug/L	0.033	0.042 (N)	0.081 J	0.042	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 1
	delta-BHC	ug/L	0.025	(2)	0.034 J	0.034	ug/L	Maximum Detected Concentration	(2)	Event 1
	Dieldrin	ug/L	0.047	(2)	0.022 J	0.022	ug/L	Maximum Detected Concentration	(2)	Event 1
	Heptachlor	ug/L	0.002	0.0049 (NP)	0.01	0.0049	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 2
	Heptachlor Epoxide	ug/L	0.0008	0.0009 (G)	0.0023	0.0009	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002	Event 2
	gamma-BHC (Lindane)	ug/L	0.026	(2)	0.044 J	0.044	ug/L	Maximum Detected Concentration	(2)	Event 1
	Dioxin-Like PCBs	ug/L	0.000011	0.00025 (NP)	0.0011	0.00025	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Nondioxin-Like PCBs	ug/L	12.5	132 (L)	180	132	ug/L	99% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002	Event 1
	Aluminum	ug/L	1,792	11,530 (NP)	30,500	11,530	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Antimony	ug/L	2.34	(2)	27.8	27.8	ug/L	Maximum Detected Concentration	(2)	Event 1
	Arsenic	ug/L	13.8	25.2 (G)	72.1	25.2	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Barium	ug/L	789	1,222 (G)	2,560[7]	1,222	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Beryllium	ug/L	1.02	(2)	8	8	ug/L	Maximum Detected Concentration	(2)	Event 2
	Boron	ug/L	1,775	2,351 (AN)	3,920[8]	2,351	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 2
	Cadmium	ug/L	1.56	(2)	21.9	21.9	ug/L	Maximum Detected Concentration	(2)	Event 1

TABLE 3.4.RME
EXPOSURE POINT CONCENTRATION SUMMARY - INSIDE LANDFILL - MAXIMUM EXPOSURE POINT CONCENTRATION OF ALL SAMPLING EVENTS
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[(1)]	95% UCL[(1)] (Distribution)	Maximum Concentration[(1)] (Qualifier)	Exposure Point Concentration				Sampling Event
						Value[(1)]	Units	Statistic	Rationale	
Inside Landfill	Chromium	ug/L	27.8	114 (NP)	399	151	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Cobalt	ug/L	8.03	12.6 (G)	50.2	12.6	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002	Event 1
	Copper	ug/L	46.2	210 (NP)	753	280	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Cyanide	ug/L	25.6	108 (L)	367	108	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Iron	ug/L	33,326	52,850 (G)	157,000 J	52,850	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002	Event 1
	Lead	ug/L	226	1,625 (NP)	4,470	226	ug/L	Arithmetic Mean Concentration	(3)	Event 1
	Manganese	ug/L	1459	4,642 (L)	13,000	4,642	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002	Event 3
	Mercury	ug/L	0.505	(2)	8.2	8.2	ug/L	Maximum Detected Concentration	(2)	Event 1
	Nickel	ug/L	32.2	132 (AL)	464	132	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002	Event 1
	Silver	ug/L	1.79	(2)	26.3	26.3	ug/L	Maximum Detected Concentration	(2)	Event 1
	Thallium	ug/L	2.36	(2)	2.9	2.9	ug/L	Maximum Detected Concentration	(2)	Event 2
	Vanadium	ug/L	19.0	90.7 (L)	327 J	90.7	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Zinc	ug/L	370	1,626 (NP)	5,660	1,626	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1

AG - Approximate gamma
AN - Approximate normal
AL - Approximate lognormal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.
J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - The exposure point concentration is the maximum of the values for each of the individual sampling events. The arithmetic mean, 95% UCL, and maximum concentration are those values associated with sampling event for the selected exposure point concentration and do not represent values for all the sampling events combined.
2 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
3 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.
4 - The maximum UCL for 1,3-dichloroebenzene occurred for sampling event 1. The maximum detected concentration associated with this UCL was 0.77 ug/L. The maximum detected concentration of 1,3-dichlorobenzene for all sampling events was 1 ug/L and occurred in sampling events 2 and 3.
5 - The maximum UCL for 1,4-dichloroebenzene occurred for sampling event 1. The maximum detected concentration associated with this UCL was 3.1 ug/L. The maximum detected concentration of 1,4-dichlorobenzene for all sampling events was 4.8 ug/L and occurred in sampling event 2.
6 - The maximum UCL for 4,4-DDE occurred for sampling event 3. The maximum detected concentration associated with this UCL was 0.055 ug/L. The maximum detected concentration of 4,4-DDE for all sampling events was 0.063 ug/L and occurred in sampling event 2.
7 - The maximum UCL for barium occurred for sampling event 2. The maximum detected concentration associated with this UCL was 2,560 ug/L. The maximum detected concentration of barium for all sampling events was 3,960 ug/L and occurred in sampling event 1.
8 - The maximum UCL for boron occurred for sampling event 2. The maximum detected concentration associated with this UCL was 3,920 ug/L. The maximum detected concentration of boron for all sampling events was 4,080 ug/L and occurred in sampling event 1.

TABLE 3.5.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - SHALLOW WELLS - SAMPLING EVENT 1
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Shallow Wells Sampling Event 1	Benzene	ug/L	1.25	(1)	3.1	3.1	ug/L	Maximum Detected Concentration	(1)
	cis-1,2-Dichloroethene	ug/L	3.08	9.37 (L)	46	9.37	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Trichloroethene	ug/L	1.44	1.36 (G)	7.2	1.36	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002
	Vinyl Chloride	ug/L	1.40	(1)	4.2	4.2	ug/L	Maximum Detected Concentration	(1)
	1,4-Dioxane	ug/L	14.25	16.1 (L)	260	16.1	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Pentachlorophenol	ug/L	0.10	(1)	0.18	0.18	ug/L	Maximum Detected Concentration	(1)
	2,3,7,8-TCDD Equivalents	ug/L	0.00000011	(1)	0.00000015	0.00000015	ug/L	Maximum Detected Concentration	(1)
	beta-BHC	ug/L	0.025	(1)	0.036	0.036	ug/L	Maximum Detected Concentration	(1)
	Dioxin-Like PCBs	ug/L	0.000006	0.0000014 (N)	0.00000001	0.0000014	ug/L	95% KM Bootstrap t UCL	ProUCL 5.1.002
	Nondioxin-Like PCBs	ug/L	0.028	0.106 (G)	0.214	0.106	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Antimony	ug/L	1.15	(1)	5.3	5.3	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	5.61	14.0 (G)	54.3	14.0	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Barium	ug/L	189	374 (L)	1110	374	ug/L	95% Chebyshev(Mean, Sd) UCL	ProUCL 5.1.002
	Boron	ug/L	309	446 (G)	1,380	446	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Cadmium	ug/L	0.612	0.794 (AN)	2.7	0.794	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Chromium	ug/L	3.16	4.03 (N)	7.4	4.03	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Cobalt	ug/L	9.83	12.9 (AG)	53.3	12.9	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Cyanide	ug/L	4.03	2.07 (AN)	3.3	2.07	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Iron	ug/L	10,599	31,843 (NP)	62,400	31,843	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Lead	ug/L	2.86	2.69 (AL)	51.6	2.86	ug/L	Arithmetic Mean Concentration	(2)
	Manganese	ug/L	4,034	6870 (G)	67200	6,870	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002

AG - Approximate gamma
AN - Approximate normal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

TABLE 3.6.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - SHALLOW WELLS - SAMPLING EVENT 2
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Shallow Wells Sampling Event 2	1,1,2-Trichloroethane	ug/L	0.246	(1)	0.12 J	0.12	ug/L	Maximum Detected Concentration	(1)
	1,2-Dibromo-3-Chloropropane	ug/L	0.249	(1)	0.23 J	0.23	ug/L	Maximum Detected Concentration	(1)
	1,2-Dichloroethane	ug/L	0.279	(1)	1.1	1.1	ug/L	Maximum Detected Concentration	(1)
	1,4-Dichlorobenzene	ug/L	0.266	0.344 (N)	0.77	0.344	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Benzene	ug/L	0.434	1.33 (NP)	5.9	1.33	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	cis-1,2-Dichloroethene	ug/L	5.38	28.8 (AL)	94	28.8	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Ethylbenzene	ug/L	0.362	(1)	3.5	3.5	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene	ug/L	0.871	1.80 (AN)	14	1.80	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Vinyl Chloride	ug/L	0.419	0.566 (AN)	2.2	0.566	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	1,4-Dioxane	ug/L	12.78	28.6 (AG)	150	28.6	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Benzo(a)anthracene	ug/L	0.046	(1)	0.034 J	0.034	ug/L	Maximum Detected Concentration	(1)
	Bis(2-Chloroethyl)Ether	ug/L	2.41	(1)	1.2 J	1.2	ug/L	Maximum Detected Concentration	(1)
	Naphthalene	ug/L	0.376	1.0 (AL)	5.2	1.0	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Pentachlorophenol	ug/L	0.155	(1)	0.21 J	0.21	ug/L	Maximum Detected Concentration	(1)
	2,3,7,8-TCDD Equivalents	ug/L	0.0000005	0.0000032 (AN)	0.0000021	0.0000021	ug/L	Maximum Detected Concentration	(3)
	Pentadecafluorooctanoic Acid	ug/L	0.141	0.16 (AL)	2	0.16	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Perfluorooctane Sulfonic Acid	ug/L	0.086	0.12 (G)	0.42	0.12	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002
	Aldrin	ug/L	0.001	0.0011 (L)	0.0059 J	0.0011	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Dieldrin	ug/L	0.004	0.012 (AL)	0.042	0.012	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Heptachlor	ug/L	0.0008	0.0011 (G)	0.0028 J	0.0011	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002
	Heptachlor Epoxide	ug/L	0.0009	0.00095 (L)	0.0039 J	0.00095	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Dioxin-Like PCBs	ug/L	0.000000006	0.0000023 (NP)	0.000000051	0.000000051	ug/L	Maximum Detected Concentration	(3)
	Nondioxin-Like PCBs	ug/L	0.031	0.204 (L)	0.199	0.199	ug/L	Maximum Detected Concentration	(3)
	Arsenic	ug/L	4.80	12.9 (L)	51.3	12.9	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Barium	ug/L	214	428 (L)	1220	428	ug/L	95% Chebyshev(Mean, Sd) UCL	ProUCL 5.1.002
	Boron	ug/L	420	738 (G)	2920	738	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Cadmium	ug/L	0.930	0.556 (G)	2.2	0.556	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Chromium	ug/L	1.51	1.93 (N)	4.7 J	1.93	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Cobalt	ug/L	14.5	13.0 (G)	65.6	13.0	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Cyanide	ug/L	4.72	(1)	1.3 J	1.3	ug/L	Maximum Detected Concentration	(1)
	Iron	ug/L	8368	17,000 (G)	53,400	17,000	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Lead	ug/L	2.19	(1)	19.8	2.19	ug/L	Arithmetic Mean Concentration	(2)
	Manganese	ug/L	5261	10,800 (G)	71,800	10,800	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Thallium	ug/L	2.85	(1)	3.9 J	3.9	ug/L	Maximum Detected Concentration	(1)

AG - Approximate gamma
AL - Approximate lognormal
AN - Approximate normal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.

J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.
3 - The recommended UCL is greater than the maximum detected concentration, therefore the maximum detected concentration is used as the EPC.

TABLE 3.7.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - SHALLOW WELLS - SAMPLING EVENT 3
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Shallow Wells Sampling Event 3	1,4-Dichlorobenzene	ug/L	0.329	(1)	0.92	0.92	ug/L	Maximum Detected Concentration	(1)
	Benzene	ug/L	0.467	(1)	3.5	3.5	ug/L	Maximum Detected Concentration	(1)
	cis-1,2-Dichloroethene	ug/L	4.12	9.39 (AN)	42	9.390	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Ethylbenzene	ug/L	0.460	(1)	3.4	3.4	ug/L	Maximum Detected Concentration	(1)
	m+p-Xylenes	ug/L	1.97	(1)	26	26	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene	ug/L	1.19	2.43 (N)	8.4	2.43	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Vinyl Chloride	ug/L	0.420	(1)	2.8	2.8	ug/L	Maximum Detected Concentration	(1)
	1,4-Dioxane	ug/L	16.2	56.6 (AG)	290	56.6	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	2,6-Dinitrotoluene	ug/L	3.05	(1)	8.6	8.6	ug/L	Maximum Detected Concentration	(1)
	2-Methylnaphthalene	ug/L	0.891	(1)	9.3	9.3	ug/L	Maximum Detected Concentration	(1)
	Benzo(a)anthracene	ug/L	0.060	(1)	0.26	0.26	ug/L	Maximum Detected Concentration	(1)
	Benzo(a)pyrene	ug/L	0.058	(1)	0.12	0.12	ug/L	Maximum Detected Concentration	(1)
	Naphthalene	ug/L	0.774	(1)	8	8	ug/L	Maximum Detected Concentration	(1)
	Pentachlorophenol	ug/L	0.133	(1)	0.49	0.49	ug/L	Maximum Detected Concentration	(1)
	Pentadecafluorooctanoic Acid	ug/L	0.440	1.85 (L)	2.7	1.85	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Perfluorooctane Sulfonic Acid	ug/L	0.159	0.26 (N)	0.45	0.26	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Dieldrin	ug/L	0.009	0.017 (N)	0.0564	0.017	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Aluminum	ug/L	1,300	7,920 (AL)	29,300 J	7,920	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Antimony	ug/L	1.20	2.18 (NP)	10	2.18	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Arsenic	ug/L	5.44	18.7 (NP)	84.1	18.7	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Barium	ug/L	264	515 (L)	1,220 J	515	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002
	Cadmium	ug/L	0.577	1.84 (NP)	8.3	1.84	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Chromium	ug/L	3.35	8.03 (G)	31.3 J	8.03	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Cobalt	ug/L	6.49	12.9 (G)	58.7	12.9	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Copper	ug/L	6.86	22.4 (L)	94.6	22.4	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cyanide	ug/L	7.86	(1)	16.8 J	16.8	ug/L	Maximum Detected Concentration	(1)
	Iron	ug/L	17,926	39,590 (G)	137,000	39,590	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Lead	ug/L	87.6	944 (NP)	2,400	87.6	ug/L	Arithmetic Mean Concentration	(2)
	Manganese	ug/L	3,986	7,462 (G)	70,000	7,462	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Mercury	ug/L	0.072	0.075 (L)	0.28	0.075	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002
	Silver	ug/L	1.35	(1)	25.3	25.3	ug/L	Maximum Detected Concentration	(1)
	Vanadium	ug/L	3.25	11.1 (AL)	52	11.1	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Zinc	ug/L	50.8	37.2 (AL)	1,170	37.2	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002

AG - Approximate gamma
AL - Approximate lognormal
AN - Approximate normal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.

J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

TABLE 3.8.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - SHALLOW WELLS - SAMPLING EVENT 4
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Shallow Wells Sampling Event 4	1,4-Dichlorobenzene	ug/L	0.379	(1)	0.83	0.83	ug/L	Maximum Detected Concentration	(1)
	2-Hexanone	ug/L	2.84	(1)	5.6 J+	5.6	ug/L	Maximum Detected Concentration	(1)
	Benzene	ug/L	0.867	(1)	5.8	5.8	ug/L	Maximum Detected Concentration	(1)
	cis-1,2-Dichloroethene	ug/L	6.66	66.8 (AL)	54 J-	54	ug/L	Maximum Detected Concentration	(2)
	Ethylbenzene	ug/L	0.711	(1)	4.4	4.4	ug/L	Maximum Detected Concentration	(1)
	Trichloroethene	ug/L	0.964	(1)	6.2	6.2	ug/L	Maximum Detected Concentration	(1)
	Vinyl Chloride	ug/L	0.267	(1)	0.4 J	0.4	ug/L	Maximum Detected Concentration	(1)

AL - Approximate lognormal

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - The recommended UCL is greater than the maximum detected concentration, therefore the maximum detected concentration is used as the EPC.

TABLE 3.9.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - SHALLOW WELLS - MAXIMUM EXPOSURE POINT CONCENTRATION OF ALL SAMPLING EVENTS
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[1]	95% UCL[1] (Distribution)	Maximum Concentration[1] (Qualifier)	Exposure Point Concentration				Sampling Event
						Value[1]	Units	Statistic	Rationale	
Outside Landfill Shallow Wells	1,1,2-Trichloroethane	ug/L	0.246	(2)	0.12 J	0.12	ug/L	Maximum Detected Concentration	(2)	Event 2
	1,2-Dibromo-3-Chloropropane	ug/L	0.249	(2)	0.23 J	0.23	ug/L	Maximum Detected Concentration	(2)	Event 2
	1,2-Dichloroethane	ug/L	0.279	(2)	1.1	1.1	ug/L	Maximum Detected Concentration	(2)	Event 2
	1,4-Dichlorobenzene	ug/L	0.329	(2)	0.92	0.92	ug/L	Maximum Detected Concentration	(2)	Event 3
	2-Hexanone	ug/L	2.84	(2)	5.6 J+	5.6	ug/L	Maximum Detected Concentration	(2)	Event 4
	Benzene	ug/L	0.867	(2)	5.8[4]	5.8	ug/L	Maximum Detected Concentration	(2)	Event 4
	cis-1,2-Dichloroethene	ug/L	6.66	66.8 (AL)	54 J-	54	ug/L	Maximum Detected Concentration	(2)	Event 4
	Ethylbenzene	ug/L	0.711	(2)	4.4[5]	4.4	ug/L	Maximum Detected Concentration	(2)	Event 4
	m+p-Xylenes	ug/L	1.97	(2)	26	26	ug/L	Maximum Detected Concentration	(2)	Event 3
	Trichloroethene (Kidney)	ug/L	0.964	(2)	6.2[6]	6.2	ug/L	Maximum Detected Concentration	(2)	Event 4
	Trichloroethene (Non-Kidney)	ug/L	0.964	(2)	6.2[6]	6.2	ug/L	Maximum Detected Concentration	(2)	Event 4
	Vinyl Chloride	ug/L	1.40	(2)	4.2	4.2	ug/L	Maximum Detected Concentration	(2)	Event 1
	1,4-Dioxane	ug/L	16.2	56.6 (AG)	290	56.6	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 3
	2,6-Dinitrotoluene	ug/L	3.05	(2)	8.6	8.6	ug/L	Maximum Detected Concentration	(2)	Event 3
	2-Methylnaphthalene	ug/L	0.891	(2)	9.3	9.3	ug/L	Maximum Detected Concentration	(2)	Event 3
	Benzo(a)anthracene	ug/L	0.060	(2)	0.26	0.26	ug/L	Maximum Detected Concentration	(2)	Event 3
	Benzo(a)pyrene	ug/L	0.058	(2)	0.12	0.12	ug/L	Maximum Detected Concentration	(2)	Event 3
	Bis(2-Chloroethyl)Ether	ug/L	2.41	(2)	1.2 J	1.2	ug/L	Maximum Detected Concentration	(2)	Event 2
	Naphthalene	ug/L	0.774	(2)	8	8	ug/L	Maximum Detected Concentration	(2)	Event 3
	Pentadecafluorooctanoic Acid	ug/L	0.440	1.85 (L)	2.7	1.85	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002	Event 3
	Perfluorooctane Sulfonic Acid	ug/L	0.159	0.26 (N)	0.45	0.26	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 3
	Pentachlorophenol	ug/L	0.133	(2)	0.49	0.49	ug/L	Maximum Detected Concentration	(2)	Event 3
	2,3,7,8-TCDD Equivalents	ug/L	0.0000005	0.0000032 (AN)	0.0000021	0.0000021	ug/L	Maximum Detected Concentration	(2)	Event 2
	Aldrin	ug/L	0.001	0.0011 (L)	0.0059 J	0.0011	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002	Event 2
	beta-BHC	ug/L	0.025	(2)	0.036	0.036	ug/L	Maximum Detected Concentration	(2)	Event 1
	Dieldrin	ug/L	0.009	0.017 (N)	0.0564	0.017	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 3
	Heptachlor	ug/L	0.0008	0.0011 (G)	0.0028 J	0.0011	ug/L	95% KM Adjusted Gamma UCL	ProUCL 5.1.002	Event 2
	Heptachlor Epoxide	ug/L	0.0009	0.00095 (L)	0.0039 J	0.00095	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002	Event 2
	Dioxin-Like PCBs	ug/L	0.000006	0.0000014 (N)	0.00000001	0.0000014	ug/L	95% KM Bootstrap t UCL	ProUCL 5.1.002	Event 1
	Nondioxin-Like PCBs	ug/L	0.031	0.204 (L)	0.199	0.199	ug/L	Maximum Detected Concentration	(2)	Event 2
	Aluminum	ug/L	1,300	7,920 (AL)	29,300 J	7,920	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3
	Antimony	ug/L	1.15	(2)	5.3[7]	5.3	ug/L	Maximum Detected Concentration	(2)	Event 1
	Arsenic	ug/L	5.44	18.7 (NP)	84.1	18.7	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002	Event 3
	Barium	ug/L	264	515 (L)	1,220 J	515	ug/L	95% Chebyshev (Mean, Sd) UCL	ProUCL 5.1.002	Event 3
	Boron	ug/L	420	738 (G)	2920	738	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Cadmium	ug/L	0.577	1.84 (NP)	8.3	1.84	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3
	Chromium	ug/L	3.35	8.03 (G)	31.3 J	8.03	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 3
	Cobalt	ug/L	14.5	13.0 (G)	65.6	13.0	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Copper	ug/L	6.86	22.4 (L)	94.6	22.4	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3

TABLE 3.9.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - SHALLOW WELLS - MAXIMUM EXPOSURE POINT CONCENTRATION OF ALL SAMPLING EVENTS
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[(1)]	95% UCL[(1)] (Distribution)	Maximum Concentration[(1)] (Qualifier)	Exposure Point Concentration				Sampling Event
						Value[(1)]	Units	Statistic	Rationale	
Outside Landfill Shallow Wells	Cyanide	ug/L	7.86	(2)	16.8 J	16.8	ug/L	Maximum Detected Concentration	(2)	Event 3
	Iron	ug/L	17,926	39,590 (G)	137,000	39,590	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 3
	Lead	ug/L	87.6	944 (NP)	2,400	87.6	ug/L	Arithmetic Mean Concentration	(3)	Event 3
	Manganese	ug/L	5261	10,800 (G)	71,800	10,800	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002	Event 2
	Mercury	ug/L	0.072	0.075 (L)	0.28	0.075	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002	Event 3
	Silver	ug/L	1.35	(2)	25.3	25.3	ug/L	Maximum Detected Concentration	(2)	Event 3
	Thallium	ug/L	2.85	(2)	3.9 J	3.9	ug/L	Maximum Detected Concentration	(2)	Event 2
	Vanadium	ug/L	3.25	11.1 (AL)	52	11.1	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3
	Zinc	ug/L	50.8	37.2 (AL)	1,170	37.2	ug/L	95% H-UCL (KM-Log)	ProUCL 5.1.002	Event 3

AG - Approximate gamma
AN - Approximate normal
AL - Approximate lognormal
G - Gamma distribution.
L - Lognormal
N - Normal distribution.
NP - Nonparametric distribution.

J = Value considered is estimated.
J- = Value considered is estimated biased low.
J+ = Value considered is estimated biased high.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - The exposure point concentration is the maximum of the values for each of the individual sampling events. The arithmetic mean, 95% UCL, and maximum concentration are those values associated with sampling event for the selected exposure point concentration and do not represent values for all the sampling events combined.
2 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
3 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.
4 - The maximum UCL for benzene occurred for sampling event 4. The maximum detected concentration associated with this UCL was 5.8 ug/L. The maximum detected concentration of benzene for all sampling events was 5.9 ug/L and occurred in sampling event 2.
5 - The maximum UCL for cis-1,2-dichloroethene occurred for sampling event 4. The maximum detected concentration associated with this UCL was 54 ug/L. The maximum detected concentration of cis-1,2-dichloroethene for all sampling events was 94 ug/L and occurred in sampling event 2.
6 - The maximum UCL for trichloroethene occurred for sampling event 4. The maximum detected concentration associated with this UCL was 6.2 ug/L. The maximum detected concentration of trichloroethene for all sampling events was 14 ug/L and occurred in sampling event 2.
7 - The maximum UCL for antimony occurred for sampling event 1. The maximum detected concentration associated with this UCL was 5.3 ug/L. The maximum detected concentration of antimony for all sampling events was 10 ug/L and occurred in sampling event 3.

TABLE 3.10.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - DEEP WELLS - SAMPLING EVENT 1
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Deep Wells Sampling Event 1	cis-1,2-Dichloroethene	ug/L	84.6	667 (G)	1,000	667	ug/L	95% Gamma Adjusted KM-UCL	ProUCL 5.1.002
	Trichloroethene	ug/L	23.1	58.8 (AN)	260	58.8	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	1,4-Dioxane	ug/L	3.32	(1)	22	22	ug/L	Maximum Detected Concentration	(1)
	Bis(2-ethylhexyl)phthalate	ug/L	2.93	(1)	7	7	ug/L	Maximum Detected Concentration	(1)
	delta-BHC	ug/L	0.024	(1)	0.013 J	0.013	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	265	1,620 (L)	3,050 J	1620	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Arsenic	ug/L	1.36	2.36 (AN)	7.8	2.36	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Cadmium	ug/L	0.513	(1)	1.4	1.4	ug/L	Maximum Detected Concentration	(1)
	Chromium	ug/L	9.36	30.4 (NP)	62.6	30.4	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cobalt	ug/L	7.37	18.1 (G)	37.7	18.1	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Cyanide	ug/L	4.66	(1)	0.9 J	0.9	ug/L	Maximum Detected Concentration	(1)
	Iron	ug/L	8841	20900 (G)	42,600 J	20900	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Manganese	ug/L	1224	3100 (G)	4,090	3100	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002

AN - Approximate normal
G - Gamma distribution.
L - Lognormal
NP - Nonparametric distribution.
J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.

TABLE 3.11.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - DEEP WELLS - SAMPLING EVENT 2
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Deep Wells Sampling Event 2	1,1-Dichloroethane	ug/L	0.508	(1)	3.7	3.7	ug/L	Maximum Detected Concentration	(1)
	Benzene	ug/L	0.269	0.38 (G)	0.88	0.38	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	cis-1,2-Dichloroethene	ug/L	144	1,247 (G)	1800	1,247	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Trichloroethene	ug/L	34.4	289 (G)	420	289	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Vinyl Chloride	ug/L	1.07	(1)	11	11	ug/L	Maximum Detected Concentration	(1)
	1,4-Dioxane	ug/L	3.81	15.9 (G)	29	15.9	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Dibenzo(a,h)anthracene	ug/L	0.066	(1)	0.32	0.32	ug/L	Maximum Detected Concentration	(1)
	Indeno(1,2,3-cd)pyrene	ug/L	0.071	(1)	0.39	0.39	ug/L	Maximum Detected Concentration	(1)
	Naphthalene	ug/L	0.055	0.15 (NP)	0.36	0.15	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	2,3,7,8-TCDD Equivalents	ug/L	0.00000048	0.0000028 (AN)	0.000002	0.0000028	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Pentadecafluorooctanoic Acid	ug/L	0.030	0.050 (AN)	0.15 J	0.050	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Perfluorooctane Sulfonic Acid	ug/L	0.028	0.044 (AN)	0.14 J	0.044	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Arsenic	ug/L	2.41	4.58 (G)	10	4.58	ug/L	95% Gamma Adjusted KM-UC	ProUCL 5.1.002
	Barium	ug/L	120	207 (G)	381	207	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Chromium	ug/L	2.94	15.8 (L)	28.7	15.8	ug/L	97.5% KM (Chebyshev) UCL	ProUCL 5.1.002
	Cobalt	ug/L	11.9	22.1 (G)	37	22.1	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Cyanide	ug/L	4.76	(1)	1.6	1.6	ug/L	Maximum Detected Concentration	(1)
	Iron	ug/L	12878	36,694 (G)	68400	36694	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Manganese	ug/L	1251	2,838 (G)	4490	2838	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002

AN - Approximate normal
G - Gamma distribution.
L - Lognormal
NP - Nonparametric distribution.
J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - The recommended UCL is greater than the maximum detected concentration, therefore the maximum detected concentration is used as the EPC.

TABLE 3.12.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - DEEP WELLS - SAMPLING EVENT 3
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Deep Wells Sampling Event 3	1,1-Dichloroethane	ug/L	0.539	(1)	2.9 J	2.9	ug/L	Maximum Detected Concentration	(1)
	Benzene	ug/L	0.292	(1)	0.65 J	0.65	ug/L	Maximum Detected Concentration	(1)
	Chloroform	ug/L	0.356	(1)	1.2	1.2	ug/L	Maximum Detected Concentration	(1)
	cis-1,2-Dichloroethene	ug/L	188	2,091 (G)	1,500	1500	ug/L	Maximum Detected Concentration	(2)
	Trichloroethene	ug/L	43.8	(1)	330	330	ug/L	Maximum Detected Concentration	(1)
	Vinyl Chloride	ug/L	1.17	(1)	8.5 J	8.5	ug/L	Maximum Detected Concentration	(1)
	1,4-Dioxane	ug/L	4.23	8.51 (N)	32	8.51	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Benzo(a)pyrene	ug/L	0.053	(1)	0.077 J	0.077	ug/L	Maximum Detected Concentration	(1)
	Pentadecafluorooctanoic Acid	ug/L	0.040	(1)	0.049	0.049	ug/L	Maximum Detected Concentration	(1)
	Dieldrin	ug/L	0.0006	(1)	0.00224 J	0.00224	ug/L	Maximum Detected Concentration	(1)
	Aluminum	ug/L	2,908	31,226 (L)	36,800 J	31,226	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002
	Antimony	ug/L	1.35	(1)	5.5	5.5	ug/L	Maximum Detected Concentration	(1)
	Arsenic	ug/L	1.47	3.03 (G)	5.5 J	3.03	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002
	Beryllium	ug/L	0.570	1.2 (NP)	2.5 J	1.2	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002
	Chromium	ug/L	4.62	32.4 (L)	27.1 J	27.1	ug/L	Maximum Detected Concentration	(2)
	Cobalt	ug/L	8.67	27.2 (G)	40.9	27.2	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Cyanide	ug/L	7.03	(1)	11.1 J	11.1	ug/L	Maximum Detected Concentration	(1)
	Iron	ug/L	12,537	20,636 (AN)	42,500	20,636	ug/L	95% KM (t) UCL	ProUCL 5.1.002
	Lead	ug/L	3.65	35.6 (L)	41.4	3.65	ug/L	Arithmetic Mean Concentration	(3)
	Manganese	ug/L	1,491	3,312 (G)	5,080	3,312	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002
	Vanadium	ug/L	2.24	8.21 (G)	15.4	8.21	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002

AN - Approximate normal
G - Gamma distribution.
L - Lognormal
NP - Nonparametric distribution.
J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - The recommended UCL is greater than the maximum detected concentration, therefore the maximum detected concentration is used as the EPC.
3 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.

TABLE 3.13.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - DEEP WELLS - SAMPLING EVENT 4
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside Landfill Deep Wells Sampling Event 4	1,1-Dichloroethane	ug/L	0.950	(1)	3.6	3.6	ug/L	Maximum Detected Concentration	(1)
	Benzene	ug/L	0.349	(1)	0.76	0.76	ug/L	Maximum Detected Concentration	(1)
	cis-1,2-Dichloroethene	ug/L	390	10,249 (G)	2,000	2,000	ug/L	Maximum Detected Concentration	(2)
	Trichloroethene	ug/L	68.6	1,906 (G)	310	310	ug/L	Maximum Detected Concentration	(2)
	Vinyl Chloride	ug/L	2.30	(1)	9.8	9.8	ug/L	Maximum Detected Concentration	(1)

G - Gamma distribution.

1 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
2 - The recommended UCL is greater than the maximum detected concentration, therefore the maximum detected concentration is used as the EPC.

TABLE 3.14.RME
EXPOSURE POINT CONCENTRATION SUMMARY - OUTSIDE LANDFILL - DEEP WELLS - MAXIMUM EXPOSURE POINT CONCENTRATION OF ALL SAMPLING EVENTS
REASONABLE MAXIMUM EXPOSURE
LOWER DARBY CREEK AREA

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

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean[1]	95% UCL[1] (Distribution)	Maximum Concentration[1] (Qualifier)	Exposure Point Concentration				Sampling Event
						Value[1]	Units	Statistic	Rationale	
Outside Landfill Deep Wells	1,1-Dichloroethane	ug/L	0.508	(2)	3.7	3.7	ug/L	Maximum Detected Concentration	(2)	Event 2
	Benzene	ug/L	0.349	(2)	0.76[5]	0.76	ug/L	Maximum Detected Concentration	(2)	Event 4
	Chloroform	ug/L	0.356	(2)	1.2	1.2	ug/L	Maximum Detected Concentration	(2)	Event 3
	cis-1,2-Dichloroethene	ug/L	390	10,249 (G)	2,000	2,000	ug/L	Maximum Detected Concentration	(3)	Event 4
	Trichloroethene (Kidney)	ug/L	43.8	(2)	330[6]	330	ug/L	Maximum Detected Concentration	(2)	Event 3
	Trichloroethene (Non-Kidney)	ug/L	43.8	(2)	330[6]	330	ug/L	Maximum Detected Concentration	(2)	Event 3
	Vinyl Chloride	ug/L	1.07	(2)	11	11	ug/L	Maximum Detected Concentration	(2)	Event 2
	1,4-Dioxane	ug/L	3.32	(2)	22[7]	22	ug/L	Maximum Detected Concentration	(2)	Event 1
	Benzo(a)pyrene	ug/L	0.053	(2)	0.077 J	0.077	ug/L	Maximum Detected Concentration	(2)	Event 3
	Bis(2-ethylhexyl)phthalate	ug/L	2.93	(2)	7	7	ug/L	Maximum Detected Concentration	(2)	Event 1
	Dibenzo(a,h)anthracene	ug/L	0.066	(2)	0.32	0.32	ug/L	Maximum Detected Concentration	(2)	Event 2
	Indeno(1,2,3-cd)pyrene	ug/L	0.071	(2)	0.39	0.39	ug/L	Maximum Detected Concentration	(2)	Event 2
	Naphthalene	ug/L	0.055	0.15 (NP)	0.36	0.15	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 2
	2,3,7,8-TCDD Equivalents	ug/L	0.00000048	0.0000028 (AN)	0.000002	0.0000028	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 2
	Pentadecafluorooctanoic Acid	ug/L	0.030	0.050 (AN)	0.15 J	0.050	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 2
	Perfluorooctane Sulfonic Acid	ug/L	0.028	0.044 (AN)	0.14 J	0.044	ug/L	95% KM (t) UCL	ProUCL 5.1.002	Event 2
	Dieldrin	ug/L	0.0006	(2)	0.00224 J	0.00224	ug/L	Maximum Detected Concentration	(2)	Event 3
	delta-BHC	ug/L	0.024	(2)	0.013 J	0.013	ug/L	Maximum Detected Concentration	(2)	Event 1
	Aluminum	ug/L	2,908	31,226 (L)	36,800 J	31,226	ug/L	99% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3
	Antimony	ug/L	1.35	(2)	5.5	5.5	ug/L	Maximum Detected Concentration	(2)	Event 3
	Arsenic	ug/L	2.41	4.58 (G)	10	4.58	ug/L	95% Gamma Adjusted KM-UC	ProUCL 5.1.002	Event 2
	Barium	ug/L	120	207 (G)	381	207	ug/L	95% Adjusted Gamma UCL	ProUCL 5.1.002	Event 2
	Beryllium	ug/L	0.570	1.2 (NP)	2.5 J	1.2	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 3
	Cadmium	ug/L	0.513	(2)	1.4	1.4	ug/L	Maximum Detected Concentration	(2)	Event 1
	Chromium	ug/L	9.36	30.4 (NP)	62.6	30.4	ug/L	95% KM (Chebyshev) UCL	ProUCL 5.1.002	Event 1
	Cobalt	ug/L	8.67	27.2 (G)	40.9	27.2	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 3
	Cyanide	ug/L	7.03	(2)	11.1 J	11.1	ug/L	Maximum Detected Concentration	(2)	Event 3
	Iron	ug/L	12878	36,694 (G)	68400	36694	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 2
	Lead	ug/L	3.65	35.6 (L)	41.4	3.65	ug/L	Arithmetic Mean Concentration	(4)	Event 3
	Manganese	ug/L	1,491	3,312 (G)	5,080	3,312	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 3
	Vanadium	ug/L	2.24	8.21 (G)	15.4	8.21	ug/L	95% Adjusted Gamma KM-UCL	ProUCL 5.1.002	Event 3

AN - Approximate normal
G - Gamma distribution.
L - Lognormal
NP - Nonparametric distribution.
J - Value considered is estimated.
KM - Kaplan-Meier
UCL - Upper confidence limit
ug/L - microgram per liter

1 - The exposure point concentration is the maximum of the values for each of the individual sampling events. The arithmetic mean, 95% UCL, and maximum concentration are those values associated with sampling event for the selected exposure point concentration and do not represent values for all the sampling events combined.
2 - There are less than four detected concentrations. Reliable statistics cannot be computed. The maximum concentration was used as the EPC.
3 - The recommended UCL is greater than the maximum detected concentration, therefore the maximum detected concentration is used as the EPC.
4 - Mean concentration is used as exposure point concentration for evaluating exposures to lead.
U.S. EPA, 1994: Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for lead in Children.
5 - The maximum UCL for benzene occurred for sampling event 4. The maximum detected concentration associated with this UCL was 0.76 ug/L. The maximum detected concentration of benzene for all sampling events was 0.88 ug/L and occurred in sampling event 2.
6 - The maximum UCL for trichloroethene occurred for sampling event 3. The maximum detected concentration associated with this UCL was 330 ug/L. The maximum detected concentration of trichloroethene for all sampling events was 420 ug/L and occurred in sampling event 2.
7 - The maximum UCL for 1,4-dioxane occurred for sampling event 1. The maximum detected concentration associated with this UCL was 22 ug/L. The maximum detected concentration of trichloroethene for all sampling events was 32 ug/L and occurred in sampling event 3.

RAGS Part D Table 4

Values Used For Daily Intake Calculations

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RAGS PART D TABLE 4
VALUES USED FOR DAILY INTAKE CALCULATIONS

Table No.

Reasonable Maximum Exposures

4.1.RME Construction Workers Exposed to Groundwater
4.2.RME Construction Workers Exposed to Volatile Emissions from Groundwater In Trench
4.3.RME Industrial Workers Exposed to Groundwater
4.4.RME Industrial Workers Exposed to Volatile Emissions from Groundwater In Trench
4.5.RME Industrial Workers Exposed to Volatile Emissions from Groundwater Used for Irrigation
4.6.RME Industrial Workers Exposed to Volatile Emissions from Groundwater While Showering
4.7.RME Child Residents Exposed to Groundwater
4.8.RME Adult Residents Exposed to Groundwater
4.9.RME Adult Residents Exposed to Volatiles While Showering

Central Tendency Exposures

4.1.CTE Construction Workers Exposed to Groundwater
4.2.CTE Construction Workers Exposed to Volatile Emissions from Groundwater In Trench
4.3.CTE Industrial Workers Exposed to Groundwater
4.4.CTE Industrial Workers Exposed to Volatile Emissions from Groundwater In Trench
4.5.CTE Industrial Workers Exposed to Volatile Emissions from Groundwater Used for Irrigation
4.6.CTE Industrial Workers Exposed to Volatile Emissions from Groundwater While Showering
4.7.CTE Child Residents Exposed to Groundwater
4.8.CTE Adult Residents Exposed to Groundwater
4.9.CTE Adult Residents Exposed to Volatiles While Showering

TABLE 4.1.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	On-Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.05	L/day	(1)	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	30	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014b	
Dermal	Construction Workers	Adult	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	8	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014b	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	30	days/year	(1)	For organics if tevent > t*
				ED	Exposure Duration	1	years	(1)	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	80	kg	USEPA, 2014b	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014b	

Notes:

1 - Professional judgment.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.2.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - GROUNDWATER TO AIR

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	On-Site	CA	Chemical concentration in air	Calculated	mg/m3	VDEQ, 2017	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				ET	Exposure Time	8	hours/day	(1)	
				EF	Exposure Frequency	30	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	CA = CW x CF x VF
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014b	
				VF	Volatilization Factor	Calculated	(mg/m3)/(mg/L)	VDEQ, 2017	

Notes:

1 - Professional judgment.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

VDEQ, 2017: Virginia Department of Environmental Quality (VDEQ, online- http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RemediationProgram/RiskAssessment.aspx)

TABLE 4.3.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers	Adult	On-Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.01	L/day	(1)	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	250	days/year	USEPA, 2014b	
				ED	Exposure Duration	25	years	USEPA, 2014b	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 2014b	
Dermal	Industrial Workers	Adult	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	8	hr/event	(2)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3,527	cm2	(3)	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	(2)	
				EF	Exposure Frequency	250	days/year	USEPA, 2014b	For organics if tevent > t*
				ED	Exposure Duration	25	years	USEPA, 2014b	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	80	kg	USEPA, 2014b	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 2014b	

Notes

1 - USEPA, 2014: Frequently Asked Questions (FAQs) About Update of Standard Default Exposure Factors.

2 - Professional judgment.

3 - Assumes hands and forearms are exposed (Table 7-2, USEPA, 2011).

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.4.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - GROUNDWATER TO AIR

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	On-Site	CA	Chemical concentration in air	Calculated	mg/m3	VDEQ, 2017	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				ET	Exposure Time	8	hours/day	(1)	
				EF	Exposure Frequency	250	days/year	(1)	
				ED	Exposure Duration	25	years	(1)	CA = CW x CF x VF
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 2014b	
				VF	Volatilization Factor	Calculated	(mg/m3)/(mg/L)	VDEQ, 2017	

Notes:

1 - Professional judgment.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

VDEQ, 2017: Virginia Department of Environmental Quality (VDEQ, online- http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RemediationProgram/RiskAssessment.aspx)

TABLE 4.5.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - INHALATION OF VOLATILES FROM GROUNDWATER USED FOR IRRIGATION

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	On-Site	CA	Chemical concentration in air	Calculated	mg/m3	UF, 2009	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				ET	Exposure Time	8	hours/day	(1)	
				EF	Exposure Frequency	250	days/year	(1)	
				ED	Exposure Duration	25	years	(1)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 2014b	

Notes:

1 - Professional judgment.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

UF, 2009. Letter from Stephen Roberts, Ph.D to Ligia Mora-Applegate, Methodology for the Development of Irrigation Water Risk-Based Criteria. January 14

TABLE 4.6.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - INHALATION OF VOLATILES FROM GROUNDWATER WHILE SHOWERING

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	On-Site	S	Volatile Chemical Generation Rate	Derived	mg/m3-min-shower	Foster&Chrostowski 1987	Exposure Concentration (mg/m^3)=
				K	Mass Transfer Coefficient	Derived	min	Foster&Chrostowski 1987	
				EF	Exposure Frequency	250	days/year	USEPA, 2014	$\frac{S \times K \times EF \times ED}{AT \times Ra \times CF}$
				ED	Exposure Duration	25	years	USEPA, 2014	
				Ra	Air Exchange Rate	0.017	min^{-1}	Foster&Chrostowski 1987	
				CF	Conversion Factor	1,440	min/day	--	$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$
				Ds	Shower Duration	10	min	(1)	
				Dt	Total Time in Bathroom	15	min	(1)	
				Fr	Shower Water Flow Rate	10	L/min	Foster&Chrostowski 1987	
				Sv	Shower Room Air Volume	12	m^3	Foster&Chrostowski 1987	
				ts	Shower Dropler Drop Time	0.5	sec	Foster&Chrostowski 1987	
				d	Shower Droplet Diameter	1	mm	Foster&Chrostowski 1987	
				T1	Calibration Water Temperature	293	K	Foster&Chrostowski 1987	
				Ts	Shower Water Temperature	318	K	Foster&Chrostowski 1987	
				m1	Water Viscosity at T1	1.002	cp	Foster&Chrostowski 1987	
				ms	Water Viscosity at Ts	0.596	cp	Foster&Chrostowski 1987	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Noncancer)	9,125	days	USEPA, 2014	

Notes:

1 - Professional judgment.

Sources:

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

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

Foster, S.A. and P.C. Chrostowski, 1987. Inhalation Exposure to Volatile Organic Contaminants in the Shower.

TABLE 4.7.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Child	On-Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.78	L/day	USEPA, 2014b	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014b	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014b	
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014b	
Dermal	Residents	Child	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.54	hr/event	USEPA, 2014b	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,365	cm2	USEPA, 2014b	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	For organics if tevent > t*
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014b	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014b	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014b	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.8.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Adult	On-Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	2.5	L/day	USEPA, 2014b	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014b	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
Dermal	Residents	Adult	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	DAevent x EV x EF x ED x SA
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	BW x AT
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	For inorganics
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	0.71	hr/event	USEPA, 2014b	For organics if tevent <= t*
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				SA	Skin Surface Available for Contact	19,652	cm2	USEPA, 2014b	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014b	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.9.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Residents	Adult	On-Site	S	Volatile Chemical Generation Rate	Derived	mg/m3-min-shower	Foster&Chrostowski 1987	Exposure Concentration (mg/m^3)=
				K	Mass Transfer Coefficient	Derived	min	Foster&Chrostowski 1987	
				EF	Exposure Frequency	350	showers/year	USEPA, 2014	$\frac{S \times K \times EF \times ED}{AT \times Ra \times CF}$
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014	
				Ra	Air Exchange Rate	0.017	min^{-1}	Foster&Chrostowski 1987	$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$
				CF	Conversion Factor	1,440	min/day	--	
				Ds	Shower Duration	42.6	min	USEPA, 2004	
				Dt	Total Time in Bathroom	60	min	(2)	
				Fr	Shower Water Flow Rate	10	L/min	Foster&Chrostowski 1987	
				Sv	Shower Room Air Volume	12	m^3	Foster&Chrostowski 1987	
				ts	Shower Dropler Drop Time	0.5	sec	Foster&Chrostowski 1987	
				d	Shower Droplet Diameter	1	mm	Foster&Chrostowski 1987	
				T1	Calibration Water Temperature	293	K	Foster&Chrostowski 1987	
				Ts	Shower Water Temperature	318	K	Foster&Chrostowski 1987	
				m1	Water Viscosity at T1	1.002	cp	Foster&Chrostowski 1987	
				ms	Water Viscosity at Ts	0.596	cp	Foster&Chrostowski 1987	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Noncancer)	7,300	days	USEPA, 2014	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

2 - Professional judgment.

Sources:

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

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

Foster, S.A. and P.C. Chrostowski, 1987. Inhalation Exposure to Volatile Organic Contaminants in the Shower.

TABLE 4.1.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CONSTRUCTION WORKERS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	On-Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.05	L/day	(1)	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	30	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014b	
Dermal	Construction Workers	Adult	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	4	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014b	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	30	days/year	(1)	For organics if tevent > t*
				ED	Exposure Duration	1	years	(1)	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	80	kg	USEPA, 2014b	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014b	

Notes

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.2.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CONSTRUCTION WORKERS - GROUNDWATER TO AIR

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	On-Site	CA	Chemical concentration in air	Calculated	mg/m3	VDEQ, 2016	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				ET	Exposure Time	4	hours/day	(1)	
				EF	Exposure Frequency	30	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	CA = CW x CF x VF
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014b	
				VF	Volatilization Factor	Calculated	(mg/m3)/(mg/L)	VDEQ, 2016	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

VDEQ, 2017: Virginia Department of Environmental Quality (VDEQ, online- http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RemediationProgram/RiskAssessment.aspx)

TABLE 4.3.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - INDUSTRIAL WORKERS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers	Adult	On-Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.01	L/day	(1)	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	219	days/year	USEPA, 1993	BW x AT
				ED	Exposure Duration	6.6	years	(2)	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,409	days	USEPA, 2014b	
Dermal	Industrial Workers	Adult	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	4	hr/event	(3)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3,527	cm2	(4)	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	(3)	
				EF	Exposure Frequency	219	days/year	USEPA, 1993	For organics if tevent > t*
				ED	Exposure Duration	6.6	years	(2)	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	80	kg	USEPA, 2014b	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,409	days	USEPA, 2014b	

Notes

1 - USEPA, 2014: Frequently Asked Questions (FAQs) About Update of Standard Default Exposure Factors.
2 - USEPA, 2011. Exposure Factors Handbook: 2011 Edition, Table 16-103.

3 - Professional judgment.

4 - Assumes hands and forearms are exposed (Table 7-2, USEPA, 2011).

USEPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.4.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - INDUSTRIAL WORKERS - GROUNDWATER TO AIR

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	On-Site	CA	Chemical concentration in air	Calculated	mg/m3	VDEQ, 2017	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				ET	Exposure Time	4	hours/day	(1)	
				EF	Exposure Frequency	219	days/year	(1)	
				ED	Exposure Duration	6.6	years	(1)	CA = CW x CF x VF
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,409	days	USEPA, 2014b	
				VF	Volatilization Factor	Calculated	(mg/m3)/(mg/L)	VDEQ, 2017	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

VDEQ, 2017: Virginia Department of Environmental Quality (VDEQ, online- http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RemediationProgram/RiskAssessment.aspx)

TABLE 4.5.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - INDUSTRIAL WORKERS - INHALATION OF VOLATILES FROM GROUNDWATER USED FOR IRRIGATION

LOWER DARBY CREEK AREA, PENNSYLVANIA

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

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	On-Site	CA	Chemical concentration in air	Calculated	mg/m3	UF, 2009	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				ET	Exposure Time	4	hours/day	(1)	
				EF	Exposure Frequency	219	days/year	(1)	
				ED	Exposure Duration	6.6	years	(1)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,409	days	USEPA, 2014b	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

UF, 2009. Letter from Stephen Roberts, Ph.D to Ligia Mora-Applegate, Methodology for the Development of Irrigation Water Risk-Based Criteria. January 14

TABLE 4.6.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - INDUSTRIAL WORKERS - INHALATION OF VOLATILES FROM GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers	Adult	On-Site	S	Volatile Chemical Generation Rate	Derived	mg/m3-min-shower	Foster & Chrostowski 1987	Exposure Concentration (mg/m^3)=
				K	Mass Transfer Coefficient	Derived	min	Foster&Chrostowski 1987	
				EF	Exposure Frequency	219	days/year	USEPA, 1993	$\frac{S \times K \times EF \times ED}{AT \times Ra \times CF}$
				ED	Exposure Duration	6.6	years	USEPA, 2011	
				Ra	Air Exchange Rate	0.017	min^{-1}	Foster&Chrostowski 1987	
				CF	Conversion Factor	1,440	min/day	--	$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$
				Ds	Shower Duration	10	min	(1)	
				Dt	Total Time in Bathroom	15	min	(1)	
				Fr	Shower Water Flow Rate	10	L/min	Foster&Chrostowski 1987	
				Sv	Shower Room Air Volume	12	m^3	Foster&Chrostowski 1987	
				ts	Shower Dropler Drop Time	0.5	sec	Foster&Chrostowski 1987	
				d	Shower Droplet Diameter	1	mm	Foster&Chrostowski 1987	
				T1	Calibration Water Temperature	293	K	Foster&Chrostowski 1987	
				Ts	Shower Water Temperature	318	K	Foster&Chrostowski 1987	
				m1	Water Viscosity at T1	1.002	cp	Foster&Chrostowski 1987	
				ms	Water Viscosity at Ts	0.596	cp	Foster&Chrostowski 1987	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Noncancer)	2,409	days	USEPA, 2014	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition.

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

Foster, S.A. and P.C. Chrostowski, 1987. Inhalation Exposure to Volatile Organic Contaminants in the Shower.

TABLE 4.7.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CHILD RESIDENTS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Child	On-Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.45	L/day	USEPA, 2011	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	1,095	days	USEPA, 2014b	
Dermal	Residents	Child	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.33	hr/event	USEPA, 2004	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,365	cm2	USEPA, 2014b	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	For organics if tevent > t*
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2011	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	1,095	days	USEPA, 2014b	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. Tables 3-15 and 3-33.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.8.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Adult	On-Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	1.2	L/day	USEPA, 2011	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	7	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	3,285	days	USEPA, 2014b	
Dermal	Residents	Adult	On-Site	Daevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.25	hr/event	USEPA, 2004	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	19,652	cm2	USEPA, 2014b	DAevent = 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/pi]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	DAevent = FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 26)	7	years	(1), USEPA, 2005, 2011	2 x τ x (1 + 3B + $3B^2$)/(1+B^2)]
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	3,285	days	USEPA, 2014b	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition, Table 3-33.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

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

TABLE 4.9.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER

LOWER DARBY CREEK AREA, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Residents	Adult	On-Site	S	Volatile Chemical Generation Rate	Derived	mg/m3-min-shower	Foster & Chrostowski 1987	Exposure Concentration (mg/m^3)=
				K	Mass Transfer Coefficient	Derived	min	Foster&Chrostowski 1987	
				EF	Exposure Frequency	234	showers/year	USEPA, 1993	$\frac{S \times K \times EF \times ED}{AT \times Ra \times CF}$
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	7	years	(1), USEPA, 2005, 2011	
				Ra	Air Exchange Rate	0.017	min^{-1}	Foster&Chrostowski 1987	$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$
				CF	Conversion Factor	1,440	min/day	--	
				Ds	Shower Duration	10	min	USEPA, 2004	
				Dt	Total Time in Bathroom	15	min	(2)	
				Fr	Shower Water Flow Rate	10	L/min	Foster&Chrostowski 1987	
				Sv	Shower Room Air Volume	12	m^3	Foster&Chrostowski 1987	
				ts	Shower Dropler Drop Time	0.5	sec	Foster&Chrostowski 1987	
				d	Shower Droplet Diameter	1	mm	Foster&Chrostowski 1987	
				T1	Calibration Water Temperature	293	K	Foster&Chrostowski 1987	
				Ts	Shower Water Temperature	318	K	Foster&Chrostowski 1987	
				m1	Water Viscosity at T1	1.002	cp	Foster&Chrostowski 1987	
				ms	Water Viscosity at Ts	0.596	cp	Foster&Chrostowski 1987	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Noncancer)	3,285	days	USEPA, 2014	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

2 - Professional judgment.

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition, Table 3-33.

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

Foster, S.A. and P.C. Chrostowski, 1987. Inhalation Exposure to Volatile Organic Contaminants in the Shower.

RAGS Part D Table 5

Non-Cancer Toxicity Data

LIST OF TABLES
RAGS PART D TABLE 5
NON-CANCER TOXICITY DATA

Table No.

5-1 Non-Cancer Toxicity Data - Oral/Dermal
5-2 Non-Cancer Toxicity Data - Inhalation

TABLE 5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
1,1,2-Trichloroethane	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Hepatic	1000	PPRTV	4/1/2011
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Immune, Hematologic	1000	IRIS	7/18/2016
1,1-Dichloroethane	Subchronic	2.0E+00	mg/kg/day	1	2.0E+00	mg/kg/day	Urinary	300	PPRTV	9/27/2006
	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Urinary	3000	PPRTV	9/27/2006
1,2-Dibromo-3-Chloropropane	Subchronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	Reproductive	300	PPRTV	8/3/2006
	Chronic	2.0E-04	mg/kg/day	1	2.0E-04	mg/kg/day	Reproductive	3000	PPRTV	8/3/2006
1,2-Dichloroethane	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Urinary	3000	PPRTV	10/1/2010
	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Urinary	30000	PPRTV X	10/1/2010
1,2-Dichlorobenzene	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	Hepatic	100	ATSDR	7/18/2016
	Chronic	9.0E-02	mg/kg/day	1	9.0E-02	mg/kg/day	None Reported	1000	IRIS	7/18/2016
1,3-Dichlorobenzene[3]	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Hepatic	100	ATSDR	8/2006
	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Hepatic	300	ATSDR	8/2006
1,4-Dichlorobenzene	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Hepatic	100	ATSDR	8/2006
	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Hepatic	300	ATSDR	8/2006
2-Hexanone	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Nervous	1000	IRIS	7/18/2016
Benzene	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Hematologic	100	PPRTV	9/29/2009
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Immune	300	IRIS	7/18/2016
Chlorobenzene	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Hepatic, Urinary	300	PPRTV	10/12/2006
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Hepatic	1000	IRIS	7/18/2016
Chloroform	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Hepatic	100	ATSDR	9/1997
	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Hepatic	100	IRIS	7/18/2016
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Urinary	300	PPRTV	2/3/2011
	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	Urinary	3000	IRIS	7/18/2016
Ethylbenzene	Subchronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Hepatic	1000	PPRTV	9/10/2009
	Chronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Hepatic, Urinary	1000	IRIS	7/18/2016
m+p-Xylenes[4]	Chronic	4.0E-01	mg/kg/day	1	4.0E-01	mg/kg/day	Whole Body	1000	PPRTV	9/30/2009
	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Nervous System	1000	IRIS	7/18/2016
Trichloroethene	Subchronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Developmental, Immune	10 - 100	ATSDR	10/2014
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Cardiovascular, Developmental, Immune	10 - 1000	IRIS	7/18/2016
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Hepatic	30	IRIS	7/18/2016
Semivolatile Organic Compounds										
1,4-Dioxane	Subchronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	Hepatic	100	ATSDR	4/2012
	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Hepatic, Urinary	300	IRIS	7/18/2016
2,6-Dinitrotoluene	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Hematologic	1000	ATSDR	4/2013
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Hepatic, Spleen	10000	PPRTV X	4/10/2013
2-Methylnaphthalene	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Respiratory	1000	PPRTV	9/18/2007
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Respiratory	1000	IRIS	7/18/2016
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Developmental, Immune, Reproductive	300	IRIS	8/15/2017
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Bis(2-ethylhexyl)phthalate	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Reproductive	100	ATSDR	9/2002
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Hepatic	1000	IRIS	7/18/2016
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Whole Body	3000	PPRTV	6/11/2007
	Chronic	1.0E-03	mg/kg/day	1	1.0E-03	mg/kg/day	Whole Body	10000	PPRTV X	6/11/2007
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	Nervous System	90	ATSDR	8/2005
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000	IRIS	7/18/2016
Pentachlorophenol	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Hepatic	300	IRIS	7/18/2016
Phenanthrene	Subchronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Urinary	300	PPRTV	9/5/2007
	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Urinary	3000	IRIS	7/18/2016
Dioxin/Furans										
2,3,7,8-TCDD	Subchronic	2.0E-08	mg/kg/day	1	2.0E-08	mg/kg/day	Immune	30	ATSDR	12/1998
	Chronic	7.0E-10	mg/kg/day	1	7.0E-10	mg/kg/day	Developmental, Endocrine, Reproductive	30	IRIS	7/18/2016
Perfluorinated Compounds										
Pentadecafluorooctanoic Acid	Subchronic	2.0E-04	mg/kg/day	1	2.0E-04	mg/kg/day	Developmental	2430	USEPA[14]	10/28/2009
	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Developmental	30	USEPA[12]	5/2016
Perfluorooctane Sulfonic Acid	Subchronic	8.0E-05	mg/kg/day	1	8.0E-05	mg/kg/day	Developmental	390	USEPA[14]	10/28/2009
	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Developmental	30	USEPA[13]	5/2016
Pesticides										
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	Subchronic	4.0E-05	mg/kg/day	1	4.0E-05	mg/kg/day	Urinary	1000	PPRTV	3/14/2005
	Chronic	3.0E-05	mg/kg/day	1	3.0E-05	mg/kg/day	Hepatic	1000	IRIS	7/18/2016
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC[5]	Chronic	8.0E-03	mg/kg/day	1	8.0E-03	mg/kg/day	Hepatic	100	ATSDR	8/2005
Dieldrin	Subchronic	1.0E-04	mg/kg/day	1	1.0E-04	mg/kg/day	Nervous System	100	ATSDR	9/2002
	Chronic	5.0E-05	mg/kg/day	1	5.0E-05	mg/kg/day	Hepatic	100	IRIS	7/18/2016
gamma-BHC (Lindane)	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Hepatic, Urinary	1000	IRIS	7/18/2016
Heptachlor	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Hepatic	300	IRIS	7/18/2016
Heptachlor Epoxide	Subchronic	1.3E-05	mg/kg/day	1	1.3E-05	mg/kg/day	Hepatic	1000	HEAST	7/18/2016
	Chronic	1.3E-05	mg/kg/day	1	1.3E-05	mg/kg/day	Hepatic	1000	IRIS	7/18/2016
PCBs										
Dioxin-Like PCBs[6]	Subchronic	2.0E-08	mg/kg/day	1	2.0E-08	mg/kg/day	Immune	30	ATSDR	12/1998
	Chronic	7.0E-10	mg/kg/day	1	7.0E-10	mg/kg/day	Developmental, Endocrine, Reproductive	30	IRIS	7/18/2016
Total PCB Congeners	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics										
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Nervous System	30	ATSDR	9/2008
	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Nervous System	100	PPRTV	10/23/2006
Antimony	Subchronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Whole Body	1000	PPRTV	7/29/2008
	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Hematologic	1000	IRIS	7/18/2016
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Cardiovascular System, Dermal	3	IRIS	7/18/2016
Barium	Subchronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Urinary	300	ATSDR	8/2007
	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Urinary	300	IRIS	7/18/2016
Beryllium	Subchronic	5.0E-03	mg/kg/day	0.007	3.5E-05	mg/kg/day	None Observed	100	HEAST	7/18/2016
	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal	300	IRIS	7/18/2016

TABLE 5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Boron	Subchronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Developmental	66	ATSDR	11/2010
	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Developmental	66	IRIS	7/18/2016
Cadmium (water)	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Urinary	10	IRIS	7/18/2016
Chromium[7]	Subchronic	5.0E-03	mg/kg/day	0.025	1.3E-04	mg/kg/day	Hematologic	100	ATSDR	9/2012
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300	IRIS	7/18/2016
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000	PPRTV	8/25/2008
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	Gastrointestinal System	NA	HEAST	7/18/2016
Cyanide[8]	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Whole Body, Thyroid, Nervous System	500	HEAST	7/18/2016
	Chronic	6.0E-04	mg/kg/day	1	6.0E-04	mg/kg/day	Reproductive	3000	IRIS	7/18/2016
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese[9]	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	Nervous System	3	IRIS	7/18/2016
Mercury[10]	Subchronic	1.5E+00	mg/kg/day	1	1.5E+00	mg/kg/day	Nervous System	10	HEAST	7/18/2016
	Chronic	1.0E-04	mg/kg/day	1	1.0E-04	mg/kg/day	Developmental, Nervous System	10	IRIS	7/18/2016
Nickel	Subchronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300	HEAST	7/18/2016
	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300	IRIS	7/18/2016
Silver	Subchronic	5.0E-03	mg/kg/day	0.04	2.0E-04	mg/kg/day	Dermal	3	HEAST	7/18/2016
	Chronic	5.0E-03	mg/kg/day	0.04	2.0E-04	mg/kg/day	Dermal	3	IRIS	7/18/2016
Thallium	Subchronic	4.0E-05	mg/kg/day	1	4.0E-05	mg/kg/day	Hair	1000	PPRTV X	10/25/2012
	Chronic	1.0E-05	mg/kg/day	1	1.0E-05	mg/kg/day	Hair	3000	PPRTV X	10/25/2012
Vanadium[11]	Subchronic	1.0E-02	mg/kg/day	0.026	2.6E-04	mg/kg/day	Hematologic	10	ATSDR	9/2012
	Chronic	5.0E-03	mg/kg/day	0.026	1.3E-04	mg/kg/day	Dermal	300	IRIS	7/18/2016
Zinc	Subchronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Hematologic	3	ATSDR	8/2005
	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Immune, Hematologic	3	IRIS	7/18/2016

Footnotes:

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - 1,4-Dichlorobenzene is used as a surrogate for 1,3-Dichlorobenzene.

4 - Values are for xylenes.

5 - Values are for alpha-BHC.

6 - Values are for 2,3,7,8-TCDD.

7 - Values are for hexavalent chromium.

8 - Values are for hydrogen cyanide.

9 - Adjusted IRIS value in accordance with IRIS.

10 - Values are for methyl mercury.

11 - Chronic value from IRIS adjusted as specified in the USEPA Regional Screening Level User Guide (November 2015).

12 - Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), EPA 882-R-16-005.

13 - Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS), EPA 882-R-16-004.

14 - The Toxicity of Perfluorooctanic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS), Office of Soild Waste and Emergency Response, October 28, 2009.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry.

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Available.

PPRTV = Provisional Peer Reviewed Toxicity Value.

PPRTV X = Provisional Peer Reviewed Toxicity Appendix Screening Value

TABLE 5.2
NON-CANCER TOXICITY DATA - INHALATION
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds									
1,1,2-Trichloroethane	Subchronic	2.0E-03	mg/m^3	5.7E-04	(mg/kg/day)	Respiratory	300	PPRTV X	4/1/2011
	Chronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Respiratory	3000	PPRTV X	4/1/2011
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-Chloropropane	Subchronic	2.0E-03	mg/m^3	5.7E-04	(mg/kg/day)	Reproductive	100	PPRTV	8/3/2016
	Chronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Reproductive	3000	IRIS	7/18/2016
1,2-Dichloroethane	Subchronic	7.0E-02	mg/m^3	2.0E-02	(mg/kg/day)	Nervous System	300	PPRTV	10/1/2010
	Chronic	7.0E-03	mg/m^3	2.0E-03	(mg/kg/day)	Nervous System	3000	PPRTV	10/1/2010
1,2-Dichlorobenzene	Subchronic	2.0E+00	mg/m^3	5.7E-01	(mg/kg/day)	Body Weight	100	HEAST	7/18/2016
	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Body Weight	1000	HEAST	7/18/2016
1,3-Dichlorobenzene[2]	Subchronic	1.2E+00	mg/m^3	3.4E-01	(mg/kg/day)	Hepatic	100	ATSDR	8/2006
	Chronic	8.0E-01	mg/m^3	2.3E-01	(mg/kg/day)	Hepatic	100	IRIS	7/18/2016
1,4-Dichlorobenzene	Subchronic	1.2E+00	mg/m^3	3.4E-01	(mg/kg/day)	Hepatic	100	ATSDR	8/2006
	Chronic	8.0E-01	mg/m^3	2.3E-01	(mg/kg/day)	Hepatic	100	IRIS	7/18/2016
2-Hexanone	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Nervous	3000	IRIS	7/18/2016
Benzene	Subchronic	8.0E-02	mg/m^3	2.3E-02	(mg/kg/day)	Immune	100	PPRTV	9/29/2009
	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Immune	300	IRIS	7/18/2016
Chlorobenzene	Subchronic	5.0E-01	mg/m^3	1.4E-01	(mg/kg/day)	Hepatic, Urinary	100	PPRTV	10/12/2006
	Chronic	5.0E-02	mg/m^3	1.4E-02	(mg/kg/day)	Hepatic, Urinary	1000	PPRTV	10/12/2006
Chloroform	Subchronic	2.4E-01	mg/m^3	7.0E-02	(mg/kg/day)	Hepatic	300	ATSDR	9/1997
	Chronic	9.8E-02	mg/m^3	2.8E-02	(mg/kg/day)	Hepatic	100	ATSDR	9/1997
Cyclohexane	Subchronic	1.8E+01	mg/m^3	5.1E+00	(mg/kg/day)	Developmental	100	PPRTV	9/29/2010
	Chronic	6.0E+00	mg/m^3	1.7E+00	(mg/kg/day)	Developmental	300	IRIS	7/18/2016
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	Subchronic	9.0E+00	mg/m^3	2.6E+00	(mg/kg/day)	Ear	100	PPRTV	9/10/2009
	Chronic	1.0E+00	mg/m^3	2.9E-01	(mg/kg/day)	Developmental	300	IRIS	7/18/2016
m+p-Xylenes[3]	Subchronic	4.0E-01	mg/m^3	1.1E-01	(mg/kg/day)	Whole Body	1000	PPRTV	9/30/2009
	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Nervous System	300	IRIS	7/18/2016
Trichloroethene	Chronic	2.0E-03	mg/m^3	5.7E-04	(mg/kg/day)	Cardiovascular, Developmental, Immune	10 - 100	IRIS	7/18/2016
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Hepatic	30	IRIS	7/18/2016
Semivolatile Organic Compounds									
1,4-Dioxane	Subchronic	7.2E-01	mg/m^3	2.1E-01	(mg/kg/day)	Respiratory	30	ATSDR	4/2012
	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Nervous System, Respiratory	1000	IRIS	7/18/2016
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	Chronic	2.0E-06	mg/m^3	5.7E-07	(mg/kg/day)	Developmental, Reproductive	3000	IRIS	8/15/2017
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5.2
NON-CANCER TOXICITY DATA - INHALATION
LOWER DARBY CREEK AREA
PAGE 2 OF 3

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[(1)]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	3.0E-03	mg/m^3	8.6E-04	(mg/kg/day)	Nervous System, Respiratory	3000	IRIS	7/18/2016
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin/Furans									
2,3,7,8-TCDD	Chronic	4.0E-08	mg/m^3	1.1E-08	(mg/kg/day)	Developmental, Endocrine, Reproductive	NA	Cal EPA	2008
Perfluorinated Compounds									
Pentadecafluorooctanoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides									
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs									
Dioxin-Like PCBs[(4)]	Chronic	4.0E-08	mg/m^3	1.1E-08	(mg/kg/day)	Developmental, Endocrine, Reproductive	NA	Cal EPA	2008
Total PCB Congeners	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	Nervous System	300	PPRTV	10/23/2006
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	Chronic	1.5E-05	mg/m^3	4.3E-06	(mg/kg/day)	Cardiovascular System, Dermal	NA	Cal EPA	2008
Barium	Subchronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	Developmental	100	HEAST	7/18/2016
	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Developmental	1000	HEAST	7/18/2016
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Immune, Respiratory	10	IRIS	7/18/2016
Boron	Subchronic	2.0E-02	mg/m^3	5.7E-03	(mg/kg/day)	Respiratory	100	HEAST	7/18/2016
	Chronic	2.0E-02	mg/m^3	5.7E-03	(mg/kg/day)	Respiratory	100	HEAST	7/18/2016
Cadmium	Chronic	1.0E-05	mg/m^3	2.9E-06	(mg/kg/day)	Urinary	9	ATSDR	9/2012
Chromium[(5)]	Subchronic	3.0E-04	mg/m^3	8.6E-05	(mg/kg/day)	Respiratory	30	ATSDR	9/2012
	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Respiratory	300	IRIS	7/18/2016
Cobalt	Subchronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Respiratory	100	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m^3	1.7E-06	(mg/kg/day)	Respiratory	300	PPRTV	8/25/2008

TABLE 5.2
NON-CANCER TOXICITY DATA - INHALATION
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[(1)]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	Chronic	8.0E-04	mg/m^3	2.3E-04	(mg/kg/day)	Endocrine	3000	IRIS	7/18/2016
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	Nervous System	1000	IRIS	7/18/2016
Mercury[(6)]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	Subchronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Respiratory	30	ATSDR	8/2005
	Chronic	9.0E-05	mg/m^3	2.6E-05	(mg/kg/day)	Respiratory	30	ATSDR	8/2005
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Respiratory	30	ATSDR	9/2012
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

Footnotes:

1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

2 - 1,4-Dichlorobenzene is used as a surrogate for 1,3-Dichlorobenzene.

3 - Values are for xylenes.

4 - Values are for 2,3,7,8-TCDD.

5 - Values are for hexavalent chromium.

6 - Values are for methyl mercury.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Noncancer RELs, 2008.

HEAST = Health Effects Assessment Summary Table

IRIS = Integrated Risk Information System

NA = Not Applicable

PPRTV = Provisional Peer Reviewed Toxicity Value.

PPRTV X = Provisional Peer Reviewed Toxicity Appendix Screening Value

RAGS Part D Table 6

Cancer Toxicity Data

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CANCER TOXICITY DATA

Table No.

6-1 Cancer Toxicity Data - Oral/Dermal
6-2 Cancer Toxicity Data - Inhalation

TABLE 6.1
CANCER TOXICITY DATA - ORAL/DERMAL
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description[3]	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
1,1,2-Trichloroethane	5.7E-02	$(mg/kg/day)^{-1}$	1	5.7E-02	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	IRIS	7/18/2016
1,1-Dichloroethane	5.7E-03	$(mg/kg/day)^{-1}$	1	5.7E-03	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	Cal EPA	2009
1,2-Dibromo-3-Chloropropane	8.0E-01	$(mg/kg/day)^{-1}$	1	8.0E-01	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	PPRTV	8/3/2006
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	7/18/2016
1,3-Dichlorobenzene[4]	5.4E-03	$(mg/kg/day)^{-1}$	1	5.4E-03	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	Cal EPA	2009
1,4-Dichlorobenzene	5.4E-03	$(mg/kg/day)^{-1}$	1	5.4E-03	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	Cal EPA	2009
2-Hexanone	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	7/18/2016
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	7/18/2016
Chlorobenzene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Chloroform	3.1E-02	$(mg/kg/day)^{-1}$	1	3.1E-02	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	Cal EPA	2009
Cyclohexane	NA	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential	IRIS	7/18/2016
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	7/18/2016
Ethylbenzene	1.1E-02	$(mg/kg/day)^{-1}$	1	1.1E-02	$(mg/kg/day)^{-1}$	D (Not classifiable as to human carcinogenicity)	Cal EPA	2009
m+p-Xylenes	NA	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential	IRIS	7/18/2016
Trichloroethene - (Nonmutagenic)[5]	3.7E-02	$(mg/kg/day)^{-1}$	1	3.7E-02	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	7/18/2016
Trichloroethene (Mutagenic)[5,6]	9.3E-03	$(mg/kg/day)^{-1}$	1	9.3E-03	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	7/18/2016
Vinyl Chloride	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	7/18/2016
Semivolatile Organic Compounds								
1,4-Dioxane	1.0E-01	$(mg/kg/day)^{-1}$	1	1.0E-01	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	7/18/2016
2,6-Dinitrotoluene	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	NA	PPRTV	4/10/2013
2-Methylnaphthalene	NA	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential	NA	NA
Benzo(a)anthracene[6]	1.0E-01	$(mg/kg/day)^{-1}$	1	1.0E-01	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Benzo(a)pyrene[6]	1.0E+00	$(mg/kg/day)^{-1}$	1	1.0E+00	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	8/15/2017
Benzo(b)fluoranthene[6]	1.0E-01	$(mg/kg/day)^{-1}$	1	1.0E-01	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Benzo(k)fluoranthene[6]	1.0E-02	$(mg/kg/day)^{-1}$	1	1.0E-02	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Bis(2-chloroethyl)ether	1.1E+00	$(mg/kg/day)^{-1}$	1	1.1E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Bis(2-ethylhexyl)phthalate	1.4E-02	$(mg/kg/day)^{-1}$	1	1.4E-02	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Dibenzo(a,h)anthracene[6]	1.0E+00	$(mg/kg/day)^{-1}$	1	1.0E+00	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Dibenzofuran	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	7/18/2016
Indeno(1,2,3-cd)pyrene[6]	1.0E-01	$(mg/kg/day)^{-1}$	1	1.0E-01	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Naphthalene	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	7/18/2016
Pentachlorophenol	4.0E-01	$(mg/kg/day)^{-1}$	1	4.0E-01	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	7/18/2016

TABLE 6.1
CANCER TOXICITY DATA - ORAL/DERMAL
LOWER DARBY CREEK AREA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description[3]	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Phenanthrene	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Dioxin/Furans								
2,3,7,8-TCDD	1.3E+05	$(mg/kg/day)^{-1}$	1	1.3E+05	$(mg/kg/day)^{-1}$	NA	Cal EPA	2009
Perfluorinated Compounds								
Pentadecafluorooctanoic Acid	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides								
4,4'-DDD	2.4E-01	$(mg/kg/day)^{-1}$	1	2.4E-01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
4,4'-DDE	3.4E-01	$(mg/kg/day)^{-1}$	1	3.4E-01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Aldrin	1.7E+01	$(mg/kg/day)^{-1}$	1	1.7E+01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
beta-BHC	1.8E+00	$(mg/kg/day)^{-1}$	1	1.8E+00	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	IRIS	7/18/2016
delta-BHC[7]	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Dieldrin	1.6E+01	$(mg/kg/day)^{-1}$	1	1.6E+01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
gamma-BHC (Lindane)	1.1E+00	$(mg/kg/day)^{-1}$	1	1.1E+00	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	Cal EPA	2009
Heptachlor	4.5E+00	$(mg/kg/day)^{-1}$	1	4.5E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Heptachlor Epoxide	9.1E+00	$(mg/kg/day)^{-1}$	1	9.1E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
PCBs								
Dioxin-Like PCBs[8]	1.3E+05	$(mg/kg/day)^{-1}$	1	1.3E+05	$(mg/kg/day)^{-1}$	NA	Cal EPA	2009
Total PCB Congeners[9]	4.0E-01	$(mg/kg/day)^{-1}$	1	4.0E-01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A (human carcinogen)	IRIS	7/18/2016
Barium	NA	NA	NA	NA	NA	Not likely to be carcinogenic to humans	NA	NA
Beryllium	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	NA	NA
Boron	NA	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential (Oral route)	NA	NA
Cadmium	NA	NA	NA	NA	NA	B1 (Probable human carcinogen)	NA	NA
Chromium[6,10]	5.0E-01	$(mg/kg/day)^{-1}$	0.025	2.0E+01	$(mg/kg/day)^{-1}$	Carcinogenic potential cannot be determined	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Cyanide	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 (Probable human carcinogen)	NA	NA
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Mercury	NA	NA	NA	NA	NA	C (Possible human carcinogen)	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6.1
CANCER TOXICITY DATA - ORAL/DERMAL
LOWER DARBY CREEK AREA
PAGE 3 OF 3

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description[3]	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Silver	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Thallium	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA

Footnotes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Weight of evidence description is the most recent one presented in IRIS.

3 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.

4 - 1,4-Dichlorobenzene is used as a surrogate for 1,3-dichlorobenzene.

5 - See text for a discussion of trichloroethene toxicity.

6 - Trichloroethene, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's for Assessing Susceptibility from Early-Life Exposure to Carcinogens (March 2005).

7 - Alpha-BHC is used as a surrogate for delta-BHC.

8 - Values are for 2,3,7,8-TCDD.

9 - Value is for polychlorinated biphenyls (low risk).

10 - Values are for hexavalent chromium.

Definitions:

IRIS = Integrated Risk Information System.

NA = Not Available.

NJDEP = New Jersey Department of Environmental Protection.

USEPA(1) = USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, 1993b, EPA/600/R-93/089.

Cal EPA = California Environmental Protection Agency, Technical Support Document for Cancer Potency Factors, 2009.

TABLE 6.2
CANCER TOXICITY DATA - INHALATION
LOWER DARBY CREEK AREA
PAGE 1 OF 3

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description[2]	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
1,1,2-Trichloroethane	1.6E-05	$(ug/m^3)^{-1}$	5.6E-02	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	IRIS	7/18/2016
1,1-Dichloroethane	1.6E-06	$(ug/m^3)^{-1}$	5.6E-03	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	Cal EPA	2009
1,2-Dibromo-3-Chloropropane	6.0E-03	$(ug/m^3)^{-1}$	2.1E+01	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	PPRTV	8/3/2006
1,2-Dichloroethane	2.6E-05	$(ug/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
1,2-Dichlorobenzene	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	7/18/2016
1,3-Dichlorobenzene[3]	1.1E-05	$(ug/m^3)^{-1}$	3.9E-02	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	Cal EPA	2009
1,4-Dichlorobenzene	1.1E-05	$(ug/m^3)^{-1}$	3.9E-02	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	Cal EPA	2009
2-Hexanone	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	7/18/2016
Benzene	7.8E-06	$(ug/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	7/18/2016
Chlorobenzene	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Chloroform	2.3E-05	$(ug/m^3)^{-1}$	8.1E-02	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	7/18/2016
Cyclohexane	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential	IRIS	7/18/2016
cis-1,2-Dichloroethene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	7/18/2016
Ethylbenzene	2.5E-06	$(ug/m^3)^{-1}$	8.8E-03	$(mg/kg/day)^{-1}$	D (Not classifiable as to human carcinogenicity)	Cal EPA	2009
m+p-Xylenes	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential	IRIS	7/18/2016
Trichloroethene - (Nonmutagenic)[4]	3.1E-06	$(ug/m^3)^{-1}$	1.1E-02	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	7/18/2016
Trichloroethene - (Mutagenic)[4,5]	1.0E-06	$(ug/m^3)^{-1}$	3.5E-03	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	7/18/2016
Vinyl Chloride	4.4E-06	$(ug/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	7/18/2016
Semivolatile Organic Compounds							
1,4-Dioxane	5.0E-06	$(ug/m^3)^{-1}$	1.8E-02	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	7/18/2016
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential	NA	NA
Benzo(a)anthracene[5]	6.0E-05	$(ug/m^3)^{-1}$	2.1E-01	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Benzo(a)pyrene[5]	6.0E-04	$(ug/m^3)^{-1}$	2.1E+00	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	8/15/2017
Benzo(b)fluoranthene[5]	6.0E-05	$(ug/m^3)^{-1}$	2.1E-01	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Benzo(k)fluoranthene[5]	6.0E-06	$(ug/m^3)^{-1}$	2.1E-02	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Bis(2-chloroethyl)ether	3.3E-04	$(ug/m^3)^{-1}$	1.2E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Bis(2-ethylhexyl)phthalate	2.4E-06	$(ug/m^3)^{-1}$	8.4E-03	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	Cal EPA	2009
Dibenzo(a,h)anthracene[5]	6.0E-04	$(ug/m^3)^{-1}$	2.1E+00	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Dibenzofuran	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA

TABLE 6.2
CANCER TOXICITY DATA - INHALATION
LOWER DARBY CREEK AREA
PAGE 2 OF 3

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description[2]	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Indeno(1,2,3-cd)pyrene[5]	6.0E-05	$(ug/m^3)^{-1}$	2.1E-01	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Naphthalene	3.4E-05	$(ug/m^3)^{-1}$	1.2E-01	$(mg/kg/day)^{-1}$	Carcinogenic potential cannot be determined	Cal EPA	2009
Pentachlorophenol	5.1E-06	$(ug/m^3)^{-1}$	1.8E-02	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	Cal EPA	2009
Phenanthrene	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Dioxin/Furans							
2,3,7,8-TCDD	3.8E+01	$(ug/m^3)^{-1}$	1.3E+05	$(mg/kg/day)^{-1}$	NA	Cal EPA	5/2009
Perfluorinated Compounds							
Pentadecafluorooctanoic Acid	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	NA	NA	NA	NA	NA	NA	NA
Pesticides							
4,4'-DDD	6.9E-05	$(ug/m^3)^{-1}$	2.4E-01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	Cal EPA	2009
4,4'-DDE	9.7E-05	$(ug/m^3)^{-1}$	3.4E-01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	Cal EPA	2009
Aldrin	4.9E-03	$(ug/m^3)^{-1}$	1.7E+01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
beta-BHC	5.3E-04	$(ug/m^3)^{-1}$	1.9E+00	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	IRIS	7/18/2016
delta-BHC[6]	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Dieldrin	4.6E-03	$(ug/m^3)^{-1}$	1.6E+01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
gamma-BHC (Lindane)	3.1E-04	$(ug/m^3)^{-1}$	1.1E+00	$(mg/kg/day)^{-1}$	Not assessed under the IRIS Program	Cal EPA	2009
Heptachlor	1.3E-03	$(ug/m^3)^{-1}$	4.6E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Heptachlor Epoxide	2.6E-03	$(ug/m^3)^{-1}$	9.1E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
PCBs							
Dioxin-Like PCBs[7]	3.8E+01	$(ug/m^3)^{-1}$	1.3E+05	$(mg/kg/day)^{-1}$	NA	Cal EPA	2009
Total PCB Congeners[8]	1.0E-04	$(ug/m^3)^{-1}$	3.5E-01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	7/18/2016
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A (Known human carcinogen)	IRIS	7/18/2016
Barium	NA	NA	NA	NA	Carcinogenic potential cannot be determined	NA	NA
Beryllium	2.4E-03	$(ug/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	7/18/2016
Boron	NA	NA	NA	NA	NA	NA	NA
Cadmium	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1 (Probable human carcinogen)	IRIS	7/18/2016
Chromium[5,9]	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	Known/likely human carcinogen (Inhalation route)	IRIS	7/18/2016
Cobalt	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/2008
Copper	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA

TABLE 6.2
CANCER TOXICITY DATA - INHALATION
LOWER DARBY CREEK AREA
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Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description[2]	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Cyanide	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2 (Probable human carcinogen)	NA	NA
Manganese	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Mercury	NA	NA	NA	NA	C (Possible human carcinogen)	NA	NA
Nickel	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$(mg/kg/day)^{-1}$	NA	Cal EPA	2009
Silver	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Thallium	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA

Footnotes:

1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

2 - Weight of evidence description is the most recent one presented in IRIS.

3 - 1,4-Dichlorobenzene is used as a surrogate for 1,3-dichlorobenzene.

4 - See text for a discussion of trichloroethene toxicity.

5 - Trichloroethene, carcinogenic PAHs and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (March 2005).

6 - Alpha-BHC is used as a surrogate for delta-BHC.

7 - Values are for 2,3,7,8-TCDD.

8 - Value is for polychlorinated biphenyls (low risk).

9 - Values are for hexavalent chromium.

Definitions:

Cal EPA = California Environmental Protection Agency, Technical Support Document for Cancer Potency Factors, 2009.

USEPA(1) = USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, 1993b, EPA/600/R-93/089.

IRIS = Integrated Risk Information System.

NA = Not Available.

PPRTV = Provisional Peer Reviewed Toxicity Value.

RAGS Part D Table 7

Calculation of Cancer Risks and Non-Cancer Hazards

LIST OF TABLES

RAGS PART D TABLE 7

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

Table No.	
	Reasonable Maximum Exposures
7.1.RME	Construction Workers - Groundwater Inside Landfill
7.2.RME	Industrial Workers - Groundwater Inside Landfill
7.3.RME	Child Residents - Groundwater Inside Landfill
7.4.RME	Adult Residents - Groundwater Inside Landfill
7.5.RME	Lifetime Residents - Groundwater Inside Landfill
7.6.RME	Construction Workers - Groundwater Outside Landfill - Shallow Wells
7.7.RME	Industrial Workers - Groundwater Outside Landfill - Shallow Wells
7.8.RME	Child Residents - Groundwater Outside Landfill - Shallow Wells
7.9.RME	Adult Residents - Groundwater Outside Landfill - Shallow Wells
7.10.RME	Lifetime Residents - Groundwater Outside Landfill - Shallow Wells
7.11.RME	Industrial Workers - Groundwater Outside Landfill - Deep Wells
7.12.RME	Child Residents - Groundwater Outside Landfill - Deep Wells
7.13.RME	Adult Residents - Groundwater Outside Landfill - Deep Wells
7.14.RME	Lifetime Residents - Groundwater Outside Landfill - Deep Wells
	Central Tendency Exposures
7.1.CTE	Construction Workers - Groundwater Inside Landfill
7.2.CTE	Industrial Workers - Groundwater Inside Landfill
7.3.CTE	Child Residents - Groundwater Inside Landfill
7.4.CTE	Adult Residents - Groundwater Inside Landfill
7.5.CTE	Lifetime Residents - Groundwater Inside Landfill
7.6.CTE	Construction Workers - Groundwater Outside Landfill - Shallow Wells
7.7.CTE	Industrial Workers - Groundwater Outside Landfill - Shallow Wells
7.8.CTE	Child Residents - Groundwater Outside Landfill - Shallow Wells
7.9.CTE	Adult Residents - Groundwater Outside Landfill - Shallow Wells
7.10.CTE	Lifetime Residents - Groundwater Outside Landfill - Shallow Wells
7.11.CTE	Industrial Workers - Groundwater Outside Landfill - Deep Wells
7.12.CTE	Child Residents - Groundwater Outside Landfill - Deep Wells
7.13.CTE	Adult Residents - Groundwater Outside Landfill - Deep Wells
7.14.CTE	Lifetime Residents - Groundwater Outside Landfill - Deep Wells

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.70E-01	ug/L	5.7E-10	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.1E-12	4.0E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	5.7E-07
				1,4-Dichlorobenzene	1.89E+00	ug/L	1.4E-09	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	7.5E-12	9.7E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.4E-06
				Benzene	1.60E+00	ug/L	1.2E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.5E-11	8.2E-08	(mg/kg/day)	1.0E-02	(mg/kg/day)	8.2E-06
				Chlorobenzene	3.03E+01	ug/L	2.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.2E-05
				Trichloroethene	2.30E+00	ug/L	1.7E-09	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	7.8E-11	1.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.4E-04
				1,4-Dioxane	9.19E+01	ug/L	6.7E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.7E-09	4.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	9.4E-06
				Benzo(a)anthracene	5.55E-01	ug/L	4.1E-10	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.1E-11	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	6.1E-10	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	6.1E-10	4.3E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-04
				Benzo(b)fluoranthene	1.40E+00	ug/L	1.0E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.0E-10	7.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	3.9E-10	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	3.9E-12	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	9.0E-09	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.3E-10	6.3E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)	6.3E-06
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	4.5E-11	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	4.5E-11	3.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	5.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	9.5E-05
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	3.5E-10	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.5E-11	2.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	8.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-08	(mg/kg/day)	6.0E-01	(mg/kg/day)	9.4E-08
				Pentachlorophenol	1.91E-01	ug/L	1.4E-10	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	5.6E-11	9.8E-09	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.0E-06
				Phenanthrene	8.21E+00	ug/L	6.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-07	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.4E-06
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	1.8E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.4E-07	1.3E-10	(mg/kg/day)	2.0E-08	(mg/kg/day)	6.4E-03
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	2.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-08	(mg/kg/day)	2.0E-04	(mg/kg/day)	7.4E-05
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	3.8E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-08	(mg/kg/day)	8.0E-05	(mg/kg/day)	3.3E-04
				4,4'-DDD	1.00E-02	ug/L	7.3E-12	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.8E-12	5.1E-10	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	4.0E-11	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.4E-11	2.8E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	3.4E-11	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	5.9E-10	2.4E-09	(mg/kg/day)	4.0E-05	(mg/kg/day)	6.0E-05
				beta-BHC	4.20E-02	ug/L	3.1E-11	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.5E-11	2.2E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	2.5E-11	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.6E-10	1.7E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	2.2E-07
				Dieldrin	2.20E-02	ug/L	1.6E-11	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.6E-10	1.1E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.1E-05
				Heptachlor	4.90E-03	ug/L	3.6E-12	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.6E-11	2.5E-10	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.0E-07
				Heptachlor Epoxide	9.00E-04	ug/L	6.6E-13	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.0E-12	4.6E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.6E-06
				gamma-BHC (Lindane)	4.40E-02	ug/L	3.2E-11	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.6E-11	2.3E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.5E-06
				Dioxin-Like PCBs	2.50E-04	ug/L	1.8E-13	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.4E-08	1.3E-11	(mg/kg/day)	2.0E-08	(mg/kg/day)	6.4E-04
				Nondioxin-Like PCBs	1.32E+02	ug/L	9.7E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.9E-08	6.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	8.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.9E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	5.9E-04
				Antimony	2.78E+01	ug/L	2.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	3.6E-03
				Arsenic	2.52E+01	ug/L	1.8E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.8E-08	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.3E-03
				Barium	1.22E+03	ug/L	9.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.1E-04
				Beryllium	8.00E+00	ug/L	5.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.2E-05
				Boron	2.35E+03	ug/L	1.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	6.0E-04
				Cadmium	2.19E+01	ug/L	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.3E-03
				Chromium	1.51E+02	ug/L	1.1E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	5.5E-08	7.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.6E-03
				Cobalt	1.26E+01	ug/L	9.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.2E-04
				Copper	2.80E+02	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	3.6E-04
				Cyanide	1.08E+02	ug/L	7.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.8E-04
				Iron	5.29E+04	ug/L	3.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	3.9E-03
				Lead	2.26E+02	ug/L	1.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	3.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	9.9E-03
				Mercury	8.20E+00	ug/L	6.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	2.8E-07
				Nickel	1.32E+02	ug/L	9.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.4E-04
				Silver	2.63E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.7E-04
				Thallium	2.90E+00	ug/L	2.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	9.07E+01	ug/L	6.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	4.7E-04
				Zinc	1.63E+03	ug/L	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.8E-04
			Exp. Route Total								3.9E-07					3.7E-02

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.70E-01	ug/L	1.9E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.0E-10	1.3E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.9E-05
				1,4-Dichlorobenzene	1.89E+00	ug/L	3.7E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.0E-10	2.6E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	3.7E-05
				Benzene	1.60E+00	ug/L	1.0E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.6E-10	7.1E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	7.1E-05
				Chlorobenzene	3.03E+01	ug/L	3.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	3.6E-04
				Trichloroethene	2.30E+00	ug/L	1.2E-08	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	5.6E-10	8.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.7E-03
				1,4-Dioxane	9.19E+01	ug/L	1.4E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.4E-09	9.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	1.9E-06
				Benzo(a)anthracene	5.55E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.40E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E-01	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	3.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.2E-03
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	2.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-06	(mg/kg/day)	6.0E-01	(mg/kg/day)	2.5E-06
				Pentachlorophenol	1.91E-01	ug/L	1.6E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.4E-09	1.1E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.2E-04
				Phenanthrene	8.21E+00	ug/L	4.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.1E-04
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-04	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	8.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.00E-02	ug/L	2.1E-09	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	5.0E-10	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-05	(mg/kg/day)	--
				beta-BHC	4.20E-02	ug/L	6.7E-10	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.2E-09	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	5.3E-10	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	3.3E-09	3.7E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	4.6E-06
				Dieldrin	2.20E-02	ug/L	8.8E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.4E-08	6.1E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	6.1E-04
				Heptachlor	4.90E-03	ug/L	8.2E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.7E-09	5.7E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E-04
				Heptachlor Epoxide	9.00E-04	ug/L	2.4E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.2E-10	1.7E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.3E-04
				gamma-BHC (Lindane)	4.40E-02	ug/L	7.0E-10	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	7.7E-10	4.9E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.6E-04
				Dioxin-Like PCBs	2.50E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.32E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	4.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	3.3E-04
				Antimony	2.78E+01	ug/L	1.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.3E-02
				Arsenic	2.52E+01	ug/L	1.0E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.6E-08	7.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.4E-03
				Barium	1.22E+03	ug/L	5.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	2.5E-03
				Beryllium	8.00E+00	ug/L	3.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-07	(mg/kg/day)	3.5E-05	(mg/kg/day)	6.6E-03
				Boron	2.35E+03	ug/L	9.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.4E-04
				Cadmium	2.19E+01	ug/L	9.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	2.5E-02
				Chromium	1.51E+02	ug/L	6.3E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.3E-06	4.4E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	3.5E-02
				Cobalt	1.26E+01	ug/L	2.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	4.9E-05
				Copper	2.80E+02	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.0E-04
				Cyanide	1.08E+02	ug/L	4.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.6E-04
				Iron	5.29E+04	ug/L	2.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.2E-03
				Lead	2.26E+02	ug/L	9.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.4E-01
				Mercury	8.20E+00	ug/L	3.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.6E-07
				Nickel	1.32E+02	ug/L	1.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.7E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	9.6E-04
				Silver	2.63E+01	ug/L	6.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.6E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	2.3E-03
				Thallium	2.90E+00	ug/L	1.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	9.07E+01	ug/L	3.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	2.6E-04	(mg/kg/day)	1.0E-02
				Zinc	1.63E+03	ug/L	4.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	9.4E-05
			Exp. Route Total								1.3E-06					2.5E-01
		Exposure Point Total									1.7E-06					2.9E-01
	Exposure Medium Total										1.7E-06					2.9E-01

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Trench	Inside Landfill	Inhalation	1,3-Dichlorobenzene	4.97E-03	mg/m^3	1.9E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	2.1E-08	1.4E-04	(mg/m^3)	1.2E+00	(mg/m^3)	1.1E-04
				1,4-Dichlorobenzene	1.22E-02	mg/m^3	4.8E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	5.2E-08	3.3E-04	(mg/m^3)	1.2E+00	(mg/m^3)	2.8E-04
				Benzene	1.43E-02	mg/m^3	5.6E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	4.4E-08	3.9E-04	(mg/m^3)	8.0E-02	(mg/m^3)	4.9E-03
				Chlorobenzene	2.24E-01	mg/m^3	8.8E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	6.1E-03	(mg/m^3)	5.0E-01	(mg/m^3)	1.2E-02
				Trichloroethene	1.59E-02	mg/m^3	6.2E-06	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	2.6E-08	4.4E-04	(mg/m^3)	2.0E-03	(mg/m^3)	2.2E-01
				1,4-Dioxane	6.02E-02	mg/m^3	2.4E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.2E-07	1.6E-03	(mg/m^3)	7.2E-01	(mg/m^3)	2.3E-03
				Benzo(a)anthracene	5.75E-04	mg/m^3	2.3E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	1.4E-08	1.6E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	3.67E-02	mg/m^3	1.4E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.0E-03	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	6.91E-03	mg/m^3	2.7E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	9.2E-08	1.9E-04	(mg/m^3)	3.0E-03	(mg/m^3)	6.3E-02
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	2.22E-02	mg/m^3	8.7E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	6.1E-04	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	5.77E-06	mg/m^3	2.3E-09	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	8.6E-05	1.6E-07	(mg/m^3)	4.0E-08	(mg/m^3)	3.9E+00
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	1.16E-04	mg/m^3	4.5E-08	(mg/m^3)	9.7E-05	(ug/m^3)$^{-1}$	4.4E-09	3.2E-06	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	9.66E-05	mg/m^3	3.8E-08	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.9E-07	2.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.75E-05	mg/m^3	6.9E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	8.9E-09	4.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.16E-06	mg/m^3	4.5E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	1.2E-09	3.2E-08	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	1.05E-06	mg/m^3	4.1E-10	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	1.6E-05	2.9E-08	(mg/m^3)	4.0E-08	(mg/m^3)	7.2E-01
				Nondioxin-Like PCBs	5.54E-01	mg/m^3	2.2E-04	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	2.2E-05	1.5E-02	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Beryllium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	3.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.69E+00	mg/m^3	6.6E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	4.6E-02	(mg/m^3)	8.0E-04	(mg/m^3)	5.8E+01
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-04	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								1.2E-04					6.3E+01
		Exposure Point Total									1.2E-04					6.3E+01
	Exposure Medium Total										1.2E-04					6.3E+01
Medium Total											1.3E-04					6.3E+01
										Total of Receptor Risks Across All Media	1E-04			Total of Receptor Hazards Across All Media		6E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.7E-01	ug/L	2.4E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.3E-10	6.6E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	9.4E-07
				1,4-Dichlorobenzene	1.9E+00	ug/L	5.8E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.1E-10	1.6E-07	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.3E-06
				Benzene	1.6E+00	ug/L	4.9E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.7E-09	1.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.4E-05
				Chlorobenzene	3.0E+01	ug/L	9.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.3E-04
				Trichloroethene	2.3E+00	ug/L	7.0E-08	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	3.2E-09	2.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.9E-04
				1,4-Dioxane	9.2E+01	ug/L	2.8E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.8E-07	7.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.6E-04
				Benzo(a)anthracene	5.6E-01	ug/L	1.7E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.7E-09	4.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	2.5E-08	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.5E-08	7.1E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.4E-04
				Benzo(b)fluoranthene	1.4E+00	ug/L	4.3E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.3E-09	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	1.6E-08	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	1.6E-10	4.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	3.7E-07	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	5.2E-09	1.0E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.2E-05
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	1.9E-09	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.9E-09	5.2E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	2.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-07	(mg/kg/day)	1.0E-03	(mg/kg/day)	6.3E-04
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	1.5E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.5E-09	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	3.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.4E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.7E-06
				Pentachlorophenol	1.9E-01	ug/L	5.8E-09	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.3E-09	1.6E-08	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.3E-06
				Phenanthrene	8.2E+00	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.3E-05
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	7.6E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	9.9E-06	2.1E-10	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.1E-01
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	8.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.2E-03
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.2E-03
				4,4'-DDD	1.0E-02	ug/L	3.1E-10	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	7.3E-11	8.6E-10	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	1.7E-09	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	5.7E-10	4.7E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	1.4E-09	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	2.4E-08	4.0E-09	(mg/kg/day)	3.0E-05	(mg/kg/day)	1.3E-04
				beta-BHC	4.2E-02	ug/L	1.3E-09	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	2.3E-09	3.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	1.0E-09	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	6.5E-09	2.9E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.6E-07
				Dieldrin	2.2E-02	ug/L	6.7E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.1E-08	1.9E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.8E-05
				Heptachlor	4.9E-03	ug/L	1.5E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	6.7E-10	4.2E-10	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.4E-07
				Heptachlor Epoxide	9.0E-04	ug/L	2.8E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.5E-10	7.7E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	5.9E-06
				gamma-BHC (Lindane)	4.4E-02	ug/L	1.3E-09	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.5E-09	3.8E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3E-05
				Dioxin-Like PCBs	2.5E-04	ug/L	7.6E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	9.9E-07	2.1E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.1E-02
				Nondioxin-Like PCBs	1.3E+02	ug/L	4.0E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.6E-06	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.9E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	9.9E-04
				Antimony	2.8E+01	ug/L	8.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	6.0E-03
				Arsenic	2.5E+01	ug/L	7.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-06	2.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.2E-03
				Barium	1.2E+03	ug/L	3.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.2E-04
				Beryllium	8.0E+00	ug/L	2.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.4E-04
				Boron	2.4E+03	ug/L	7.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.0E-03
				Cadmium	2.2E+01	ug/L	6.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.8E-03
				Chromium	1.5E+02	ug/L	4.6E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.3E-06	1.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	4.3E-03
				Cobalt	1.3E+01	ug/L	3.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.6E-03
				Copper	2.8E+02	ug/L	8.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	6.0E-04
				Cyanide	1.1E+02	ug/L	3.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.2E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.5E-02
				Iron	5.3E+04	ug/L	1.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	6.5E-03
				Lead	2.3E+02	ug/L	6.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	1.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.7E-02
				Mercury	8.2E+00	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	7.0E-03
				Nickel	1.3E+02	ug/L	4.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.7E-04
				Silver	2.6E+01	ug/L	8.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.5E-04
				Thallium	2.9E+00	ug/L	8.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	2.5E-02
				Vanadium	9.1E+01	ug/L	2.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.6E-03
				Zinc	1.6E+03	ug/L	5.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	4.6E-04
			Exp. Route Total								1.6E-05					4.4E-01

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	1,3-Dichlorobenzene	7.7E-01	ug/L	3.5E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.9E-08	9.7E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.4E-04
				1,4-Dichlorobenzene	1.9E+00	ug/L	6.8E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.7E-08	1.9E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.7E-04
				Benzene	1.6E+00	ug/L	1.8E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	9.9E-08	5.0E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.3E-03
				Chlorobenzene	3.0E+01	ug/L	6.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	9.3E-03
				Trichloroethene	2.3E+00	ug/L	2.2E-06	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	1.0E-07	6.3E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.3E-02
				1,4-Dioxane	9.2E+01	ug/L	2.8E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.8E-07	7.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.6E-04
				Benzo(a)anthracene	5.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	5.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	1.7E-01
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	4.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.7E-04
				Pentachlorophenol	1.9E-01	ug/L	3.3E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.3E-06	9.3E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.9E-03
				Phenanthrene	8.2E+00	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	9.4E-03
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.0E-02	ug/L	4.3E-07	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.0E-07	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	4.2E-02	ug/L	1.4E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	2.5E-07	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	1.1E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	6.9E-07	3.1E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.8E-05
				Dieldrin	2.2E-02	ug/L	1.8E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.9E-06	5.1E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.0E-02
				Heptachlor	4.9E-03	ug/L	1.6E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	7.3E-07	4.6E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	9.1E-04
				Heptachlor Epoxide	9.0E-04	ug/L	5.0E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.6E-08	1.4E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.1E-03
				gamma-BHC (Lindane)	4.4E-02	ug/L	1.5E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.6E-07	4.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-03
				Dioxin-Like PCBs	2.5E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	9.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.8E-03
				Antimony	2.8E+01	ug/L	2.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.1E-01
				Arsenic	2.5E+01	ug/L	2.2E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.3E-06	6.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.0E-02
				Barium	1.2E+03	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	2.1E-02
				Beryllium	8.0E+00	ug/L	6.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	1.4E-05	(mg/kg/day)	1.4E-01
				Boron	2.4E+03	ug/L	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.8E-03
				Cadmium	2.2E+01	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-06	(mg/kg/day)	2.5E-05	(mg/kg/day)	2.1E-01
				Chromium	1.5E+02	ug/L	1.3E-05	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.6E-04	3.6E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	4.9E-01
				Cobalt	1.3E+01	ug/L	4.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.1E-03
				Copper	2.8E+02	ug/L	2.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.7E-03
				Cyanide	1.1E+02	ug/L	7.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-05	(mg/kg/day)	6.0E-04	(mg/kg/day)	3.3E-02
				Iron	5.3E+04	ug/L	4.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.8E-02
				Lead	2.3E+02	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	4.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.2E+00
				Mercury	8.2E+00	ug/L	7.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	2.0E-02
				Nickel	1.3E+02	ug/L	2.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.4E-06	(mg/kg/day)	8.0E-04	(mg/kg/day)	8.0E-03
				Silver	2.6E+01	ug/L	1.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.9E-02
				Thallium	2.9E+00	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	7.0E-02
				Vanadium	9.1E+01	ug/L	7.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-05	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.7E-01
				Zinc	1.6E+03	ug/L	8.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	7.9E-04
			Exp. Route Total								2.7E-04					2.7E+00
		Exposure Point Total									2.9E-04					3.2E+00
	Exposure Medium Total										2.9E-04					3.2E+00

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air-Trench	Inside Landfill	Inhalation	1,3-Dichlorobenzene	5.0E-03	mg/m^3	4.9E-05	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	5.4E-07	1.4E-04	(mg/m^3)	8.0E-01	(mg/m^3)	1.7E-04
				1,4-Dichlorobenzene	1.2E-02	mg/m^3	1.2E-04	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	1.3E-06	3.3E-04	(mg/m^3)	8.0E-01	(mg/m^3)	4.2E-04
				Benzene	1.4E-02	mg/m^3	1.4E-04	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.1E-06	3.9E-04	(mg/m^3)	3.0E-02	(mg/m^3)	1.3E-02
				Chlorobenzene	2.2E-01	mg/m^3	2.2E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.1E-03	(mg/m^3)	5.0E-02	(mg/m^3)	1.2E-01
				Trichloroethene	1.6E-02	mg/m^3	1.6E-04	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	6.4E-07	4.4E-04	(mg/m^3)	2.0E-03	(mg/m^3)	2.2E-01
				1,4-Dioxane	6.0E-02	mg/m^3	5.9E-04	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	2.9E-06	1.6E-03	(mg/m^3)	3.0E-02	(mg/m^3)	5.5E-02
				Benzo(a)anthracene	5.8E-04	mg/m^3	5.6E-06	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	3.4E-07	1.6E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	3.7E-02	mg/m^3	3.6E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.0E-03	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	6.9E-03	mg/m^3	6.8E-05	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	2.3E-06	1.9E-04	(mg/m^3)	3.0E-03	(mg/m^3)	6.3E-02
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	2.2E-02	mg/m^3	2.2E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.1E-04	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	5.8E-06	mg/m^3	5.6E-08	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	2.1E-03	1.6E-07	(mg/m^3)	4.0E-08	(mg/m^3)	3.9E+00
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	1.2E-04	mg/m^3	1.1E-06	(mg/m^3)	9.7E-05	$(ug/m^3)^{-1}$	1.1E-07	3.2E-06	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	9.7E-05	mg/m^3	9.4E-07	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	4.6E-06	2.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.8E-05	mg/m^3	1.7E-07	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	2.2E-07	4.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.2E-06	mg/m^3	1.1E-08	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	2.9E-08	3.2E-08	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	1.0E-06	mg/m^3	1.0E-08	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	3.9E-04	2.9E-08	(mg/m^3)	4.0E-08	(mg/m^3)	7.2E-01
				Nondioxin-Like PCBs	5.5E-01	mg/m^3	5.4E-03	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	5.4E-04	1.5E-02	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.7E+00	mg/m^3	1.6E-02	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.6E-02	(mg/m^3)	8.0E-04	(mg/m^3)	5.8E+01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								3.1E-03					6.3E+01
		Exposure Point Total									3.1E-03					6.3E+01
	Exposure Medium Total										3.1E-03					6.3E+01
Medium Total											3.4E-03					6.6E+01

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air -Irrigation	Inside Landfill	Inhalation	1,3-Dichlorobenzene	1.8E-05	mg/m^3	1.5E-06	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	1.6E-08	4.1E-06	(mg/m^3)	8.0E-01	(mg/m^3)	5.1E-06
				1,4-Dichlorobenzene	4.4E-05	mg/m^3	3.5E-06	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	3.9E-08	9.9E-06	(mg/m^3)	8.0E-01	(mg/m^3)	1.2E-05
				Benzene	4.2E-05	mg/m^3	3.4E-06	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	2.7E-08	9.5E-06	(mg/m^3)	3.0E-02	(mg/m^3)	3.2E-04
				Chlorobenzene	7.3E-04	mg/m^3	5.9E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.7E-04	(mg/m^3)	5.0E-02	(mg/m^3)	3.3E-03
				Trichloroethene	6.5E-05	mg/m^3	5.3E-06	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	2.2E-08	1.5E-05	(mg/m^3)	2.0E-03	(mg/m^3)	7.4E-03
				1,4-Dioxane	1.3E-05	mg/m^3	1.1E-06	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	5.3E-09	3.0E-06	(mg/m^3)	3.0E-02	(mg/m^3)	9.9E-05
				Benzo(a)anthracene	2.0E-06	mg/m^3	1.6E-07	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	9.5E-09	4.5E-07	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	1.0E-04	mg/m^3	8.5E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.4E-05	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	1.8E-05	mg/m^3	1.5E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	5.1E-08	4.2E-06	(mg/m^3)	3.0E-03	(mg/m^3)	1.4E-03
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	6.7E-05	mg/m^3	5.5E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.5E-05	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.2E-08	mg/m^3	1.8E-09	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	6.8E-05	5.0E-09	(mg/m^3)	4.0E-08	(mg/m^3)	1.3E-01
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	4.4E-07	mg/m^3	3.6E-08	(mg/m^3)	9.7E-05	$(ug/m^3)^{-1}$	3.5E-09	1.0E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	3.9E-07	mg/m^3	3.2E-08	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	1.6E-07	8.9E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	7.5E-08	mg/m^3	6.1E-09	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	7.9E-09	1.7E-08	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	5.0E-09	mg/m^3	4.1E-10	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	1.1E-09	1.1E-09	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	4.1E-09	mg/m^3	3.4E-10	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	1.3E-05	9.4E-10	(mg/m^3)	4.0E-08	(mg/m^3)	2.4E-02
				Nondioxin-Like PCBs	2.2E-03	mg/m^3	1.8E-04	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	1.8E-05	5.0E-04	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	3.4E-03	mg/m^3	2.8E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.8E-04	(mg/m^3)	8.0E-04	(mg/m^3)	9.7E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								9.9E-05					1.1E+00
		Exposure Point Total									9.9E-05					1.1E+00
	Exposure Medium Total										9.9E-05					1.1E+00
Medium Total											9.9E-05					1.1E+00

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Showering	Inside Landfill	Inhalation	1,3-Dichlorobenzene	4.3E-06	mg/m^3	1.1E-06	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	1.2E-08	3.0E-06	(mg/m^3)	8.0E-01	(mg/m^3)	3.7E-06
				1,4-Dichlorobenzene	1.1E-05	mg/m^3	2.6E-06	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	2.8E-08	7.2E-06	(mg/m^3)	8.0E-01	(mg/m^3)	9.0E-06
				Benzene	1.3E-05	mg/m^3	3.1E-06	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	2.4E-08	8.7E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.9E-04
				Chlorobenzene	2.0E-04	mg/m^3	4.8E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.3E-04	(mg/m^3)	5.0E-02	(mg/m^3)	2.7E-03
				Trichloroethene	1.5E-05	mg/m^3	3.6E-06	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	1.5E-08	1.0E-05	(mg/m^3)	2.0E-03	(mg/m^3)	5.0E-03
				1,4-Dioxane	1.5E-05	mg/m^3	3.6E-06	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	1.8E-08	1.0E-05	(mg/m^3)	3.0E-02	(mg/m^3)	3.3E-04
				Benzo(a)anthracene	1.3E-07	mg/m^3	3.2E-08	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	1.9E-09	9.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	2.0E-05	mg/m^3	4.9E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.4E-05	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	4.7E-06	mg/m^3	1.1E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	3.9E-08	3.2E-06	(mg/m^3)	3.0E-03	(mg/m^3)	1.1E-03
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	7.0E-06	mg/m^3	1.7E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.8E-06	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	1.8E-09	mg/m^3	4.5E-10	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	1.7E-05	1.2E-09	(mg/m^3)	4.0E-08	(mg/m^3)	3.1E-02
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	3.5E-08	mg/m^3	8.4E-09	(mg/m^3)	9.7E-05	$(ug/m^3)^{-1}$	8.2E-10	2.4E-08	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	2.9E-08	mg/m^3	7.1E-09	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	3.5E-08	2.0E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.1E-08	mg/m^3	2.6E-09	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	3.4E-09	7.3E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	2.8E-10	mg/m^3	6.8E-11	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	1.8E-10	1.9E-10	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	7.0E-10	mg/m^3	1.7E-10	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	6.5E-06	4.8E-10	(mg/m^3)	4.0E-08	(mg/m^3)	1.2E-02
				Nondioxin-Like PCBs	3.7E-04	mg/m^3	9.1E-05	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	9.1E-06	2.5E-04	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.4E-03	mg/m^3	3.5E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.9E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.2E+00
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								3.3E-05					1.3E+00
		Exposure Point Total									3.3E-05					1.3E+00
	Exposure Medium Total										3.3E-05					1.3E+00
Medium Total											3.3E-05					1.3E+00
										Total of Receptor Risks Across All Media	4E-03			Total of Receptor Hazards Across All Media		7E+01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.70E-01	ug/L	3.3E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.8E-08	3.8E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	5.5E-04
				1,4-Dichlorobenzene	1.89E+00	ug/L	8.1E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	4.4E-08	9.4E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.3E-03
				Benzene	1.60E+00	ug/L	6.8E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.8E-07	8.0E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.0E-02
				Chlorobenzene	3.03E+01	ug/L	1.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-03	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.6E-02
				Trichloroethene (Kidney)	2.30E+00	ug/L	5.2E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	4.9E-07	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.30E+00	ug/L	9.8E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	3.6E-07	1.1E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.3E-01
				1,4-Dioxane	9.19E+01	ug/L	3.9E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.9E-05	4.6E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.5E-01
				Benzo(a)anthracene	5.55E-01	ug/L	1.3E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.3E-06	2.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	1.9E-05	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.9E-05	4.1E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-01
				Benzo(b)fluoranthene	1.40E+00	ug/L	3.2E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.2E-06	7.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	1.2E-05	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	1.2E-07	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	5.2E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	7.3E-07	6.1E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.0E-02
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	1.4E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.4E-06	3.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	3.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	3.7E-01
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	1.1E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.1E-06	2.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	4.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.7E-03
				Pentachlorophenol	1.91E-01	ug/L	8.2E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.3E-07	9.5E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.9E-03
				Phenanthrene	8.21E+00	ug/L	3.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.4E-02
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	1.1E-08	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.4E-03	1.2E-07	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.8E+02
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	7.2E-01
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	2.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.3E+00
				4,4'-DDD	1.00E-02	ug/L	4.3E-08	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.0E-08	5.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	2.4E-07	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	8.0E-08	2.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	2.0E-07	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	3.4E-06	2.3E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	7.8E-02
				beta-BHC	4.20E-02	ug/L	1.8E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	3.2E-07	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	1.5E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	9.2E-07	1.7E-06	(mg/kg/day)	8.0E-03	(mg/kg/day)	2.1E-04
				Dieldrin	2.20E-02	ug/L	9.4E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.5E-06	1.1E-06	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.2E-02
				Heptachlor	4.90E-03	ug/L	2.1E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	9.4E-08	2.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.9E-04
				Heptachlor Epoxide	9.00E-04	ug/L	3.8E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	3.5E-08	4.5E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.5E-03
				gamma-BHC (Lindane)	4.40E-02	ug/L	1.9E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	2.1E-07	2.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.3E-03
				Dioxin-Like PCBs	2.50E-04	ug/L	1.1E-09	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.4E-04	1.2E-08	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.8E+01
				Nondioxin-Like PCBs	1.32E+02	ug/L	5.6E-04	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.3E-04	6.6E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	4.9E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	5.7E-01
				Antimony	2.78E+01	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-03	(mg/kg/day)	4.0E-04	(mg/kg/day)	3.5E+00
				Arsenic	2.52E+01	ug/L	1.1E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.6E-04	1.3E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.2E+00
				Barium	1.22E+03	ug/L	5.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.1E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.0E-01
				Beryllium	8.00E+00	ug/L	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.0E-01
				Boron	2.35E+03	ug/L	1.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-01	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.9E-01
				Cadmium	2.19E+01	ug/L	9.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.2E+00
				Chromium	1.51E+02	ug/L	3.4E-03	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.7E-03	7.5E-03	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.5E+00
				Cobalt	1.26E+01	ug/L	5.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.1E+00
				Copper	2.80E+02	ug/L	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-02	(mg/kg/day)	4.0E-02	(mg/kg/day)	3.5E-01
				Cyanide	1.08E+02	ug/L	4.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-03	(mg/kg/day)	6.0E-04	(mg/kg/day)	9.0E+00
				Iron	5.29E+04	ug/L	2.3E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	3.8E+00
				Lead	2.26E+02	ug/L	9.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-02	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	2.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	9.6E+00
				Mercury	8.20E+00	ug/L	3.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-04	(mg/kg/day)	1.0E-04	(mg/kg/day)	4.1E+00
				Nickel	1.32E+02	ug/L	5.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-03	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.3E-01
				Silver	2.63E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-03	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.6E-01
				Thallium	2.90E+00	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-04	(mg/kg/day)	1.0E-05	(mg/kg/day)	1.4E+01
				Vanadium	9.07E+01	ug/L	3.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-03	(mg/kg/day)	5.0E-03	(mg/kg/day)	9.0E-01
				Zinc	1.63E+03	ug/L	6.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-02	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.7E-01
			Exp. Route Total								3.7E-03					2.6E+02

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.70E-01	ug/L	2.7E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.4E-08	3.1E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	4.4E-04
				1,4-Dichlorobenzene	1.89E+00	ug/L	5.1E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.7E-08	5.9E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	8.5E-04
				Benzene	1.60E+00	ug/L	9.1E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.0E-08	1.1E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.6E-03
				Chlorobenzene	3.03E+01	ug/L	4.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.4E-02
				Trichloroethene (Kidney)	2.30E+00	ug/L	7.6E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	7.1E-08	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.30E+00	ug/L	1.4E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	5.3E-08	1.7E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.3E-02
				1,4-Dioxane	9.19E+01	ug/L	1.2E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.2E-07	1.4E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	4.8E-04
				Benzo(a)anthracene	5.55E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.40E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	4.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	5.7E-01
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	2.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.6E-03
				Pentachlorophenol	1.91E-01	ug/L	2.8E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.1E-06	3.3E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	6.5E-03
				Phenanthrene	8.21E+00	ug/L	8.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.4E-02
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.00E-02	ug/L	3.6E-07	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	8.7E-08	4.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	4.20E-02	ug/L	1.2E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	2.1E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	9.2E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	5.8E-07	1.1E-06	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.3E-04
				Dieldrin	2.20E-02	ug/L	1.5E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.5E-06	1.8E-06	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.6E-02
				Heptachlor	4.90E-03	ug/L	1.4E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	6.4E-07	1.7E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.3E-03
				Heptachlor Epoxide	9.00E-04	ug/L	4.3E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	3.9E-08	5.0E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.8E-03
				gamma-BHC (Lindane)	4.40E-02	ug/L	1.2E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.3E-07	1.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.8E-03
				Dioxin-Like PCBs	2.50E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.32E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.5E-03
				Antimony	2.78E+01	ug/L	5.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.1E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.0E-01
				Arsenic	2.52E+01	ug/L	4.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.1E-07	5.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.8E-02
				Barium	1.22E+03	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.9E-02
				Beryllium	8.00E+00	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-06	(mg/kg/day)	1.4E-05	(mg/kg/day)	1.3E-01
				Boron	2.35E+03	ug/L	4.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.2E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.6E-03
				Cadmium	2.19E+01	ug/L	4.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-06	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.9E-01
				Chromium	1.51E+02	ug/L	1.5E-05	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	3.0E-04	3.3E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	4.4E-01
				Cobalt	1.26E+01	ug/L	9.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.7E-03
				Copper	2.80E+02	ug/L	5.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.5E-03
				Cyanide	1.08E+02	ug/L	2.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	6.0E-04	(mg/kg/day)	4.0E-02
				Iron	5.29E+04	ug/L	1.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.7E-02
				Lead	2.26E+02	ug/L	4.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	8.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.1E+00
				Mercury	8.20E+00	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.8E-02
				Nickel	1.32E+02	ug/L	5.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-06	(mg/kg/day)	8.0E-04	(mg/kg/day)	7.3E-03
				Silver	2.63E+01	ug/L	3.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.7E-02
				Thallium	2.90E+00	ug/L	5.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.4E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	6.4E-02
				Vanadium	9.07E+01	ug/L	1.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-05	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.5E-01
				Zinc	1.63E+03	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	7.1E-04
			Exp. Route Total								3.1E-04					3.0E+00
		Exposure Point Total									4.0E-03					2.6E+02
	Exposure Medium Total										4.0E-03					2.6E+02
Medium Total											4.0E-03					2.6E+02
										Total of Receptor Risks Across All Media	4E-03			Total of Receptor Hazards Across All Media		3E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.7E-01	ug/L	6.6E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.6E-08	2.3E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	3.3E-04
				1,4-Dichlorobenzene	1.9E+00	ug/L	1.6E-05	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	8.7E-08	5.7E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	8.1E-04
				Benzene	1.6E+00	ug/L	1.4E-05	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	7.5E-07	4.8E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.2E-02
				Chlorobenzene	3.0E+01	ug/L	2.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.1E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.5E-02
				Trichloroethene (Kidney)	2.3E+00	ug/L	3.9E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	3.7E-07	6.9E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	2.0E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	7.3E-07	6.9E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.4E-01
				1,4-Dioxane	9.2E+01	ug/L	7.9E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.9E-05	2.8E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	9.2E-02
				Benzo(a)anthracene	5.6E-01	ug/L	9.5E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	9.5E-07	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	1.4E-05	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.4E-05	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.3E-02
				Benzo(b)fluoranthene	1.4E+00	ug/L	2.4E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.4E-06	4.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	9.1E-06	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	9.1E-08	1.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	1.0E-04	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.5E-06	3.7E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.8E-02
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	1.0E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.0E-06	1.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	6.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	2.2E-01
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	8.2E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.2E-07	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	9.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.6E-03
				Pentachlorophenol	1.9E-01	ug/L	1.6E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.5E-07	5.7E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.1E-03
				Phenanthrene	8.2E+00	ug/L	7.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	8.2E-03
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	2.1E-08	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.8E-03	7.5E-08	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.1E+02
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	2.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	4.3E-01
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	4.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	7.8E-01
				4,4'-DDD	1.0E-02	ug/L	8.6E-08	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	2.1E-08	3.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	4.7E-07	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.6E-07	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	4.0E-07	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	6.8E-06	1.4E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	4.7E-02
				beta-BHC	4.2E-02	ug/L	3.6E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	6.5E-07	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	2.9E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.8E-06	1.0E-06	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.3E-04
				Dieldrin	2.2E-02	ug/L	1.9E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.0E-06	6.6E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.3E-02
				Heptachlor	4.9E-03	ug/L	4.2E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.9E-07	1.5E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.9E-04
				Heptachlor Epoxide	9.0E-04	ug/L	7.7E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	7.0E-08	2.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	2.1E-03
				gamma-BHC (Lindane)	4.4E-02	ug/L	3.8E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	4.1E-07	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.4E-03
				Dioxin-Like PCBs	2.5E-04	ug/L	2.1E-09	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.8E-04	7.5E-09	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.1E+01
				Nondioxin-Like PCBs	1.3E+02	ug/L	1.1E-03	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	4.5E-04	4.0E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	9.9E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	3.5E-01
				Antimony	2.8E+01	ug/L	2.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.3E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	2.1E+00
				Arsenic	2.5E+01	ug/L	2.2E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.2E-04	7.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5E+00
				Barium	1.2E+03	ug/L	1.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.8E-01
				Beryllium	8.0E+00	ug/L	6.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.2E-01
				Boron	2.4E+03	ug/L	2.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.5E-01
				Cadmium	2.2E+01	ug/L	1.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.3E+00
				Chromium	1.5E+02	ug/L	2.6E-03	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.3E-03	4.5E-03	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.5E+00
				Cobalt	1.3E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3E+00
				Copper	2.8E+02	ug/L	2.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.1E-01
				Cyanide	1.1E+02	ug/L	9.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-03	(mg/kg/day)	6.0E-04	(mg/kg/day)	5.4E+00
				Iron	5.3E+04	ug/L	4.5E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.3E+00
				Lead	2.3E+02	ug/L	1.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	4.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	5.8E+00
				Mercury	8.2E+00	ug/L	7.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	1.0E-04	(mg/kg/day)	2.5E+00
				Nickel	1.3E+02	ug/L	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-03	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.0E-01
				Silver	2.6E+01	ug/L	2.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.9E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.6E-01
				Thallium	2.9E+00	ug/L	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-05	(mg/kg/day)	1.0E-05	(mg/kg/day)	8.7E+00
				Vanadium	9.1E+01	ug/L	7.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.4E-01
				Zinc	1.6E+03	ug/L	1.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-02	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.6E-01
			Exp. Route Total								5.2E-03					1.6E+02

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.7E-01	ug/L	5.3E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.8E-08	1.8E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.6E-04
				1,4-Dichlorobenzene	1.9E+00	ug/L	1.0E-05	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	5.4E-08	3.5E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	5.0E-04
				Benzene	1.6E+00	ug/L	1.7E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	9.6E-08	6.1E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.5E-03
				Chlorobenzene	3.0E+01	ug/L	7.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.4E-02
				Trichloroethene (Kidney)	2.3E+00	ug/L	5.6E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	5.2E-08	9.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	2.8E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.0E-07	9.8E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.0E-02
				1,4-Dioxane	9.2E+01	ug/L	2.7E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.7E-07	9.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.2E-04
				Benzo(a)anthracene	5.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	3.6E-01
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	5.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	9.6E-04
				Pentachlorophenol	1.9E-01	ug/L	6.2E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.5E-06	2.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.3E-03
				Phenanthrene	8.2E+00	ug/L	1.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.2E-02
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.0E-02	ug/L	8.0E-07	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.9E-07	2.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	4.2E-02	ug/L	2.6E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.6E-07	9.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	2.0E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.3E-06	7.1E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	8.9E-05
				Dieldrin	2.2E-02	ug/L	3.4E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	5.4E-06	1.2E-06	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.4E-02
				Heptachlor	4.9E-03	ug/L	3.0E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.4E-06	1.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.1E-03
				Heptachlor Epoxide	9.0E-04	ug/L	9.4E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	8.5E-08	3.3E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	2.5E-03
				gamma-BHC (Lindane)	4.4E-02	ug/L	2.7E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.0E-07	9.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.2E-03
				Dioxin-Like PCBs	2.5E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	5.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.9E-03
				Antimony	2.8E+01	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.6E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	7.7E-02
				Arsenic	2.5E+01	ug/L	1.2E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.8E-06	4.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-02
				Barium	1.2E+03	ug/L	5.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.5E-02
				Beryllium	8.0E+00	ug/L	3.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	1.4E-05	(mg/kg/day)	9.6E-02
				Boron	2.4E+03	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.0E-03
				Cadmium	2.2E+01	ug/L	1.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-06	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.5E-01
				Chromium	1.5E+02	ug/L	1.4E-05	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.9E-04	2.5E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	3.4E-01
				Cobalt	1.3E+01	ug/L	2.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.8E-03
				Copper	2.8E+02	ug/L	1.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.2E-03
				Cyanide	1.1E+02	ug/L	3.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.3E-02
				Iron	5.3E+04	ug/L	2.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.8E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.3E-02
				Lead	2.3E+02	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	8.1E-01
				Mercury	8.2E+00	ug/L	3.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.4E-02
				Nickel	1.3E+02	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-06	(mg/kg/day)	8.0E-04	(mg/kg/day)	5.5E-03
				Silver	2.6E+01	ug/L	7.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.3E-02
				Thallium	2.9E+00	ug/L	1.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	4.9E-02
				Vanadium	9.1E+01	ug/L	4.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-05	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.2E-01
				Zinc	1.6E+03	ug/L	4.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	5.4E-04
			Exp. Route Total								3.0E-04					2.2E+00
		Exposure Point Total									5.5E-03					1.6E+02
	Exposure Medium Total										5.5E-03					1.6E+02

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Inside Landfill	Inhalation	1,3-Dichlorobenzene	5.6E-05	mg/m^3	1.5E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.7E-07	5.4E-05	(mg/m^3)	8.0E-01	(mg/m^3)	6.7E-05
				1,4-Dichlorobenzene	1.4E-04	mg/m^3	3.8E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	4.1E-07	1.3E-04	(mg/m^3)	8.0E-01	(mg/m^3)	1.6E-04
				Benzene	1.6E-04	mg/m^3	4.5E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	3.5E-07	1.6E-04	(mg/m^3)	3.0E-02	(mg/m^3)	5.2E-03
				Chlorobenzene	2.5E-03	mg/m^3	7.0E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.4E-03	(mg/m^3)	5.0E-02	(mg/m^3)	4.9E-02
				Trichloroethene (Kidney)	1.9E-04	mg/m^3	1.0E-04	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	1.0E-07	1.8E-04	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Non-Kidney)	1.9E-04	mg/m^3	5.2E-05	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.6E-07	1.8E-04	(mg/m^3)	2.0E-03	(mg/m^3)	9.0E-02
				1,4-Dioxane	1.9E-04	mg/m^3	5.2E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	2.6E-07	1.8E-04	(mg/m^3)	3.0E-02	(mg/m^3)	6.0E-03
				Benzo(a)anthracene	1.7E-06	mg/m^3	9.4E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	5.7E-08	1.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	2.6E-04	mg/m^3	7.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.5E-04	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	6.1E-05	mg/m^3	1.7E-05	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	5.7E-07	5.8E-05	(mg/m^3)	3.0E-03	(mg/m^3)	1.9E-02
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	9.0E-05	mg/m^3	2.5E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	8.7E-05	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.4E-08	mg/m^3	6.5E-09	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.5E-04	2.3E-08	(mg/m^3)	4.0E-08	(mg/m^3)	5.7E-01
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	4.5E-07	mg/m^3	1.2E-07	(mg/m^3)	9.7E-05	(ug/m^3)$^{-1}$	1.2E-08	4.3E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	3.7E-07	mg/m^3	1.0E-07	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	5.0E-07	3.6E-07	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.4E-07	mg/m^3	3.8E-08	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	4.9E-08	1.3E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	3.6E-09	mg/m^3	9.9E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	2.6E-09	3.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	9.1E-09	mg/m^3	2.5E-09	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	9.5E-05	8.7E-09	(mg/m^3)	4.0E-08	(mg/m^3)	2.2E-01
				Nondioxin-Like PCBs	4.8E-03	mg/m^3	1.3E-03	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	1.3E-04	4.6E-03	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.9E-02	mg/m^3	5.1E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.8E-02	(mg/m^3)	8.0E-04	(mg/m^3)	2.2E+01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								4.8E-04					2.3E+01
		Exposure Point Total									4.8E-04					2.3E+01
	Exposure Medium Total										4.8E-04					2.3E+01
Medium Total											6.0E-03					1.8E+02
										Total of Receptor Risks Across All Media	6E-03			Total of Receptor Hazards Across All Media		2E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.7E-01	ug/L	9.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	5.3E-08	--	--	--	--	--
				1,4-Dichlorobenzene	1.9E+00	ug/L	2.4E-05	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.3E-07	--	--	--	--	--
				Benzene	1.6E+00	ug/L	2.1E-05	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.1E-06	--	--	--	--	--
				Chlorobenzene	3.0E+01	ug/L	3.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	2.3E+00	ug/L	9.2E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	8.5E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	3.0E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.1E-06	--	--	--	--	--
				1,4-Dioxane	9.2E+01	ug/L	1.2E-03	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.2E-04	--	--	--	--	--
				Benzo(a)anthracene	5.6E-01	ug/L	2.2E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.2E-06	--	--	--	--	--
				Benzo(a)pyrene	8.3E-01	ug/L	3.3E-05	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	3.3E-05	--	--	--	--	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	5.6E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	5.6E-06	--	--	--	--	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	2.1E-05	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	2.1E-07	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	1.6E-04	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	2.2E-06	--	--	--	--	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	2.4E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.4E-06	--	--	--	--	--
				Dibenzofuran	7.4E+00	ug/L	9.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	1.9E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.9E-06	--	--	--	--	--
				Naphthalene	1.1E+00	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	1.9E-01	ug/L	2.5E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	9.8E-07	--	--	--	--	--
				Phenanthrene	8.2E+00	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	3.2E-08	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	4.2E-03	--	--	--	--	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	3.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	6.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				4,4'-DDD	1.0E-02	ug/L	1.3E-07	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	3.1E-08	--	--	--	--	--
				4,4'-DDE	5.5E-02	ug/L	7.1E-07	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	2.4E-07	--	--	--	--	--
				Aldrin	4.7E-02	ug/L	6.0E-07	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.0E-05	--	--	--	--	--
				beta-BHC	4.2E-02	ug/L	5.4E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	9.7E-07	--	--	--	--	--
				delta-BHC	3.4E-02	ug/L	4.4E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.7E-06	--	--	--	--	--
				Dieldrin	2.2E-02	ug/L	2.8E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.5E-06	--	--	--	--	--
				Heptachlor	4.9E-03	ug/L	6.3E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.8E-07	--	--	--	--	--
				Heptachlor Epoxide	9.0E-04	ug/L	1.2E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-07	--	--	--	--	--
				gamma-BHC (Lindane)	4.4E-02	ug/L	5.6E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	6.2E-07	--	--	--	--	--
				Dioxin-Like PCBs	2.5E-04	ug/L	3.2E-09	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	4.2E-04	--	--	--	--	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	1.7E-03	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.8E-04	--	--	--	--	--
				Aluminum	1.2E+04	ug/L	1.5E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	2.8E+01	ug/L	3.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	2.5E+01	ug/L	3.2E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.9E-04	--	--	--	--	--
				Barium	1.2E+03	ug/L	1.6E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	8.0E+00	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	2.4E+03	ug/L	3.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	2.2E+01	ug/L	2.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	1.5E+02	ug/L	6.0E-03	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	3.0E-03	--	--	--	--	--
				Cobalt	1.3E+01	ug/L	1.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.8E+02	ug/L	3.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.1E+02	ug/L	1.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	5.3E+04	ug/L	6.8E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	2.3E+02	ug/L	2.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	4.6E+03	ug/L	6.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	8.2E+00	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nickel	1.3E+02	ug/L	1.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.6E+01	ug/L	3.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	2.9E+00	ug/L	3.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	9.1E+01	ug/L	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	1.6E+03	ug/L	2.1E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								9.0E-03					--

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.7E-01	ug/L	7.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	4.3E-08	--	--	--	--	--
				1,4-Dichlorobenzene	1.9E+00	ug/L	1.5E-05	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	8.2E-08	--	--	--	--	--
				Benzene	1.6E+00	ug/L	2.7E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.5E-07	--	--	--	--	--
				Chlorobenzene	3.0E+01	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	2.3E+00	ug/L	1.3E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.2E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	4.2E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.6E-07	--	--	--	--	--
				1,4-Dioxane	9.2E+01	ug/L	4.0E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.0E-07	--	--	--	--	--
				Benzo(a)anthracene	5.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)pyrene	8.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dibenzofuran	7.4E+00	ug/L	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Naphthalene	1.1E+00	ug/L	8.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	1.9E-01	ug/L	9.0E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.6E-06	--	--	--	--	--
				Phenanthrene	8.2E+00	ug/L	2.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				4,4'-DDD	1.0E-02	ug/L	1.2E-06	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	2.8E-07	--	--	--	--	--
				4,4'-DDE	5.5E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aldrin	4.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				beta-BHC	4.2E-02	ug/L	3.7E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	6.7E-07	--	--	--	--	--
				delta-BHC	3.4E-02	ug/L	3.0E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.9E-06	--	--	--	--	--
				Dieldrin	2.2E-02	ug/L	4.9E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	7.9E-06	--	--	--	--	--
				Heptachlor	4.9E-03	ug/L	4.5E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.0E-06	--	--	--	--	--
				Heptachlor Epoxide	9.0E-04	ug/L	1.4E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.2E-07	--	--	--	--	--
				gamma-BHC (Lindane)	4.4E-02	ug/L	3.9E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	4.3E-07	--	--	--	--	--
				Dioxin-Like PCBs	2.5E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aluminum	1.2E+04	ug/L	7.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	2.8E+01	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	2.5E+01	ug/L	1.7E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.5E-06	--	--	--	--	--
				Barium	1.2E+03	ug/L	8.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	8.0E+00	ug/L	5.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	2.4E+03	ug/L	1.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	2.2E+01	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	1.5E+02	ug/L	3.0E-05	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	5.9E-04	--	--	--	--	--
				Cobalt	1.3E+01	ug/L	3.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.8E+02	ug/L	1.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.1E+02	ug/L	5.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	5.3E+04	ug/L	3.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	2.3E+02	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	4.6E+03	ug/L	3.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	8.2E+00	ug/L	5.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nickel	1.3E+02	ug/L	1.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.6E+01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	2.9E+00	ug/L	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	9.1E+01	ug/L	6.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	1.6E+03	ug/L	6.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								6.1E-04					--
		Exposure Point Total									9.6E-03					--
	Exposure Medium Total										9.6E-03					--

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Inside Landfill	Inhalation	1,3-Dichlorobenzene	5.6E-05	mg/m^3	1.5E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.7E-07	--	--	--	--	--
				1,4-Dichlorobenzene	1.4E-04	mg/m^3	3.8E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	4.1E-07	--	--	--	--	--
				Benzene	1.6E-04	mg/m^3	4.5E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	3.5E-07	--	--	--	--	--
				Chlorobenzene	2.5E-03	mg/m^3	7.0E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	1.9E-04	mg/m^3	1.0E-04	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	1.0E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	1.9E-04	mg/m^3	5.2E-05	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.6E-07	--	--	--	--	--
				1,4-Dioxane	1.9E-04	mg/m^3	5.2E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	2.6E-07	--	--	--	--	--
				Benzo(a)anthracene	1.7E-06	mg/m^3	9.4E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	5.7E-08	--	--	--	--	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Dibenzofuran	2.6E-04	mg/m^3	7.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Naphthalene	6.1E-05	mg/m^3	1.7E-05	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	5.7E-07	--	--	--	--	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Phenanthrene	9.0E-05	mg/m^3	2.5E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.4E-08	mg/m^3	6.5E-09	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.5E-04	--	--	--	--	--
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				4,4'-DDE	4.5E-07	mg/m^3	1.2E-07	(mg/m^3)	9.7E-05	(ug/m^3)$^{-1}$	1.2E-08	--	--	--	--	--
				Aldrin	3.7E-07	mg/m^3	1.0E-07	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	5.0E-07	--	--	--	--	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Heptachlor	1.4E-07	mg/m^3	3.8E-08	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	4.9E-08	--	--	--	--	--
				Heptachlor Epoxide	3.6E-09	mg/m^3	9.9E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	2.6E-09	--	--	--	--	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Dioxin-Like PCBs	9.1E-09	mg/m^3	2.5E-09	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	9.5E-05	--	--	--	--	--
				Nondioxin-Like PCBs	4.8E-03	mg/m^3	1.3E-03	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	1.3E-04	--	--	--	--	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cyanide	1.9E-02	mg/m^3	5.1E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								4.8E-04					--
		Exposure Point Total									4.8E-04					--
	Exposure Medium Total										4.8E-04					--
Medium Total											1.0E-02					--
										Total of Receptor Risks Across All Media	1E-02			Total of Receptor Hazards Across All Media		--

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	8.8E-11	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	5.0E-12	6.2E-09	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.5E-06
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	1.7E-10	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.4E-10	1.2E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.9E-06
				1,2-Dichloroethane	1.10E+00	ug/L	8.1E-10	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	7.3E-11	5.7E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.8E-06
				1,4-Dichlorobenzene	9.20E-01	ug/L	6.8E-10	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.6E-12	4.7E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	6.8E-07
				2-Hexanone	5.60E+00	ug/L	4.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.8E-05
				Benzene	5.80E+00	ug/L	4.3E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.3E-10	3.0E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	3.0E-05
				cis-1,2-Dichloroethene	5.40E+01	ug/L	4.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.4E-04
				Ethylbenzene	4.40E+00	ug/L	3.2E-09	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	3.6E-11	2.3E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)	2.3E-06
				m+p-Xylenes	2.60E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	4.0E-01	(mg/kg/day)	3.3E-06
				Trichloroethene	6.20E+00	ug/L	4.5E-09	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	2.1E-10	3.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				Vinyl Chloride	4.20E+00	ug/L	3.1E-09	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.2E-09	2.2E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	7.2E-05
				1,4-Dioxane	5.66E+01	ug/L	4.2E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.2E-09	2.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	5.8E-06
				2,6-Dinitrotoluene	8.60E+00	ug/L	6.3E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	9.5E-09	4.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.1E-04
				2-Methylnaphthalene	9.30E+00	ug/L	6.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.2E-04
				Benzo(a)anthracene	2.60E-01	ug/L	1.9E-10	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.9E-11	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	8.8E-11	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	8.8E-11	6.2E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.1E-05
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	8.8E-10	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	9.7E-10	6.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	5.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-07	(mg/kg/day)	6.0E-01	(mg/kg/day)	6.8E-07
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	1.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-08	(mg/kg/day)	2.0E-04	(mg/kg/day)	4.8E-04
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	1.9E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-08	(mg/kg/day)	8.0E-05	(mg/kg/day)	1.7E-04
				Pentachlorophenol	4.90E-01	ug/L	3.6E-10	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.4E-10	2.5E-08	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.0E-06
				2,3,7,8-TCDD Equivalents	3.20E-06	ug/L	2.3E-15	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.1E-10	1.6E-13	(mg/kg/day)	2.0E-08	(mg/kg/day)	8.2E-06
				Aldrin	1.10E-03	ug/L	8.1E-13	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.4E-11	5.7E-11	(mg/kg/day)	4.0E-05	(mg/kg/day)	1.4E-06
				beta-BHC	3.60E-02	ug/L	2.6E-11	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.8E-11	1.8E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	1.2E-11	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.0E-10	8.7E-10	(mg/kg/day)	1.0E-04	(mg/kg/day)	8.7E-06
				Heptachlor	1.10E-03	ug/L	8.1E-13	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.6E-12	5.7E-11	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E-07
				Heptachlor Epoxide	9.50E-04	ug/L	7.0E-13	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.3E-12	4.9E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.8E-06
				Dioxin-Like PCBs	1.40E-06	ug/L	1.0E-15	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.3E-10	7.2E-14	(mg/kg/day)	2.0E-08	(mg/kg/day)	3.6E-06
				Nondioxin-Like PCBs	2.13E-01	ug/L	1.6E-10	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.3E-11	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	5.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	4.1E-04
				Antimony	5.30E+00	ug/L	3.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	6.8E-04
				Arsenic	1.87E+01	ug/L	1.4E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.1E-08	9.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.2E-03
				Barium	5.15E+02	ug/L	3.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.3E-04
				Boron	7.38E+02	ug/L	5.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.9E-04
				Cadmium	1.84E+00	ug/L	1.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9E-04
				Chromium	8.03E+00	ug/L	5.9E-09	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.9E-09	4.1E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.3E-05
				Cobalt	1.30E+01	ug/L	9.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.2E-04
				Copper	2.24E+01	ug/L	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.9E-05
				Cyanide	1.68E+01	ug/L	1.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.3E-05
				Iron	3.96E+04	ug/L	2.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.9E-03
				Lead	8.76E+01	ug/L	6.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	7.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	2.3E-02
				Mercury	7.50E-02	ug/L	5.5E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)	2.6E-09
				Silver	2.53E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.6E-04
				Thallium	3.90E+00	ug/L	2.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	1.11E+01	ug/L	8.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	5.7E-05
				Zinc	3.72E+01	ug/L	2.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	6.4E-06
			Exp. Route Total								4.2E-08					3.3E-02

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	2.8E-10	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	1.6E-11	2.0E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	4.9E-06
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	1.0E-09	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	8.0E-10	7.0E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.5E-05
				1,2-Dichloroethane	1.10E+00	ug/L	2.1E-09	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.9E-10	1.4E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.2E-06
				1,4-Dichlorobenzene	9.20E-01	ug/L	1.8E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	9.7E-11	1.3E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.8E-05
				2-Hexanone	5.60E+00	ug/L	8.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.2E-04
				Benzene	5.80E+00	ug/L	3.7E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.0E-09	2.6E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	2.6E-04
				cis-1,2-Dichloroethene	5.40E+01	ug/L	2.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	9.1E-04
				Ethylbenzene	4.40E+00	ug/L	8.6E-08	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	9.5E-10	6.0E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)	6.0E-05
				m+p-Xylenes	2.60E+01	ug/L	5.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-05	(mg/kg/day)	4.0E-01	(mg/kg/day)	9.0E-05
				Trichloroethene	6.20E+00	ug/L	3.3E-08	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	1.5E-09	2.3E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				Vinyl Chloride	4.20E+00	ug/L	1.5E-08	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.1E-08	1.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	3.5E-04
				1,4-Dioxane	5.66E+01	ug/L	8.4E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.4E-10	5.9E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	1.2E-06
				2,6-Dinitrotoluene	8.60E+00	ug/L	1.7E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.5E-08	1.2E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.9E-04
				2-Methylnaphthalene	9.30E+00	ug/L	3.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.8E-03
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	1.0E-09	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.1E-09	7.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-05	(mg/kg/day)	6.0E-01	(mg/kg/day)	1.8E-05
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-04	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	8.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	4.1E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.6E-08	2.9E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.7E-04
				2,3,7,8-TCDD Equivalents	3.20E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	5.7E-10	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.0E-09	4.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	6.8E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.1E-08	4.7E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	4.7E-04
				Heptachlor	1.10E-03	ug/L	1.8E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	8.2E-10	1.3E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.6E-05
				Heptachlor Epoxide	9.50E-04	ug/L	2.6E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.3E-10	1.8E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.4E-04
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Nondioxin-Like PCBs	2.13E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	3.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.3E-04
				Antimony	5.30E+00	ug/L	2.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	2.6E-03
				Arsenic	1.87E+01	ug/L	7.7E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-08	5.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.8E-03
				Barium	5.15E+02	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.1E-03
				Boron	7.38E+02	ug/L	3.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.1E-04
				Cadmium	1.84E+00	ug/L	7.6E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	2.1E-03
				Chromium	8.03E+00	ug/L	3.3E-09	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	6.7E-08	2.3E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.9E-03
				Cobalt	1.30E+01	ug/L	2.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	5.0E-05
				Copper	2.24E+01	ug/L	9.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-07	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.6E-05
				Cyanide	1.68E+01	ug/L	7.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.4E-05
				Iron	3.96E+04	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.6E-03
				Lead	8.76E+01	ug/L	3.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	4.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	3.3E-01
				Mercury	7.50E-02	ug/L	3.1E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)	1.4E-09
				Silver	2.53E+01	ug/L	6.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	2.2E-03
				Thallium	3.90E+00	ug/L	1.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	1.11E+01	ug/L	4.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	2.6E-04	(mg/kg/day)	1.2E-03
				Zinc	3.72E+01	ug/L	9.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-07	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.2E-06
			Exp. Route Total								1.5E-07					3.5E-01
		Exposure Point Total									1.9E-07					3.9E-01
	Exposure Medium Total										1.9E-07					3.9E-01

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Trench	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	7.79E-04	mg/m^3	3.0E-07	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	4.9E-09	2.1E-05	(mg/m^3)	2.0E-03	(mg/m^3)	1.1E-02
				1,2-Dibromo-3-Chloropropane	8.97E-04	mg/m^3	3.5E-07	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	2.1E-06	2.5E-05	(mg/m^3)	2.0E-03	(mg/m^3)	1.2E-02
				1,2-Dichloroethane	8.43E-03	mg/m^3	3.3E-06	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	8.6E-08	2.3E-04	(mg/m^3)	7.0E-02	(mg/m^3)	3.3E-03
				1,4-Dichlorobenzene	5.93E-03	mg/m^3	2.3E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	2.6E-08	1.6E-04	(mg/m^3)	1.2E+00	(mg/m^3)	1.4E-04
				2-Hexanone	2.78E-02	mg/m^3	1.1E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.6E-04	(mg/m^3)	3.0E-02	(mg/m^3)	2.5E-02
				Benzene	5.19E-02	mg/m^3	2.0E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	1.6E-07	1.4E-03	(mg/m^3)	8.0E-02	(mg/m^3)	1.8E-02
				cis-1,2-Dichloroethene	4.32E-01	mg/m^3	1.7E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.2E-02	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.39E-02	mg/m^3	1.3E-05	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	3.3E-08	9.3E-04	(mg/m^3)	9.0E+00	(mg/m^3)	1.0E-04
				m+p-Xylenes	2.00E-01	mg/m^3	7.8E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	5.5E-03	(mg/m^3)	4.0E-01	(mg/m^3)	1.4E-02
				Trichloroethene	4.30E-02	mg/m^3	1.7E-05	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	6.9E-08	1.2E-03	(mg/m^3)	2.0E-03	(mg/m^3)	--
				Vinyl Chloride	4.23E-02	mg/m^3	1.7E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	7.3E-08	1.2E-03	(mg/m^3)	1.0E-01	(mg/m^3)	1.2E-02
				1,4-Dioxane	3.71E-02	mg/m^3	1.5E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	7.3E-08	1.0E-03	(mg/m^3)	7.2E-01	(mg/m^3)	1.4E-03
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	5.65E-02	mg/m^3	2.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.5E-03	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	2.69E-04	mg/m^3	1.1E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	6.3E-09	7.4E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	1.94E-03	mg/m^3	7.6E-07	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	2.5E-07	5.3E-05	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	5.03E-02	mg/m^3	2.0E-05	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	6.7E-07	1.4E-03	(mg/m^3)	3.0E-03	(mg/m^3)	4.6E-01
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	7.38E-09	mg/m^3	2.9E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	1.1E-07	2.0E-10	(mg/m^3)	4.0E-08	(mg/m^3)	5.1E-03
				Aldrin	2.26E-06	mg/m^3	8.8E-10	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	4.3E-09	6.2E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	3.94E-06	mg/m^3	1.5E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	2.0E-09	1.1E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.22E-06	mg/m^3	4.8E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	1.2E-09	3.3E-08	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	5.88E-09	mg/m^3	2.3E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	8.7E-08	1.6E-10	(mg/m^3)	4.0E-08	(mg/m^3)	4.0E-03
				Nondioxin-Like PCBs	8.94E-04	mg/m^3	3.5E-07	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	3.5E-08	2.4E-05	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	3.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.62E-01	mg/m^3	1.0E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.2E-03	(mg/m^3)	8.0E-04	(mg/m^3)	9.0E+00
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								3.8E-06					1.0E+01
		Exposure Point Total									3.8E-06					1.0E+01
	Exposure Medium Total										3.8E-06					1.0E+01
Medium Total											4.0E-06					1.1E+01
										Total of Receptor Risks Across All Media	4E-06				Total of Receptor Hazards Across All Media		1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	3.7E-09	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	2.1E-10	1.0E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.6E-06
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	7.0E-09	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	5.6E-09	2.0E-08	(mg/kg/day)	2.0E-04	(mg/kg/day)	9.8E-05
				1,2-Dichloroethane	1.10E+00	ug/L	3.4E-08	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	3.1E-09	9.4E-08	(mg/kg/day)	6.0E-03	(mg/kg/day)	1.6E-05
				1,4-Dichlorobenzene	9.20E-01	ug/L	2.8E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.5E-10	7.9E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.1E-06
				2-Hexanone	5.60E+00	ug/L	1.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	9.6E-05
				Benzene	5.80E+00	ug/L	1.8E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	9.8E-09	5.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.2E-04
				cis-1,2-Dichloroethene	5.40E+01	ug/L	1.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.6E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.3E-03
				Ethylbenzene	4.40E+00	ug/L	1.3E-07	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	1.5E-09	3.8E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)	3.8E-06
				m+p-Xylenes	2.60E+01	ug/L	8.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.1E-05
				Trichloroethene	6.20E+00	ug/L	1.9E-07	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	8.7E-09	5.3E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E-03
				Vinyl Chloride	4.20E+00	ug/L	1.3E-07	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	9.2E-08	3.6E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.2E-04
				1,4-Dioxane	5.66E+01	ug/L	1.7E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.7E-07	4.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.6E-04
				2,6-Dinitrotoluene	8.60E+00	ug/L	2.6E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.9E-07	7.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5E-03
				2-Methylnaphthalene	9.30E+00	ug/L	2.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.0E-04
				Benzo(a)anthracene	2.60E-01	ug/L	8.0E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.0E-10	2.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	3.7E-09	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	3.7E-09	1.0E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.4E-05
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	3.7E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	4.0E-08	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	2.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.4E-05
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	5.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	7.9E-03
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	8.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.1E-03
				Pentachlorophenol	4.90E-01	ug/L	1.5E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.0E-09	4.2E-08	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.4E-06
				2,3,7,8-TCDD Equivalents	3.20E-06	ug/L	9.8E-14	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.3E-08	2.7E-13	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.9E-04
				Aldrin	1.10E-03	ug/L	3.4E-11	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	5.7E-10	9.4E-11	(mg/kg/day)	3.0E-05	(mg/kg/day)	3.1E-06
				beta-BHC	3.60E-02	ug/L	1.1E-09	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	2.0E-09	3.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	5.2E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	8.3E-09	1.5E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.9E-05
				Heptachlor	1.10E-03	ug/L	3.4E-11	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.5E-10	9.4E-11	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9E-07
				Heptachlor Epoxide	9.50E-04	ug/L	2.9E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.6E-10	8.1E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	6.3E-06
				Dioxin-Like PCBs	1.40E-06	ug/L	4.3E-14	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	5.6E-09	1.2E-13	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.7E-04
				Nondioxin-Like PCBs	2.13E-01	ug/L	6.5E-09	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.6E-09	1.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	2.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	6.8E-04
				Antimony	5.30E+00	ug/L	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	1.1E-03
				Arsenic	1.87E+01	ug/L	5.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.6E-07	1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	5.3E-03
				Barium	5.15E+02	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.2E-04
				Boron	7.38E+02	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.2E-04
				Cadmium	1.84E+00	ug/L	5.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.2E-04
				Chromium	8.03E+00	ug/L	2.5E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.2E-07	6.9E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.3E-04
				Cobalt	1.30E+01	ug/L	4.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.7E-03
				Copper	2.24E+01	ug/L	6.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	4.8E-05
				Cyanide	1.68E+01	ug/L	5.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.4E-03
				Iron	3.96E+04	ug/L	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	4.8E-03
				Lead	8.76E+01	ug/L	2.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	3.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	3.9E-02
				Mercury	7.50E-02	ug/L	2.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.4E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	6.4E-05
				Silver	2.53E+01	ug/L	7.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.3E-04
				Thallium	3.90E+00	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	3.3E-02
				Vanadium	1.11E+01	ug/L	3.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.9E-04
				Zinc	3.72E+01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.1E-05
			Exp. Route Total								1.8E-06					1.1E-01

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	5.3E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	3.0E-09	1.5E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.7E-05
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	2.0E-07	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.6E-07	5.6E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	2.8E-03
				1,2-Dichloroethane	1.10E+00	ug/L	3.8E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	3.5E-08	1.1E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	1.8E-04
				1,4-Dichlorobenzene	9.20E-01	ug/L	3.3E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.8E-08	9.3E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.3E-04
				2-Hexanone	5.60E+00	ug/L	1.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.0E-03
				Benzene	5.80E+00	ug/L	6.5E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.6E-07	1.8E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	4.6E-03
				cis-1,2-Dichloroethene	5.40E+01	ug/L	4.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	6.6E-02
				Ethylbenzene	4.40E+00	ug/L	1.6E-05	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	1.7E-07	4.4E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	4.4E-04
				m+p-Xylenes	2.60E+01	ug/L	9.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.3E-03
				Trichloroethene	6.20E+00	ug/L	6.0E-06	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	2.8E-07	1.7E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.4E-02
				Vinyl Chloride	4.20E+00	ug/L	2.6E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.9E-06	7.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.4E-03
				1,4-Dioxane	5.66E+01	ug/L	1.7E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.7E-07	4.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.6E-04
				2,6-Dinitrotoluene	8.60E+00	ug/L	3.5E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.2E-06	9.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.2E-02
				2-Methylnaphthalene	9.30E+00	ug/L	6.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	4.4E-02
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	2.1E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	2.3E-07	5.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	2.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.1E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	8.5E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.4E-06	2.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.8E-03
				2,3,7,8-TCDD Equivalents	3.20E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	1.2E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	2.1E-07	3.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	1.4E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.3E-06	4.0E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	7.9E-03
				Heptachlor	1.10E-03	ug/L	3.7E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.6E-07	1.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.1E-04
				Heptachlor Epoxide	9.50E-04	ug/L	5.3E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.8E-08	1.5E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.1E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	2.13E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	6.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.9E-03
				Antimony	5.30E+00	ug/L	4.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	2.1E-02
				Arsenic	1.87E+01	ug/L	1.6E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.4E-06	4.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.5E-02
				Barium	5.15E+02	ug/L	4.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	8.9E-03
				Boron	7.38E+02	ug/L	6.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	8.9E-04
				Cadmium	1.84E+00	ug/L	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.8E-02
				Chromium	8.03E+00	ug/L	6.9E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.4E-05	1.9E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	2.6E-02
				Cobalt	1.30E+01	ug/L	4.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.2E-03
				Copper	2.24E+01	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.4E-04
				Cyanide	1.68E+01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	5.1E-03
				Iron	3.96E+04	ug/L	3.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.4E-02
				Lead	8.76E+01	ug/L	7.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	9.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	2.7E+00
				Mercury	7.50E-02	ug/L	6.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.8E-04
				Silver	2.53E+01	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.8E-02
				Thallium	3.90E+00	ug/L	3.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.4E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	9.4E-02
				Vanadium	1.11E+01	ug/L	9.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	2.1E-02
				Zinc	3.72E+01	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.8E-05
			Exp. Route Total								3.1E-05					3.2E+00
		Exposure Point Total									3.3E-05					3.3E+00
	Exposure Medium Total										3.3E-05					3.3E+00

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Trench	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	7.79E-04	mg/m^3	7.6E-06	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	1.2E-07	2.1E-05	(mg/m^3)	2.0E-04	(mg/m^3)	1.1E-01
				1,2-Dibromo-3-Chloropropane	8.97E-04	mg/m^3	8.8E-06	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	5.3E-05	2.5E-05	(mg/m^3)	2.0E-04	(mg/m^3)	1.2E-01
				1,2-Dichloroethane	8.43E-03	mg/m^3	8.2E-05	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	2.1E-06	2.3E-04	(mg/m^3)	7.0E-03	(mg/m^3)	3.3E-02
				1,4-Dichlorobenzene	5.93E-03	mg/m^3	5.8E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	6.4E-07	1.6E-04	(mg/m^3)	8.0E-01	(mg/m^3)	2.0E-04
				2-Hexanone	2.78E-02	mg/m^3	2.7E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.6E-04	(mg/m^3)	3.0E-02	(mg/m^3)	2.5E-02
				Benzene	5.19E-02	mg/m^3	5.1E-04	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	4.0E-06	1.4E-03	(mg/m^3)	3.0E-02	(mg/m^3)	4.7E-02
				cis-1,2-Dichloroethene	4.32E-01	mg/m^3	4.2E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.2E-02	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.39E-02	mg/m^3	3.3E-04	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	8.3E-07	9.3E-04	(mg/m^3)	1.0E+00	(mg/m^3)	9.3E-04
				m+p-Xylenes	2.00E-01	mg/m^3	2.0E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	5.5E-03	(mg/m^3)	1.0E-01	(mg/m^3)	5.5E-02
				Trichloroethene	4.30E-02	mg/m^3	4.2E-04	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	1.7E-06	1.2E-03	(mg/m^3)	2.0E-03	(mg/m^3)	5.9E-01
				Vinyl Chloride	4.23E-02	mg/m^3	4.1E-04	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	1.8E-06	1.2E-03	(mg/m^3)	1.0E-01	(mg/m^3)	1.2E-02
				1,4-Dioxane	3.71E-02	mg/m^3	3.6E-04	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.8E-06	1.0E-03	(mg/m^3)	3.0E-02	(mg/m^3)	3.4E-02
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	5.65E-02	mg/m^3	5.5E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.5E-03	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	2.69E-04	mg/m^3	2.6E-06	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	1.6E-07	7.4E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	1.94E-03	mg/m^3	1.9E-05	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	6.3E-06	5.3E-05	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	5.03E-02	mg/m^3	4.9E-04	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	1.7E-05	1.4E-03	(mg/m^3)	3.0E-03	(mg/m^3)	4.6E-01
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	7.38E-09	mg/m^3	7.2E-11	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.7E-06	2.0E-10	(mg/m^3)	4.0E-08	(mg/m^3)	5.1E-03
				Aldrin	2.26E-06	mg/m^3	2.2E-08	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.1E-07	6.2E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	3.94E-06	mg/m^3	3.9E-08	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	5.0E-08	1.1E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.22E-06	mg/m^3	1.2E-08	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	3.1E-08	3.3E-08	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	5.88E-09	mg/m^3	5.7E-11	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.2E-06	1.6E-10	(mg/m^3)	4.0E-08	(mg/m^3)	4.0E-03
				Nondioxin-Like PCBs	8.94E-04	mg/m^3	8.7E-06	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	8.7E-07	2.4E-05	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.62E-01	mg/m^3	2.6E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.2E-03	(mg/m^3)	8.0E-04	(mg/m^3)	9.0E+00
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								9.5E-05					1.0E+01
		Exposure Point Total									9.5E-05					1.0E+01
	Exposure Medium Total										9.5E-05					1.0E+01
Medium Total											1.3E-04					1.4E+01

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Irrigation	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	2.3E-06	mg/m^3	1.9E-07	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	3.0E-09	5.2E-07	(mg/m^3)	2.0E-04	(mg/m^3)	2.6E-03
				1,2-Dibromo-3-Chloropropane	2.9E-06	mg/m^3	2.4E-07	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	1.4E-06	6.7E-07	(mg/m^3)	2.0E-04	(mg/m^3)	3.3E-03
				1,2-Dichloroethane	2.2E-05	mg/m^3	1.8E-06	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	4.8E-08	5.1E-06	(mg/m^3)	7.0E-03	(mg/m^3)	7.3E-04
				1,4-Dichlorobenzene	2.1E-05	mg/m^3	1.7E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.9E-08	4.8E-06	(mg/m^3)	8.0E-01	(mg/m^3)	6.0E-06
				2-Hexanone	6.2E-05	mg/m^3	5.0E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.4E-05	(mg/m^3)	3.0E-02	(mg/m^3)	4.7E-04
				Benzene	6.2E-05	mg/m^3	5.0E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	3.9E-08	1.4E-05	(mg/m^3)	3.0E-02	(mg/m^3)	4.7E-04
				cis-1,2-Dichloroethene	1.3E-03	mg/m^3	1.1E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.1E-04	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	1.2E-04	mg/m^3	9.8E-06	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	2.5E-08	2.8E-05	(mg/m^3)	1.0E+00	(mg/m^3)	2.8E-05
				m+p-Xylenes	7.0E-04	mg/m^3	5.7E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.6E-04	(mg/m^3)	1.0E-01	(mg/m^3)	1.6E-03
				Trichloroethene	1.7E-04	mg/m^3	1.4E-05	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	5.8E-08	4.0E-05	(mg/m^3)	2.0E-03	(mg/m^3)	2.0E-02
				Vinyl Chloride	1.3E-04	mg/m^3	1.1E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	4.8E-08	3.1E-05	(mg/m^3)	1.0E-01	(mg/m^3)	3.1E-04
				1,4-Dioxane	8.0E-06	mg/m^3	6.5E-07	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	3.3E-09	1.8E-06	(mg/m^3)	3.0E-02	(mg/m^3)	6.1E-05
				2,6-Dinitrotoluene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	1.6E-04	mg/m^3	1.3E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.7E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	9.1E-07	mg/m^3	7.5E-08	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	4.5E-09	2.1E-07	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	5.8E-06	mg/m^3	4.7E-07	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	1.5E-07	1.3E-06	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	1.3E-04	mg/m^3	1.1E-05	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	3.7E-07	3.1E-05	(mg/m^3)	3.0E-03	(mg/m^3)	1.0E-02
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.8E-11	mg/m^3	2.3E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	8.7E-08	6.4E-12	(mg/m^3)	4.0E-08	(mg/m^3)	1.6E-04
				Aldrin	9.1E-09	mg/m^3	7.4E-10	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	3.6E-09	2.1E-09	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.7E-08	mg/m^3	1.4E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	1.8E-09	3.8E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	5.3E-09	mg/m^3	4.3E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	1.1E-09	1.2E-09	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	2.3E-11	mg/m^3	1.9E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	7.2E-08	5.3E-12	(mg/m^3)	4.0E-08	(mg/m^3)	1.3E-04
				Nondioxin-Like PCBs	3.5E-06	mg/m^3	2.9E-07	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	2.9E-08	8.1E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	5.3E-04	mg/m^3	4.3E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.2E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.5E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								2.4E-06					1.9E-01
		Exposure Point Total									2.4E-06					1.9E-01
	Exposure Medium Total										2.4E-06					1.9E-01
Medium Total											2.4E-06					1.9E-01

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Shower	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	6.0E-07	mg/m^3	1.5E-07	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	2.3E-09	4.1E-07	(mg/m^3)	2.0E-04	(mg/m^3)	2.1E-03
				1,2-Dibromo-3-Chloropropane	4.3E-07	mg/m^3	1.1E-07	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	6.3E-07	2.9E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.5E-03
				1,2-Dichloroethane	6.8E-06	mg/m^3	1.7E-06	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	4.3E-08	4.6E-06	(mg/m^3)	7.0E-03	(mg/m^3)	6.6E-04
				1,4-Dichlorobenzene	5.1E-06	mg/m^3	1.3E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.4E-08	3.5E-06	(mg/m^3)	8.0E-01	(mg/m^3)	4.4E-06
				2-Hexanone	1.2E-05	mg/m^3	2.9E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	8.1E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.7E-04
				Benzene	4.6E-05	mg/m^3	1.1E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	8.7E-08	3.1E-05	(mg/m^3)	3.0E-02	(mg/m^3)	1.0E-03
				cis-1,2-Dichloroethene	3.8E-04	mg/m^3	9.3E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.6E-04	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.1E-05	mg/m^3	7.5E-06	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	1.9E-08	2.1E-05	(mg/m^3)	1.0E+00	(mg/m^3)	2.1E-05
				m+p-Xylenes	1.8E-04	mg/m^3	4.4E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.2E-04	(mg/m^3)	1.0E-01	(mg/m^3)	1.2E-03
				Trichloroethene	3.9E-05	mg/m^3	9.6E-06	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	3.9E-08	2.7E-05	(mg/m^3)	2.0E-03	(mg/m^3)	1.3E-02
				Vinyl Chloride	3.8E-05	mg/m^3	9.3E-06	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	4.1E-08	2.6E-05	(mg/m^3)	1.0E-01	(mg/m^3)	2.6E-04
				1,4-Dioxane	9.0E-06	mg/m^3	2.2E-06	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.1E-08	6.1E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.0E-04
				2,6-Dinitrotoluene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	4.0E-05	mg/m^3	9.8E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.7E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	6.2E-08	mg/m^3	1.5E-08	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	9.1E-10	4.3E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	5.0E-07	mg/m^3	1.2E-07	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	4.1E-08	3.4E-07	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	3.4E-05	mg/m^3	8.4E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	2.8E-07	2.3E-05	(mg/m^3)	3.0E-03	(mg/m^3)	7.8E-03
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.3E-12	mg/m^3	5.7E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.2E-08	1.6E-12	(mg/m^3)	4.0E-08	(mg/m^3)	4.0E-05
				Aldrin	6.8E-10	mg/m^3	1.7E-10	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	8.1E-10	4.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	2.4E-09	mg/m^3	5.8E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	7.6E-10	1.6E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	2.9E-10	mg/m^3	7.2E-11	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	1.9E-10	2.0E-10	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	3.9E-12	mg/m^3	9.6E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	3.7E-08	2.7E-12	(mg/m^3)	4.0E-08	(mg/m^3)	6.7E-05
				Nondioxin-Like PCBs	6.0E-07	mg/m^3	1.5E-07	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	1.5E-08	4.1E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.2E-04	mg/m^3	5.5E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.5E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.9E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								1.3E-06					2.2E-01
		Exposure Point Total									1.3E-06					2.2E-01
	Exposure Medium Total										1.3E-06					2.2E-01
Medium Total											1.3E-06					2.2E-01
										Total of Receptor Risks Across All Media	1E-04			Total of Receptor Hazards Across All Media		1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	5.1E-07	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	2.9E-08	6.0E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.5E-03
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	5.2E-06	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	4.2E-06	1.1E-05	(mg/kg/day)	2.0E-04	(mg/kg/day)	5.7E-02
				1,2-Dichloroethane	1.10E+00	ug/L	4.7E-06	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	4.3E-07	5.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	9.1E-03
				1,4-Dichlorobenzene	9.20E-01	ug/L	3.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.1E-08	4.6E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	6.6E-04
				2-Hexanone	5.60E+00	ug/L	2.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.6E-02
				Benzene	5.80E+00	ug/L	2.5E-05	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.4E-06	2.9E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	7.2E-02
				cis-1,2-Dichloroethene	5.40E+01	ug/L	2.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.3E+00
				Ethylbenzene	4.40E+00	ug/L	1.9E-05	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	2.1E-07	2.2E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)	2.2E-03
				m+p-Xylenes	2.60E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	6.5E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	1.4E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.3E-06	3.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	2.6E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	9.8E-07	3.1E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	6.2E-01
				Vinyl Chloride	4.20E+00	ug/L	2.4E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.7E-04	2.1E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	7.0E-02
				1,4-Dioxane	5.66E+01	ug/L	2.4E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.4E-05	2.8E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	9.4E-02
				2,6-Dinitrotoluene	8.60E+00	ug/L	3.7E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.5E-05	4.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E+00
				2-Methylnaphthalene	9.30E+00	ug/L	4.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.6E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.2E-01
				Benzo(a)anthracene	2.60E-01	ug/L	5.9E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	5.9E-07	1.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	2.7E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.7E-06	6.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.0E-02
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	5.1E-06	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	5.6E-06	6.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.0E-02
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	7.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.2E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	4.6E+00
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	6.5E-01
				Pentachlorophenol	4.90E-01	ug/L	2.1E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	8.4E-07	2.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.9E-03
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	9.1E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.2E-06	1.1E-10	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.5E-01
				Aldrin	1.10E-03	ug/L	4.7E-09	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	8.0E-08	5.5E-08	(mg/kg/day)	3.0E-05	(mg/kg/day)	1.8E-03
				beta-BHC	3.60E-02	ug/L	1.5E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	2.8E-07	1.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	7.3E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.2E-06	8.5E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.7E-02
				Heptachlor	1.10E-03	ug/L	4.7E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.1E-08	5.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E-04
				Heptachlor Epoxide	9.50E-04	ug/L	4.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	3.7E-08	4.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.6E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	6.0E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	7.8E-07	7.0E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.0E-01
				Nondioxin-Like PCBs	1.99E-01	ug/L	8.5E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.4E-07	9.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	3.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	3.9E-01
				Antimony	5.30E+00	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	6.6E-01
				Arsenic	1.87E+01	ug/L	8.0E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-04	9.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.1E+00
				Barium	5.15E+02	ug/L	2.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.3E-01
				Boron	7.38E+02	ug/L	3.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.8E-01
				Cadmium	1.84E+00	ug/L	7.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.8E-01
				Chromium	8.03E+00	ug/L	1.8E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	9.2E-05	4.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.3E-01
				Cobalt	1.30E+01	ug/L	5.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.2E+00
				Copper	2.24E+01	ug/L	9.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.8E-02
				Cyanide	1.68E+01	ug/L	7.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.4E+00
				Iron	3.96E+04	ug/L	1.7E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.8E+00
				Lead	8.76E+01	ug/L	3.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	4.6E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	2.2E+01
				Mercury	7.50E-02	ug/L	3.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	3.7E-02
				Silver	2.53E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-03	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.5E-01
				Thallium	3.90E+00	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-04	(mg/kg/day)	1.0E-05	(mg/kg/day)	1.9E+01
				Vanadium	1.11E+01	ug/L	4.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.1E-01
				Zinc	3.72E+01	ug/L	1.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-03	(mg/kg/day)	3.0E-01	(mg/kg/day)	6.2E-03
			Exp. Route Total								4.8E-04					6.3E+01

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	3.3E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	1.9E-09	3.8E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	9.6E-05
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	8.9E-07	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	7.1E-07	1.9E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	9.7E-03
				1,2-Dichloroethane	1.10E+00	ug/L	2.0E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.8E-08	2.3E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	3.9E-04
				1,4-Dichlorobenzene	9.20E-01	ug/L	2.5E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.3E-08	2.9E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	4.1E-04
				2-Hexanone	5.60E+00	ug/L	8.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.0E-03
				Benzene	5.80E+00	ug/L	3.3E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.8E-07	3.8E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	9.6E-03
				cis-1,2-Dichloroethene	5.40E+01	ug/L	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.5E-01
				Ethylbenzene	4.40E+00	ug/L	9.9E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	1.1E-07	1.2E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)	1.2E-03
				m+p-Xylenes	2.60E+01	ug/L	5.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.9E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.5E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	2.1E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.9E-07	4.5E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	3.9E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.4E-07	4.5E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	9.0E-02
				Vinyl Chloride	4.20E+00	ug/L	1.6E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.1E-05	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	4.7E-03
				1,4-Dioxane	5.66E+01	ug/L	7.6E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.6E-08	8.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.0E-04
				2,6-Dinitrotoluene	8.60E+00	ug/L	2.4E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.5E-06	2.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	9.2E-02
				2-Methylnaphthalene	9.30E+00	ug/L	4.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.4E-01
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	1.2E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.4E-07	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	2.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.1E-02
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	7.2E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.9E-06	8.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.7E-02
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	1.0E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.8E-07	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	1.2E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.9E-06	1.4E-06	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.8E-02
				Heptachlor	1.10E-03	ug/L	3.2E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.4E-07	3.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	7.5E-04
				Heptachlor Epoxide	9.50E-04	ug/L	4.5E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.1E-08	5.2E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	4.0E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.7E-03
				Antimony	5.30E+00	ug/L	1.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.9E-02
				Arsenic	1.87E+01	ug/L	3.5E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.3E-07	4.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-02
				Barium	5.15E+02	ug/L	9.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	8.1E-03
				Boron	7.38E+02	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	8.1E-04
				Cadmium	1.84E+00	ug/L	3.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.6E-02
				Chromium	8.03E+00	ug/L	8.1E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.6E-05	1.8E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	2.4E-02
				Cobalt	1.30E+01	ug/L	9.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.8E-03
				Copper	2.24E+01	ug/L	4.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.2E-04
				Cyanide	1.68E+01	ug/L	3.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	6.2E-03
				Iron	3.96E+04	ug/L	7.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.2E-02
				Lead	8.76E+01	ug/L	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	2.5E+00
				Mercury	7.50E-02	ug/L	1.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.6E-04
				Silver	2.53E+01	ug/L	2.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.7E-02
				Thallium	3.90E+00	ug/L	7.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	8.6E-02
				Vanadium	1.11E+01	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.9E-02
				Zinc	3.72E+01	ug/L	4.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.6E-05
			Exp. Route Total								3.8E-05					3.3E+00
		Exposure Point Total									5.2E-04					6.6E+01
	Exposure Medium Total										5.2E-04					6.6E+01
Medium Total											5.2E-04					6.6E+01
											Total of Receptor Risks Across All Media					
											5E-04					7E+01
																Total of Receptor Hazards Across All Media

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	1.0E-06	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	5.9E-08	3.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	9.0E-04
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	3.9E-06	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	3.2E-06	6.9E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	3.4E-02
				1,2-Dichloroethane	1.10E+00	ug/L	9.4E-06	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	8.6E-07	3.3E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	5.5E-03
				1,4-Dichlorobenzene	9.20E-01	ug/L	7.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	4.3E-08	2.8E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	3.9E-04
				2-Hexanone	5.60E+00	ug/L	4.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.4E-02
				Benzene	5.80E+00	ug/L	5.0E-05	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.7E-06	1.7E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	4.3E-02
				cis-1,2-Dichloroethene	5.40E+01	ug/L	4.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	8.1E-01
				Ethylbenzene	4.40E+00	ug/L	3.8E-05	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	4.1E-07	1.3E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)	1.3E-03
				m+p-Xylenes	2.60E+01	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.9E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	1.1E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	9.9E-07	1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	5.3E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.0E-06	1.9E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.7E-01
				Vinyl Chloride	4.20E+00	ug/L	3.6E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.6E-05	1.3E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	4.2E-02
				1,4-Dioxane	5.66E+01	ug/L	4.8E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.8E-05	1.7E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	5.7E-02
				2,6-Dinitrotoluene	8.60E+00	ug/L	7.4E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.1E-04	2.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.6E-01
				2-Methylnaphthalene	9.30E+00	ug/L	8.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	7.0E-02
				Benzo(a)anthracene	2.60E-01	ug/L	4.5E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.5E-07	7.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	2.1E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.1E-06	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.2E-02
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	1.0E-05	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.1E-05	3.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	6.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.2E-02
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.8E+00
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	2.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	3.9E-01
				Pentachlorophenol	4.90E-01	ug/L	4.2E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.7E-06	1.5E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.9E-03
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	1.8E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.4E-06	6.4E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	9.1E-02
				Aldrin	1.10E-03	ug/L	9.4E-09	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.6E-07	3.3E-08	(mg/kg/day)	3.0E-05	(mg/kg/day)	1.1E-03
				beta-BHC	3.60E-02	ug/L	3.1E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.5E-07	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	1.5E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.3E-06	5.1E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.0E-02
				Heptachlor	1.10E-03	ug/L	9.4E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.2E-08	3.3E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	6.6E-05
				Heptachlor Epoxide	9.50E-04	ug/L	8.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	7.4E-08	2.8E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	2.2E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	1.2E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.6E-06	4.2E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	6.0E-02
				Nondioxin-Like PCBs	1.99E-01	ug/L	1.7E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.8E-07	6.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	6.8E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.4E-01
				Antimony	5.30E+00	ug/L	4.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	4.0E-01
				Arsenic	1.87E+01	ug/L	1.6E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.4E-04	5.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.9E+00
				Barium	5.15E+02	ug/L	4.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	7.7E-02
				Boron	7.38E+02	ug/L	6.3E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.1E-01
				Cadmium	1.84E+00	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E-01
				Chromium	8.03E+00	ug/L	1.4E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	6.9E-05	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	8.0E-02
				Cobalt	1.30E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3E+00
				Copper	2.24E+01	ug/L	1.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.7E-02
				Cyanide	1.68E+01	ug/L	1.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	8.4E-01
				Iron	3.96E+04	ug/L	3.4E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.7E+00
				Lead	8.76E+01	ug/L	7.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	9.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.3E+01
				Mercury	7.50E-02	ug/L	6.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	2.2E-02
				Silver	2.53E+01	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.5E-01
				Thallium	3.90E+00	ug/L	3.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	1.0E-05	(mg/kg/day)	1.2E+01
				Vanadium	1.11E+01	ug/L	9.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	6.7E-02
				Zinc	3.72E+01	ug/L	3.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-03	(mg/kg/day)	3.0E-01	(mg/kg/day)	3.7E-03
			Exp. Route Total								5.3E-04					3.8E+01

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	6.6E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	3.8E-09	2.3E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.8E-05
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	7.1E-07	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	5.7E-07	1.2E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	6.2E-03
				1,2-Dichloroethane	1.10E+00	ug/L	3.9E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	3.6E-08	1.4E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	2.3E-04
				1,4-Dichlorobenzene	9.20E-01	ug/L	4.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.6E-08	1.7E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.4E-04
				2-Hexanone	5.60E+00	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.3E-03
				Benzene	5.80E+00	ug/L	6.3E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.5E-07	2.2E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.5E-03
				cis-1,2-Dichloroethene	5.40E+01	ug/L	4.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	8.6E-02
				Ethylbenzene	4.40E+00	ug/L	1.9E-05	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	2.1E-07	6.6E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	6.6E-04
				m+p-Xylenes	2.60E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.0E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	1.5E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.4E-07	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	7.5E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.8E-07	2.6E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.3E-02
				Vinyl Chloride	4.20E+00	ug/L	2.3E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.7E-06	8.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.7E-03
				1,4-Dioxane	5.66E+01	ug/L	1.7E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.7E-07	5.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.0E-04
				2,6-Dinitrotoluene	8.60E+00	ug/L	5.2E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.9E-06	1.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.1E-02
				2-Methylnaphthalene	9.30E+00	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	8.7E-02
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	2.7E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.0E-07	9.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	4.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.0E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	1.6E-05	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.3E-06	5.5E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.1E-02
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	2.2E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.0E-07	7.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	2.6E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.2E-06	9.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.8E-02
				Heptachlor	1.10E-03	ug/L	6.8E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.1E-07	2.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.8E-04
				Heptachlor Epoxide	9.50E-04	ug/L	9.9E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	9.0E-08	3.5E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	2.7E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	3.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.3E-03
				Antimony	5.30E+00	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.5E-02
				Arsenic	1.87E+01	ug/L	8.9E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.3E-06	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.0E-02
				Barium	5.15E+02	ug/L	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	6.2E-03
				Boron	7.38E+02	ug/L	3.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	6.2E-04
				Cadmium	1.84E+00	ug/L	8.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.2E-02
				Chromium	8.03E+00	ug/L	7.7E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.5E-05	1.3E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	1.8E-02
				Cobalt	1.30E+01	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.9E-03
				Copper	2.24E+01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	9.4E-05
				Cyanide	1.68E+01	ug/L	6.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	3.5E-03
				Iron	3.96E+04	ug/L	1.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	9.5E-03
				Lead	8.76E+01	ug/L	4.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	5.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.9E+00
				Mercury	7.50E-02	ug/L	3.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.3E-04
				Silver	2.53E+01	ug/L	7.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.3E-02
				Thallium	3.90E+00	ug/L	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	6.5E-02
				Vanadium	1.11E+01	ug/L	5.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.4E-02
				Zinc	3.72E+01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.7E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.2E-05
			Exp. Route Total								4.0E-05					2.4E+00
		Exposure Point Total									5.7E-04					4.0E+01
	Exposure Medium Total										5.7E-04					4.0E+01

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	7.78E-06	mg/m^3	2.1E-06	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	3.4E-08	7.5E-06	(mg/m^3)	2.0E-04	(mg/m^3)	3.7E-02
				1,2-Dibromo-3-Chloropropane	5.57E-06	mg/m^3	3.1E-06	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	1.8E-05	5.3E-06	(mg/m^3)	2.0E-04	(mg/m^3)	2.7E-02
				1,2-Dichloroethane	8.80E-05	mg/m^3	2.4E-05	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	6.3E-07	8.4E-05	(mg/m^3)	7.0E-03	(mg/m^3)	1.2E-02
				1,4-Dichlorobenzene	6.67E-05	mg/m^3	1.8E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	2.0E-07	6.4E-05	(mg/m^3)	8.0E-01	(mg/m^3)	8.0E-05
				2-Hexanone	1.53E-04	mg/m^3	4.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.5E-04	(mg/m^3)	3.0E-02	(mg/m^3)	4.9E-03
				Benzene	5.95E-04	mg/m^3	1.6E-04	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	1.3E-06	5.7E-04	(mg/m^3)	3.0E-02	(mg/m^3)	1.9E-02
				cis-1,2-Dichloroethene	4.94E-03	mg/m^3	1.4E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	4.7E-03	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.96E-04	mg/m^3	1.1E-04	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	2.7E-07	3.8E-04	(mg/m^3)	1.0E+00	(mg/m^3)	3.8E-04
				m+p-Xylenes	2.33E-03	mg/m^3	6.4E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.2E-03	(mg/m^3)	1.0E-01	(mg/m^3)	2.2E-02
				Trichloroethene (Kidney)	5.08E-04	mg/m^3	2.8E-04	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	2.8E-07	4.9E-04	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Non-Kidney)	5.08E-04	mg/m^3	1.4E-04	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	4.3E-07	4.9E-04	(mg/m^3)	2.0E-03	(mg/m^3)	2.4E-01
				Vinyl Chloride	4.92E-04	mg/m^3	1.3E-04	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	5.9E-07	4.7E-04	(mg/m^3)	1.0E-01	(mg/m^3)	4.7E-03
				1,4-Dioxane	1.16E-04	mg/m^3	3.2E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.6E-07	1.1E-04	(mg/m^3)	3.0E-02	(mg/m^3)	3.7E-03
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	5.17E-04	mg/m^3	1.4E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	5.0E-04	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	8.05E-07	mg/m^3	4.4E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	2.6E-08	7.7E-07	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	6.52E-06	mg/m^3	1.8E-06	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	5.9E-07	6.2E-06	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	4.43E-04	mg/m^3	1.2E-04	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	4.1E-06	4.2E-04	(mg/m^3)	3.0E-03	(mg/m^3)	1.4E-01
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.00E-11	mg/m^3	5.5E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.1E-07	1.9E-11	(mg/m^3)	4.0E-08	(mg/m^3)	4.8E-04
				Aldrin	8.77E-09	mg/m^3	2.4E-09	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.2E-08	8.4E-09	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	3.09E-08	mg/m^3	8.5E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	1.1E-08	3.0E-08	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	3.81E-09	mg/m^3	1.0E-09	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	2.7E-09	3.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	5.10E-11	mg/m^3	1.4E-11	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	5.3E-07	4.9E-11	(mg/m^3)	4.0E-08	(mg/m^3)	1.2E-03
				Nondioxin-Like PCBs	7.25E-06	mg/m^3	2.0E-06	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	2.0E-07	7.0E-06	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.90E-03	mg/m^3	8.0E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.8E-03	(mg/m^3)	8.0E-04	(mg/m^3)	3.5E+00
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								2.8E-05					4.0E+00
		Exposure Point Total									2.8E-05					4.0E+00
	Exposure Medium Total										2.8E-05					4.0E+00
Medium Total											5.9E-04					4.4E+01
										Total of Receptor Risks Across All Media	6E-04				Total of Receptor Hazards Across All Media	4E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.10.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	1.5E-06	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	8.8E-08	--	--	--	--	--
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	9.2E-06	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	7.3E-06	--	--	--	--	--
				1,2-Dichloroethane	1.10E+00	ug/L	1.4E-05	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.3E-06	--	--	--	--	--
				1,4-Dichlorobenzene	9.20E-01	ug/L	1.2E-05	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	6.4E-08	--	--	--	--	--
				2-Hexanone	5.60E+00	ug/L	7.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzene	5.80E+00	ug/L	7.4E-05	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	4.1E-06	--	--	--	--	--
				cis-1,2-Dichloroethene	5.40E+01	ug/L	6.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Ethylbenzene	4.40E+00	ug/L	5.6E-05	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	6.2E-07	--	--	--	--	--
				m+p-Xylenes	2.60E+01	ug/L	3.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	6.20E+00	ug/L	2.5E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	2.3E-06	--	--	--	--	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	8.0E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.9E-06	--	--	--	--	--
				Vinyl Chloride	4.20E+00	ug/L	2.7E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.0E-04	--	--	--	--	--
				1,4-Dioxane	5.66E+01	ug/L	7.3E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.3E-05	--	--	--	--	--
				2,6-Dinitrotoluene	8.60E+00	ug/L	1.1E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.7E-04	--	--	--	--	--
				2-Methylnaphthalene	9.30E+00	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)anthracene	2.60E-01	ug/L	1.0E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.0E-06	--	--	--	--	--
				Benzo(a)pyrene	1.20E-01	ug/L	4.8E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	4.8E-06	--	--	--	--	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	1.5E-05	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.7E-05	--	--	--	--	--
				Naphthalene	8.00E+00	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	2.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	3.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	4.90E-01	ug/L	6.3E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.5E-06	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	2.7E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.5E-06	--	--	--	--	--
				Aldrin	1.10E-03	ug/L	1.4E-08	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	2.4E-07	--	--	--	--	--
				beta-BHC	3.60E-02	ug/L	4.6E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	8.3E-07	--	--	--	--	--
				Dieldrin	1.70E-02	ug/L	2.2E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.5E-06	--	--	--	--	--
				Heptachlor	1.10E-03	ug/L	1.4E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	6.4E-08	--	--	--	--	--
				Heptachlor Epoxide	9.50E-04	ug/L	1.2E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-07	--	--	--	--	--
				Dioxin-Like PCBs	1.40E-06	ug/L	1.8E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.3E-06	--	--	--	--	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	2.6E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.0E-06	--	--	--	--	--
				Aluminum	7.92E+03	ug/L	1.0E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.30E+00	ug/L	6.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	1.87E+01	ug/L	2.4E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.6E-04	--	--	--	--	--
				Barium	5.15E+02	ug/L	6.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	7.38E+02	ug/L	9.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.84E+00	ug/L	2.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	8.03E+00	ug/L	3.2E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.6E-04	--	--	--	--	--
				Cobalt	1.30E+01	ug/L	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.24E+01	ug/L	2.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.68E+01	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.96E+04	ug/L	5.1E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	8.76E+01	ug/L	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	1.08E+04	ug/L	1.4E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	7.50E-02	ug/L	9.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.53E+01	ug/L	3.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	3.90E+00	ug/L	5.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	1.11E+01	ug/L	1.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	3.72E+01	ug/L	4.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								1.0E-03					--

TABLE 7.10.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	9.9E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	5.6E-09	--	--	--	--	--
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	1.6E-06	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.3E-06	--	--	--	--	--
				1,2-Dichloroethane	1.10E+00	ug/L	5.9E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	5.4E-08	--	--	--	--	--
				1,4-Dichlorobenzene	9.20E-01	ug/L	7.4E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	4.0E-08	--	--	--	--	--
				2-Hexanone	5.60E+00	ug/L	2.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzene	5.80E+00	ug/L	9.6E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.3E-07	--	--	--	--	--
				cis-1,2-Dichloroethene	5.40E+01	ug/L	7.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Ethylbenzene	4.40E+00	ug/L	2.9E-05	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	3.2E-07	--	--	--	--	--
				m+p-Xylenes	2.60E+01	ug/L	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	6.20E+00	ug/L	3.6E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	3.3E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	1.1E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	4.2E-07	--	--	--	--	--
				Vinyl Chloride	4.20E+00	ug/L	1.8E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.3E-05	--	--	--	--	--
				1,4-Dioxane	5.66E+01	ug/L	2.4E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.4E-07	--	--	--	--	--
				2,6-Dinitrotoluene	8.60E+00	ug/L	7.6E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.1E-05	--	--	--	--	--
				2-Methylnaphthalene	9.30E+00	ug/L	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	3.9E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	4.3E-07	--	--	--	--	--
				Naphthalene	8.00E+00	ug/L	5.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	4.90E-01	ug/L	2.3E-05	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	9.2E-06	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				beta-BHC	3.60E-02	ug/L	3.2E-07	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.8E-07	--	--	--	--	--
				Dieldrin	1.70E-02	ug/L	3.8E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	6.1E-06	--	--	--	--	--
				Heptachlor	1.10E-03	ug/L	1.0E-07	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.5E-07	--	--	--	--	--
				Heptachlor Epoxide	9.50E-04	ug/L	1.4E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.3E-07	--	--	--	--	--
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aluminum	7.92E+03	ug/L	5.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.30E+00	ug/L	3.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	1.87E+01	ug/L	1.2E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.9E-06	--	--	--	--	--
				Barium	5.15E+02	ug/L	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	7.38E+02	ug/L	4.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.84E+00	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	8.03E+00	ug/L	1.6E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	3.1E-05	--	--	--	--	--
				Cobalt	1.30E+01	ug/L	3.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.24E+01	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.68E+01	ug/L	9.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.96E+04	ug/L	2.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	8.76E+01	ug/L	5.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	1.08E+04	ug/L	7.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	7.50E-02	ug/L	5.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.53E+01	ug/L	1.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	3.90E+00	ug/L	2.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	1.11E+01	ug/L	7.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	3.72E+01	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								7.8E-05					--
		Exposure Point Total									1.1E-03					--
	Exposure Medium Total										1.1E-03					--

TABLE 7.10.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	7.78E-06	mg/m^3	2.1E-06	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	3.4E-08	--	--	--	--	--
				1,2-Dibromo-3-Chloropropane	5.57E-06	mg/m^3	3.1E-06	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	1.8E-05	--	--	--	--	--
				1,2-Dichloroethane	8.80E-05	mg/m^3	2.4E-05	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	6.3E-07	--	--	--	--	--
				1,4-Dichlorobenzene	6.67E-05	mg/m^3	1.8E-05	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	2.0E-07	--	--	--	--	--
				2-Hexanone	1.53E-04	mg/m^3	4.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Benzene	5.95E-04	mg/m^3	1.6E-04	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	1.3E-06	--	--	--	--	--
				cis-1,2-Dichloroethene	4.94E-03	mg/m^3	1.4E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Ethylbenzene	3.96E-04	mg/m^3	1.1E-04	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	2.7E-07	--	--	--	--	--
				m+p-Xylenes	2.33E-03	mg/m^3	6.4E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	5.08E-04	mg/m^3	2.8E-04	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	2.8E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	5.08E-04	mg/m^3	1.4E-04	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	4.3E-07	--	--	--	--	--
				Vinyl Chloride	4.92E-04	mg/m^3	1.3E-04	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	5.9E-07	--	--	--	--	--
				1,4-Dioxane	1.16E-04	mg/m^3	3.2E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.6E-07	--	--	--	--	--
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				2-Methylnaphthalene	5.17E-04	mg/m^3	1.4E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Benzo(a)anthracene	8.05E-07	mg/m^3	4.4E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	2.6E-08	--	--	--	--	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Bis(2-Chloroethyl)Ether	6.52E-06	mg/m^3	1.8E-06	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	5.9E-07	--	--	--	--	--
				Naphthalene	4.43E-04	mg/m^3	1.2E-04	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	4.1E-06	--	--	--	--	--
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.00E-11	mg/m^3	5.5E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.1E-07	--	--	--	--	--
				Aldrin	8.77E-09	mg/m^3	2.4E-09	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.2E-08	--	--	--	--	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Heptachlor	3.09E-08	mg/m^3	8.5E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	1.1E-08	--	--	--	--	--
				Heptachlor Epoxide	3.81E-09	mg/m^3	1.0E-09	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	2.7E-09	--	--	--	--	--
				Dioxin-Like PCBs	5.10E-11	mg/m^3	1.4E-11	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	5.3E-07	--	--	--	--	--
				Nondioxin-Like PCBs	7.25E-06	mg/m^3	2.0E-06	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	2.0E-07	--	--	--	--	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cyanide	2.90E-03	mg/m^3	8.0E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								2.8E-05					--
		Exposure Point Total									2.8E-05					--
	Exposure Medium Total										2.8E-05					--
Medium Total											1.1E-03					--
										Total of Receptor Risks Across All Media	1E-03			Total of Receptor Hazards Across All Media		--

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.11.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.7E+00	ug/L	1.1E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	6.4E-10	3.2E-07	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.6E-06
				Benzene	7.6E-01	ug/L	2.3E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.3E-09	6.5E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.6E-05
				Chloroform	1.2E+00	ug/L	3.7E-08	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	1.1E-09	1.0E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	1.0E-05
				cis-1,2-Dichloroethene	2.0E+03	ug/L	6.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	8.6E-02
				Trichloroethene	3.3E+02	ug/L	1.0E-05	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	4.6E-07	2.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.7E-02
				Vinyl Chloride	1.1E+01	ug/L	3.4E-07	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.4E-07	9.4E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	3.1E-04
				1,4-Dioxane	2.2E+01	ug/L	6.7E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.7E-08	1.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	6.3E-05
				Benzo(a)pyrene	7.7E-02	ug/L	2.4E-09	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.4E-09	6.6E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.2E-05
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	2.1E-07	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	3.0E-09	6.0E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.0E-05
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	9.8E-09	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	9.8E-09	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	1.2E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.2E-09	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.5E-01	ug/L	4.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	6.4E-07
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	8.6E-14	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.1E-08	2.4E-13	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.4E-04
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	1.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-09	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.1E-04
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	1.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-09	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.9E-04
				Dieldrin	2.2E-03	ug/L	6.8E-11	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.1E-09	1.9E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.8E-06
				delta-BHC	1.3E-02	ug/L	4.0E-10	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.5E-09	1.1E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.4E-07
				Aluminum	3.1E+04	ug/L	9.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.7E-03
				Antimony	5.5E+00	ug/L	1.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	1.2E-03
				Arsenic	4.6E+00	ug/L	1.4E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.1E-07	3.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3E-03
				Barium	2.1E+02	ug/L	6.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	8.9E-05
				Beryllium	1.2E+00	ug/L	3.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.1E-05
				Cadmium	1.4E+00	ug/L	4.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.4E-04
				Chromium	3.0E+01	ug/L	9.3E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	4.6E-07	2.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	8.7E-04
				Cobalt	2.7E+01	ug/L	8.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.8E-03
				Cyanide	1.1E+01	ug/L	3.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.6E-03
				Iron	3.7E+04	ug/L	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	4.5E-03
				Lead	3.7E+00	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.3E+03	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.2E-02
				Vanadium	8.2E+00	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.4E-04
			Exp. Route Total								1.5E-06					1.8E-01
			Dermal	1,1-Dichloroethane	3.7E+00	ug/L	2.0E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.1E-08	5.6E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.8E-05
				Benzene	7.6E-01	ug/L	8.5E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	4.7E-08	2.4E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	6.0E-04
				Chloroform	1.2E+00	ug/L	6.8E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.1E-08	1.9E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	1.9E-04
				cis-1,2-Dichloroethene	2.0E+03	ug/L	1.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.4E+00
				Trichloroethene	3.3E+02	ug/L	3.2E-04	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	1.5E-05	9.0E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.8E+00
				Vinyl Chloride	1.1E+01	ug/L	6.8E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	4.9E-06	1.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	6.4E-03
				1,4-Dioxane	2.2E+01	ug/L	6.8E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.8E-08	1.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	6.3E-05
				Benzo(a)pyrene	7.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.5E-01	ug/L	5.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.7E-05
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Dieldrin	2.2E-03	ug/L	1.9E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.0E-07	5.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.0E-03
				delta-BHC	1.3E-02	ug/L	4.2E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.6E-07	1.2E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.5E-05
				Aluminum	3.1E+04	ug/L	2.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	7.5E-03
				Antimony	5.5E+00	ug/L	4.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	2.2E-02
				Arsenic	4.6E+00	ug/L	4.0E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.9E-07	1.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.7E-03
				Barium	2.1E+02	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	3.6E-03
				Beryllium	1.2E+00	ug/L	1.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	2.1E-02
				Cadmium	1.4E+00	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.4E-02
				Chromium	3.0E+01	ug/L	2.6E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	5.2E-05	7.3E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	9.8E-02

TABLE 7.11.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill	Dermal	Cobalt	2.7E+01	ug/L	9.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.8E-03
		Deep Wells		Cyanide	1.1E+01	ug/L	7.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	3.3E-03
				Iron	3.7E+04	ug/L	3.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.3E-02
				Lead	3.7E+00	ug/L	3.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.3E+03	ug/L	2.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.0E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	8.3E-01
				Vanadium	8.2E+00	ug/L	7.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.5E-02
			Exp. Route Total								7.3E-05					5.3E+00
		Exposure Point Total									7.5E-05					5.5E+00
	Exposure Medium Total										7.5E-05					5.5E+00
	Air - Irrigation	Outside Landfill	Inhalation	1,1-Dichloroethane	9.7E-05	mg/m^3	7.9E-06	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	1.3E-08	2.2E-05	(mg/m^3)	NA	(mg/m^3)	--
		Deep Wells		Benzene	2.0E-05	mg/m^3	1.6E-06	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.3E-08	4.5E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.5E-04
				Chloroform	2.9E-05	mg/m^3	2.4E-06	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	5.5E-08	6.7E-06	(mg/m^3)	9.8E-02	(mg/m^3)	6.9E-05
				cis-1,2-Dichloroethene	5.0E-02	mg/m^3	4.1E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.1E-02	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene	9.3E-03	mg/m^3	7.6E-04	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	3.1E-06	2.1E-03	(mg/m^3)	2.0E-03	(mg/m^3)	1.1E+00
				Vinyl Chloride	3.5E-04	mg/m^3	2.9E-05	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	1.3E-07	8.0E-05	(mg/m^3)	1.0E-01	(mg/m^3)	8.0E-04
				1,4-Dioxane	3.1E-06	mg/m^3	2.5E-07	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	1.3E-09	7.1E-07	(mg/m^3)	3.0E-02	(mg/m^3)	2.4E-05
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	2.5E-06	mg/m^3	2.1E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	7.0E-09	5.7E-07	(mg/m^3)	3.0E-03	(mg/m^3)	1.9E-04
				2,3,7,8-TCDD Equivalents	2.5E-11	mg/m^3	2.0E-12	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	7.6E-08	5.6E-12	(mg/m^3)	4.0E-08	(mg/m^3)	1.4E-04
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	3.5E-04	mg/m^3	2.9E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.0E-05	(mg/m^3)	8.0E-04	(mg/m^3)	1.0E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								3.4E-06					1.2E+00
		Exposure Point Total									3.4E-06					1.2E+00
	Exposure Medium Total										3.4E-06					1.2E+00
Medium Total											7.8E-05					6.6E+00
Groundwater	Air - Showering	Outside Landfill	Inhalation	1,1-Dichloroethane	2.6E-05	mg/m^3	6.4E-06	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	1.0E-08	1.8E-05	(mg/m^3)	NA	(mg/m^3)	--
		Deep Wells		Benzene	6.0E-06	mg/m^3	1.5E-06	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.1E-08	4.1E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.4E-04
				Chloroform	7.6E-06	mg/m^3	1.9E-06	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	4.3E-08	5.2E-06	(mg/m^3)	9.8E-02	(mg/m^3)	5.3E-05
				cis-1,2-Dichloroethene	1.4E-02	mg/m^3	3.5E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.7E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene	2.1E-03	mg/m^3	5.1E-04	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	2.1E-06	1.4E-03	(mg/m^3)	2.0E-03	(mg/m^3)	7.1E-01
				Vinyl Chloride	9.9E-05	mg/m^3	2.4E-05	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	1.1E-07	6.8E-05	(mg/m^3)	1.0E-01	(mg/m^3)	6.8E-04
				1,4-Dioxane	3.5E-06	mg/m^3	8.5E-07	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	4.3E-09	2.4E-06	(mg/m^3)	3.0E-02	(mg/m^3)	7.9E-05
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--

TABLE 7.11.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Showering	Outside Landfill	Inhalation	Naphthalene	6.4E-07	mg/m^3	1.6E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	5.3E-09	4.4E-07	(mg/m^3)	3.0E-03	(mg/m^3)	1.5E-04
		Deep Wells		2,3,7,8-TCDD Equivalents	2.0E-12	mg/m^3	5.0E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	1.9E-08	1.4E-12	(mg/m^3)	4.0E-08	(mg/m^3)	3.5E-05
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	1.5E-04	mg/m^3	3.6E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.0E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.3E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								2.3E-06					8.4E-01
		Exposure Point Total									2.3E-06					8.4E-01
	Exposure Medium Total										2.3E-06					8.4E-01
Medium Total											2.3E-06					8.4E-01
										Total of Receptor Risks Across All Media	8E-05				Total of Receptor Hazards Across All Media	7E+00

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.12.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.70E+00	ug/L	1.6E-05	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	9.0E-08	1.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	9.2E-04
				Benzene	7.60E-01	ug/L	3.2E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.8E-07	3.8E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	9.5E-03
				Chloroform	1.20E+00	ug/L	5.1E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	1.6E-07	6.0E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	6.0E-03
				cis-1,2-Dichloroethene	2.00E+03	ug/L	8.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-01	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.0E+01
				Trichloroethene (Kidney)	3.30E+02	ug/L	7.5E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	7.0E-05	1.6E-02	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	1.4E-03	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	5.2E-05	1.6E-02	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.3E+01
				Vinyl Chloride	1.10E+01	ug/L	6.2E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	4.5E-04	5.5E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.8E-01
				1,4-Dioxane	2.20E+01	ug/L	9.4E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	9.4E-06	1.1E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.7E-02
				Benzo(a)pyrene	7.70E-02	ug/L	1.8E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.8E-06	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3E-02
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	3.0E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	4.2E-07	3.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.7E-02
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	7.3E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	7.3E-06	1.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	8.9E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.9E-07	1.9E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.50E-01	ug/L	6.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.7E-04
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	1.2E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.6E-06	1.4E-10	(mg/kg/day)	7.0E-10	(mg/kg/day)	2.0E-01
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.2E-01
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.1E-01
				Dieldrin	2.24E-03	ug/L	9.6E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.5E-07	1.1E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.2E-03
				delta-BHC	1.30E-02	ug/L	5.6E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	3.5E-07	6.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	8.1E-05
				Aluminum	3.12E+04	ug/L	1.3E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.6E+00
				Antimony	5.50E+00	ug/L	2.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	6.9E-01
				Arsenic	4.58E+00	ug/L	2.0E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.9E-05	2.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.6E-01
				Barium	2.07E+02	ug/L	8.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.2E-02
				Beryllium	1.20E+00	ug/L	5.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.0E-02
				Cadmium	1.40E+00	ug/L	6.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.4E-01
				Chromium	3.04E+01	ug/L	6.9E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	3.5E-04	1.5E-03	(mg/kg/day)	3.0E-03	(mg/kg/day)	5.1E-01
				Cobalt	2.72E+01	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-03	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.5E+00
				Cyanide	1.11E+01	ug/L	4.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	9.2E-01
				Iron	3.67E+04	ug/L	1.6E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.6E+00
				Lead	3.65E+00	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.31E+03	ug/L	1.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	6.9E+00
				Vanadium	8.21E+00	ug/L	3.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.2E-02
			Exp. Route Total								9.7E-04					1.0E+02
			Dermal	1,1-Dichloroethane	3.70E+00	ug/L	1.1E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	6.2E-09	1.3E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	6.3E-05
				Benzene	7.60E-01	ug/L	4.3E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.4E-08	5.0E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.3E-03
				Chloroform	1.20E+00	ug/L	4.1E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	1.3E-08	4.7E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	4.7E-04
				cis-1,2-Dichloroethene	2.00E+03	ug/L	9.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-02	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.5E+00
				Trichloroethene (Kidney)	3.30E+02	ug/L	1.1E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.0E-05	2.4E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	2.1E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	7.6E-06	2.4E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.8E+00
				Vinyl Chloride	1.10E+01	ug/L	4.2E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	3.0E-05	3.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.2E-02
				1,4-Dioxane	2.20E+01	ug/L	3.0E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.0E-08	3.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.2E-04
				Benzo(a)pyrene	7.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.50E-01	ug/L	3.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.1E-04
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Dieldrin	2.24E-03	ug/L	1.6E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.5E-07	1.8E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.6E-03
				delta-BHC	1.30E-02	ug/L	3.5E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.2E-07	4.1E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	5.1E-05
				Aluminum	3.12E+04	ug/L	5.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.9E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	6.9E-03
				Antimony	5.50E+00	ug/L	1.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	2.0E-02
				Arsenic	4.58E+00	ug/L	8.63E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.3E-07	1.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.4E-03
				Barium	2.07E+02	ug/L	3.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	3.2E-03
				Beryllium	1.20E+00	ug/L	2.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	1.9E-02
				Cadmium	1.40E+00	ug/L	2.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.2E-02
				Chromium	3.04E+01	ug/L	3.1E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	6.1E-05	6.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	8.9E-02

TABLE 7.12.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill	Dermal	Cobalt	2.72E+01	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.0E-03
		Deep Wells		Cyanide	1.11E+01	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	4.1E-03
				Iron	3.67E+04	ug/L	6.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.2E-02
				Lead	3.65E+00	ug/L	6.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.31E+03	ug/L	6.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.3E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	7.6E-01
				Vanadium	8.21E+00	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.4E-02
			Exp. Route Total								1.1E-04					1.1E+01
		Exposure Point Total									1.1E-03					1.1E+02
	Exposure Medium Total										1.1E-03					1.1E+02
Medium Total											1.1E-03					1.1E+02
										Total of Receptor Risks Across All Media	1E-03			Total of Receptor Hazards Across All Media		1E+02

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.13.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.7E+00	ug/L	3.2E-05	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.8E-07	1.1E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.5E-04
				Benzene	7.6E-01	ug/L	6.5E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.6E-07	2.3E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.7E-03
				Chloroform	1.2E+00	ug/L	1.0E-05	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	3.2E-07	3.6E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	3.6E-03
				cis-1,2-Dichloroethene	2.0E+03	ug/L	1.7E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-02	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.0E+01
				Trichloroethene (Kidney)	3.3E+02	ug/L	5.7E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	5.3E-05	9.9E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.3E+02	ug/L	2.8E-03	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.0E-04	9.9E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.0E+01
				Vinyl Chloride	1.1E+01	ug/L	9.4E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	6.8E-05	3.3E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.1E-01
				1,4-Dioxane	2.2E+01	ug/L	1.9E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.9E-05	6.6E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.2E-02
				Benzo(a)pyrene	7.7E-02	ug/L	1.3E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.3E-06	2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.7E-03
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	6.0E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	8.4E-07	2.1E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.0E-02
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	5.5E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	5.5E-06	9.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	6.7E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.7E-07	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.5E-01	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.2E-04
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	2.4E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.1E-06	8.4E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.2E-01
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	4.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	7.5E-02
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	3.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	6.6E-02
				Dieldrin	2.2E-03	ug/L	1.9E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.1E-07	6.7E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.3E-03
				delta-BHC	1.3E-02	ug/L	1.1E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	7.0E-07	3.9E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	4.9E-05
				Aluminum	3.1E+04	ug/L	2.7E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.4E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	9.4E-01
				Antimony	5.5E+00	ug/L	4.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	4.1E-01
				Arsenic	4.6E+00	ug/L	3.9E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.9E-05	1.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.6E-01
				Barium	2.1E+02	ug/L	1.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.1E-02
				Beryllium	1.2E+00	ug/L	1.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.8E-02
				Cadmium	1.4E+00	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.4E-02
				Chromium	3.0E+01	ug/L	5.2E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.6E-04	9.1E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	3.0E-01
				Cobalt	2.7E+01	ug/L	2.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.2E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.7E+00
				Cyanide	1.1E+01	ug/L	9.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	5.5E-01
				Iron	3.7E+04	ug/L	3.1E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.6E+00
				Lead	3.7E+00	ug/L	3.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.3E+03	ug/L	2.8E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.9E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	4.1E+00
				Vanadium	8.2E+00	ug/L	7.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.9E-02
			Exp. Route Total								5.8E-04					6.1E+01
			Dermal	1,1-Dichloroethane	3.7E+00	ug/L	2.1E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.2E-08	7.3E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.6E-05
				Benzene	7.6E-01	ug/L	8.3E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	4.6E-08	2.9E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	7.3E-04
				Chloroform	1.2E+00	ug/L	7.9E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.5E-08	2.8E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	2.8E-04
				cis-1,2-Dichloroethene	2.0E+03	ug/L	1.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.2E+00
				Trichloroethene (Kidney)	3.3E+02	ug/L	8.0E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	7.4E-06	1.4E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.3E+02	ug/L	4.0E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.5E-05	1.4E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.8E+00
				Vinyl Chloride	1.1E+01	ug/L	6.0E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	4.4E-06	2.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	7.1E-03
				1,4-Dioxane	2.2E+01	ug/L	6.5E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.5E-08	2.3E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	7.6E-05
				Benzo(a)pyrene	7.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.5E-01	ug/L	7.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.3E-04
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Dieldrin	2.2E-03	ug/L	3.5E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	5.5E-07	1.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.4E-03
				delta-BHC	1.3E-02	ug/L	7.8E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	4.9E-07	2.7E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.4E-05
				Aluminum	3.1E+04	ug/L	1.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	5.2E-03
				Antimony	5.5E+00	ug/L	2.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.2E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.5E-02
				Arsenic	4.6E+00	ug/L	2.2E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.3E-07	7.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.6E-03
				Barium	2.1E+02	ug/L	9.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	2.5E-03
				Beryllium	1.2E+00	ug/L	5.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	1.4E-02
				Cadmium	1.4E+00	ug/L	6.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	9.4E-03
				Chromium	3.0E+01	ug/L	2.9E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	5.8E-05	5.1E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	6.8E-02
				Cobalt	2.7E+01	ug/L	5.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.1E-03

TABLE 7.13.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill	Dermal	Cyanide	1.1E+01	ug/L	4.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.3E-03
		Deep Wells		Iron	3.7E+04	ug/L	1.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	8.8E-03
				Lead	3.7E+00	ug/L	1.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.3E+03	ug/L	1.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	5.8E-01
				Vanadium	8.2E+00	ug/L	3.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.1E-02
			Exp. Route Total								8.6E-05					6.7E+00
		Exposure Point Total									6.6E-04					6.8E+01
	Exposure Medium Total										6.6E-04					6.8E+01
	Air-Shower	Outside Landfill	Inhalation	1,1-Dichloroethane	3.4E-04	mg/m^3	9.3E-05	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	1.5E-07	3.3E-04	(mg/m^3)	NA	(mg/m^3)	--
		Deep Wells		Benzene	7.8E-05	mg/m^3	2.1E-05	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.7E-07	7.5E-05	(mg/m^3)	3.0E-02	(mg/m^3)	2.5E-03
				Chloroform	9.9E-05	mg/m^3	2.7E-05	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	6.2E-07	9.5E-05	(mg/m^3)	9.8E-02	(mg/m^3)	9.7E-04
				cis-1,2-Dichloroethene	1.8E-01	mg/m^3	5.0E-02	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.8E-01	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Kidney)	2.7E-02	mg/m^3	1.5E-02	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	1.5E-05	2.6E-02	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Non-Kidney)	2.7E-02	mg/m^3	7.4E-03	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	2.3E-05	2.6E-02	(mg/m^3)	2.0E-03	(mg/m^3)	1.3E+01
				Vinyl Chloride	1.3E-03	mg/m^3	3.5E-04	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	1.6E-06	1.2E-03	(mg/m^3)	1.0E-01	(mg/m^3)	1.2E-02
				1,4-Dioxane	4.5E-05	mg/m^3	1.2E-05	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	6.2E-08	4.3E-05	(mg/m^3)	3.0E-02	(mg/m^3)	1.4E-03
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	8.3E-06	mg/m^3	2.3E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	7.7E-08	8.0E-06	(mg/m^3)	3.0E-03	(mg/m^3)	2.7E-03
				2,3,7,8-TCDD Equivalents	2.6E-11	mg/m^3	7.2E-12	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	2.8E-07	2.5E-11	(mg/m^3)	4.0E-08	(mg/m^3)	6.3E-04
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	1.9E-03	mg/m^3	5.3E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.8E-03	(mg/m^3)	8.0E-04	(mg/m^3)	2.3E+00
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								4.1E-05					1.5E+01
		Exposure Point Total									4.1E-05					1.5E+01
	Exposure Medium Total										4.1E-05					1.5E+01
Medium Total											7.0E-04					8.3E+01
										Total of Receptor Risks Across All Media	7E-04				Total of Receptor Hazards Across All Media	8E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.14.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.7E+00	ug/L	4.7E-05	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	2.7E-07	--	--	--	--	--
				Benzene	7.6E-01	ug/L	9.8E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.4E-07	--	--	--	--	--
				Chloroform	1.2E+00	ug/L	1.5E-05	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	4.8E-07	--	--	--	--	--
				cis-1,2-Dichloroethene	2.0E+03	ug/L	2.6E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	3.3E+02	ug/L	1.3E-02	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.2E-04	--	--	--	--	--
				Trichloroethene (Non-Kidney)	3.3E+02	ug/L	4.2E-03	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.6E-04	--	--	--	--	--
				Vinyl Chloride	1.1E+01	ug/L	7.1E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	5.1E-04	--	--	--	--	--
				1,4-Dioxane	2.2E+01	ug/L	2.8E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.8E-05	--	--	--	--	--
				Benzo(a)pyrene	7.7E-02	ug/L	3.1E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	3.1E-06	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	9.0E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.3E-06	--	--	--	--	--
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	1.3E-05	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.3E-05	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	1.6E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.6E-06	--	--	--	--	--
				Naphthalene	1.5E-01	ug/L	1.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	3.6E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	4.7E-06	--	--	--	--	--
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	6.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	5.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dieldrin	2.2E-03	ug/L	2.9E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.6E-07	--	--	--	--	--
				delta-BHC	1.3E-02	ug/L	1.7E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.1E-06	--	--	--	--	--
				Aluminum	3.1E+04	ug/L	4.0E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.5E+00	ug/L	7.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	4.6E+00	ug/L	5.9E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.8E-05	--	--	--	--	--
				Barium	2.1E+02	ug/L	2.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	1.2E+00	ug/L	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.4E+00	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	3.0E+01	ug/L	1.2E-03	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	6.1E-04	--	--	--	--	--
				Cobalt	2.7E+01	ug/L	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.1E+01	ug/L	1.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.7E+04	ug/L	4.7E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	3.7E+00	ug/L	4.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	3.3E+03	ug/L	4.3E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	8.2E+00	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								1.5E-03					--
			Dermal	1,1-Dichloroethane	3.7E+00	ug/L	3.2E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.8E-08	--	--	--	--	--
				Benzene	7.6E-01	ug/L	1.3E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.9E-08	--	--	--	--	--
				Chloroform	1.2E+00	ug/L	1.2E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	3.7E-08	--	--	--	--	--
				cis-1,2-Dichloroethene	2.0E+03	ug/L	2.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	3.3E+02	ug/L	1.9E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.8E-05	--	--	--	--	--
				Trichloroethene (Non-Kidney)	3.3E+02	ug/L	6.0E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.2E-05	--	--	--	--	--
				Vinyl Chloride	1.1E+01	ug/L	4.8E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	3.4E-05	--	--	--	--	--
				1,4-Dioxane	2.2E+01	ug/L	9.5E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	9.5E-08	--	--	--	--	--
				Benzo(a)pyrene	7.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Naphthalene	1.5E-01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dieldrin	2.2E-03	ug/L	5.0E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	8.0E-07	--	--	--	--	--
				delta-BHC	1.3E-02	ug/L	1.1E-07	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	7.1E-07	--	--	--	--	--
				Aluminum	3.1E+04	ug/L	2.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.5E+00	ug/L	3.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	4.6E+00	ug/L	3.1E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.6E-07	--	--	--	--	--
				Barium	2.1E+02	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	1.2E+00	ug/L	8.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.4E+00	ug/L	9.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	3.0E+01	ug/L	6.0E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.2E-04	--	--	--	--	--
				Cobalt	2.7E+01	ug/L	7.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--

TABLE 7.14.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill	Dermal	Cyanide	1.1E+01	ug/L	6.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
		Deep Wells		Iron	3.7E+04	ug/L	2.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	3.7E+00	ug/L	2.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	3.3E+03	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	8.2E+00	ug/L	5.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								2.0E-04					--
		Exposure Point Total									1.7E-03					--
	Exposure Medium Total										1.7E-03					--
	Air-Shower	Outside Landfill	Inhalation	1,1-Dichloroethane	3.4E-04	mg/m^3	9.3E-05	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	1.5E-07	--	--	--	--	--
		Deep Wells		Benzene	7.8E-05	mg/m^3	2.1E-05	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.7E-07	--	--	--	--	--
				Chloroform	9.9E-05	mg/m^3	2.7E-05	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	6.2E-07	--	--	--	--	--
				cis-1,2-Dichloroethene	1.8E-01	mg/m^3	5.0E-02	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	2.7E-02	mg/m^3	1.5E-02	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	1.5E-05	--	--	--	--	--
				Trichloroethene (Non-Kidney)	2.7E-02	mg/m^3	7.4E-03	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	2.3E-05	--	--	--	--	--
				Vinyl Chloride	1.3E-03	mg/m^3	3.5E-04	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	1.6E-06	--	--	--	--	--
				1,4-Dioxane	4.5E-05	mg/m^3	1.2E-05	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	6.2E-08	--	--	--	--	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Naphthalene	8.3E-06	mg/m^3	2.3E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	7.7E-08	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.6E-11	mg/m^3	7.2E-12	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	2.8E-07	--	--	--	--	--
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.9E-03	mg/m^3	5.3E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								4.1E-05					--
		Exposure Point Total									4.1E-05					--
	Exposure Medium Total										4.1E-05					--
Medium Total											1.8E-03					--
										Total of Receptor Risks Across All Media	2E-03				Total of Receptor Hazards Across All Media		--

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.1.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.70E-01	ug/L	5.7E-10	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.1E-12	4.0E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	5.7E-07
				1,4-Dichlorobenzene	1.89E+00	ug/L	1.4E-09	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	7.5E-12	9.7E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.4E-06
				Benzene	1.60E+00	ug/L	1.2E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.5E-11	8.2E-08	(mg/kg/day)	1.0E-02	(mg/kg/day)	8.2E-06
				Chlorobenzene	3.03E+01	ug/L	2.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.2E-05
				Trichloroethene	2.30E+00	ug/L	1.7E-09	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	7.8E-11	1.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.4E-04
				1,4-Dioxane	9.19E+01	ug/L	6.7E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.7E-09	4.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	9.4E-06
				Benzo(a)anthracene	5.55E-01	ug/L	4.1E-10	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.1E-11	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	6.1E-10	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	6.1E-10	4.3E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-04
				Benzo(b)fluoranthene	1.40E+00	ug/L	1.0E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.0E-10	7.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	3.9E-10	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	3.9E-12	2.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	9.0E-09	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.3E-10	6.3E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)	6.3E-06
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	4.5E-11	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	4.5E-11	3.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	5.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	9.5E-05
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	3.5E-10	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.5E-11	2.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	8.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-08	(mg/kg/day)	6.0E-01	(mg/kg/day)	9.4E-08
				Pentachlorophenol	1.91E-01	ug/L	1.4E-10	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	5.6E-11	9.8E-09	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.0E-06
				Phenanthrene	8.21E+00	ug/L	6.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-07	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.4E-06
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	1.8E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.4E-07	1.3E-10	(mg/kg/day)	2.0E-08	(mg/kg/day)	6.4E-03
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	2.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-08	(mg/kg/day)	2.0E-04	(mg/kg/day)	7.4E-05
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	3.8E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-08	(mg/kg/day)	8.0E-05	(mg/kg/day)	3.3E-04
				4,4'-DDD	1.00E-02	ug/L	7.3E-12	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.8E-12	5.1E-10	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	4.0E-11	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.4E-11	2.8E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	3.4E-11	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	5.9E-10	2.4E-09	(mg/kg/day)	4.0E-05	(mg/kg/day)	6.0E-05
				beta-BHC	4.20E-02	ug/L	3.1E-11	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.5E-11	2.2E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	2.5E-11	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.6E-10	1.7E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	2.2E-07
				Dieldrin	2.20E-02	ug/L	1.6E-11	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.6E-10	1.1E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.1E-05
				Heptachlor	4.90E-03	ug/L	3.6E-12	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.6E-11	2.5E-10	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.0E-07
				Heptachlor Epoxide	9.00E-04	ug/L	6.6E-13	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.0E-12	4.6E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.6E-06
				gamma-BHC (Lindane)	4.40E-02	ug/L	3.2E-11	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.6E-11	2.3E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.5E-06
				Dioxin-Like PCBs	2.50E-04	ug/L	1.8E-13	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.4E-08	1.3E-11	(mg/kg/day)	2.0E-08	(mg/kg/day)	6.4E-04
				Nondioxin-Like PCBs	1.32E+02	ug/L	9.7E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.9E-08	6.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	8.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.9E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	5.9E-04
				Antimony	2.78E+01	ug/L	2.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	3.6E-03
				Arsenic	2.52E+01	ug/L	1.8E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.8E-08	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.3E-03
				Barium	1.22E+03	ug/L	9.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.1E-04
				Beryllium	8.00E+00	ug/L	5.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.2E-05
				Boron	2.35E+03	ug/L	1.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	6.0E-04
				Cadmium	2.19E+01	ug/L	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.3E-03
				Chromium	1.51E+02	ug/L	1.1E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	5.5E-08	7.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.6E-03
				Cobalt	1.26E+01	ug/L	9.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.5E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.2E-04
				Copper	2.80E+02	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	3.6E-04
				Cyanide	1.08E+02	ug/L	7.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.8E-04
				Iron	5.29E+04	ug/L	3.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	3.9E-03
				Lead	2.26E+02	ug/L	1.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	3.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	9.9E-03
				Mercury	8.20E+00	ug/L	6.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	2.8E-07
				Nickel	1.32E+02	ug/L	9.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.4E-04
				Silver	2.63E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.7E-04
				Thallium	2.90E+00	ug/L	2.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	9.07E+01	ug/L	6.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	4.7E-04
				Zinc	1.63E+03	ug/L	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.8E-04
			Exp. Route Total								3.9E-07					3.7E-02

TABLE 7.1.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.70E-01	ug/L	1.1E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	6.2E-11	8.0E-07	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.1E-05
				1,4-Dichlorobenzene	1.89E+00	ug/L	2.2E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.2E-10	1.5E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.2E-05
				Benzene	1.60E+00	ug/L	5.4E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.0E-10	3.8E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	3.8E-05
				Chlorobenzene	3.03E+01	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.0E-04
				Trichloroethene	2.30E+00	ug/L	6.9E-09	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	3.2E-10	4.8E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	9.7E-04
				1,4-Dioxane	9.19E+01	ug/L	7.3E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.3E-10	5.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	1.0E-06
				Benzo(a)anthracene	5.55E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.40E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	1.0E-01	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.5E-03
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	1.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-07	(mg/kg/day)	6.0E-01	(mg/kg/day)	1.4E-06
				Pentachlorophenol	1.91E-01	ug/L	1.1E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	4.5E-09	7.9E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.6E-04
				Phenanthrene	8.21E+00	ug/L	3.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	8.2E-05
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-04	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	8.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.00E-02	ug/L	1.5E-09	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	3.5E-10	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-05	(mg/kg/day)	--
				beta-BHC	4.20E-02	ug/L	4.7E-10	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	8.5E-10	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	3.7E-10	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.3E-09	2.6E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.3E-06
				Dieldrin	2.20E-02	ug/L	6.2E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	9.9E-09	4.3E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	4.3E-04
				Heptachlor	4.90E-03	ug/L	5.8E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.6E-09	4.0E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.1E-05
				Heptachlor Epoxide	9.00E-04	ug/L	1.7E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.6E-10	1.2E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	9.3E-05
				gamma-BHC (Lindane)	4.40E-02	ug/L	4.9E-10	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	5.4E-10	3.5E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.2E-04
				Dioxin-Like PCBs	2.50E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.32E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	2.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.7E-04
				Antimony	2.78E+01	ug/L	5.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	6.7E-03
				Arsenic	2.52E+01	ug/L	5.2E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.8E-09	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.2E-03
				Barium	1.22E+03	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.3E-03
				Beryllium	8.00E+00	ug/L	1.7E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-07	(mg/kg/day)	3.5E-05	(mg/kg/day)	3.3E-03
				Boron	2.35E+03	ug/L	4.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.7E-04
				Cadmium	2.19E+01	ug/L	4.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.3E-02
				Chromium	1.51E+02	ug/L	3.1E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	6.3E-07	2.2E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	1.8E-02
				Cobalt	1.26E+01	ug/L	1.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.3E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.4E-05
				Copper	2.80E+02	ug/L	5.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.0E-04
				Cyanide	1.08E+02	ug/L	2.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.8E-05
				Iron	5.29E+04	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.7E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.1E-03
				Lead	2.26E+02	ug/L	4.7E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	9.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	7.0E-02
				Mercury	8.20E+00	ug/L	1.7E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)	7.9E-08
				Nickel	1.32E+02	ug/L	5.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	4.8E-04
				Silver	2.63E+01	ug/L	3.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.1E-03
				Thallium	2.90E+00	ug/L	6.0E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	9.07E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	2.6E-04	(mg/kg/day)	5.1E-03
				Zinc	1.63E+03	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	4.7E-05
			Exp. Route Total								6.6E-07					1.3E-01
		Exposure Point Total									1.0E-06					1.6E-01
	Exposure Medium Total										1.0E-06					1.6E-01

TABLE 7.1.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Trench	Inside Landfill	Inhalation	1,3-Dichlorobenzene	4.97E-03	mg/m^3	9.7E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.1E-08	6.8E-05	(mg/m^3)	1.2E+00	(mg/m^3)	5.7E-05
				1,4-Dichlorobenzene	1.22E-02	mg/m^3	2.4E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	2.6E-08	1.7E-04	(mg/m^3)	1.2E+00	(mg/m^3)	1.4E-04
				Benzene	1.43E-02	mg/m^3	2.8E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	2.2E-08	2.0E-04	(mg/m^3)	8.0E-02	(mg/m^3)	2.5E-03
				Chlorobenzene	2.24E-01	mg/m^3	4.4E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.1E-03	(mg/m^3)	5.0E-01	(mg/m^3)	6.1E-03
				Trichloroethene	1.59E-02	mg/m^3	3.1E-06	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	1.3E-08	2.2E-04	(mg/m^3)	2.0E-03	(mg/m^3)	1.1E-01
				1,4-Dioxane	6.02E-02	mg/m^3	1.2E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	5.9E-08	8.2E-04	(mg/m^3)	7.2E-01	(mg/m^3)	1.1E-03
				Benzo(a)anthracene	5.75E-04	mg/m^3	1.1E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	6.8E-09	7.9E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	3.67E-02	mg/m^3	7.2E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	5.0E-04	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	6.91E-03	mg/m^3	1.4E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	4.6E-08	9.5E-05	(mg/m^3)	3.0E-03	(mg/m^3)	3.2E-02
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	2.22E-02	mg/m^3	4.3E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.0E-04	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	5.77E-06	mg/m^3	1.1E-09	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	4.3E-05	7.9E-08	(mg/m^3)	4.0E-08	(mg/m^3)	2.0E+00
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	1.16E-04	mg/m^3	2.3E-08	(mg/m^3)	9.7E-05	(ug/m^3)$^{-1}$	2.2E-09	1.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	9.66E-05	mg/m^3	1.9E-08	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	9.3E-08	1.3E-06	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.75E-05	mg/m^3	3.4E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	4.5E-09	2.4E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.16E-06	mg/m^3	2.3E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	5.9E-10	1.6E-08	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	1.05E-06	mg/m^3	2.1E-10	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	7.8E-06	1.4E-08	(mg/m^3)	4.0E-08	(mg/m^3)	3.6E-01
				Nondioxin-Like PCBs	5.54E-01	mg/m^3	1.1E-04	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	1.1E-05	7.6E-03	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Beryllium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	3.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.69E+00	mg/m^3	3.3E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.3E-02	(mg/m^3)	8.0E-04	(mg/m^3)	2.9E+01
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-04	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								6.2E-05					3.1E+01
		Exposure Point Total									6.2E-05					3.1E+01
	Exposure Medium Total										6.2E-05					3.1E+01
Medium Total											6.3E-05					3.2E+01
										Total of Receptor Risks Across All Media	6E-05				Total of Receptor Hazards Across All Media	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.7E-01	ug/L	5.4E-09	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.9E-11	5.8E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	8.3E-07
				1,4-Dichlorobenzene	1.9E+00	ug/L	1.3E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	7.2E-11	1.4E-07	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.0E-06
				Benzene	1.6E+00	ug/L	1.1E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.2E-10	1.2E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.0E-05
				Chlorobenzene	3.0E+01	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.1E-04
				Trichloroethene	2.3E+00	ug/L	1.6E-08	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	7.5E-10	1.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.5E-04
				1,4-Dioxane	9.2E+01	ug/L	6.5E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	6.5E-08	6.9E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.3E-04
				Benzo(a)anthracene	5.6E-01	ug/L	3.9E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.9E-10	4.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	5.9E-09	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	5.9E-09	6.2E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.1E-04
				Benzo(b)fluoranthene	1.4E+00	ug/L	9.9E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	9.9E-10	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	3.7E-09	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	3.7E-11	4.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	8.6E-08	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.2E-09	9.2E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.6E-05
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	4.3E-10	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	4.3E-10	4.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	5.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-07	(mg/kg/day)	1.0E-03	(mg/kg/day)	5.6E-04
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	3.4E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.4E-10	3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	7.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.3E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.1E-06
				Pentachlorophenol	1.9E-01	ug/L	1.4E-09	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	5.4E-10	1.4E-08	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.9E-06
				Phenanthrene	8.2E+00	ug/L	5.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.1E-05
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	1.8E-11	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.3E-06	1.9E-10	(mg/kg/day)	7.0E-10	(mg/kg/day)	2.7E-01
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	2.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.1E-03
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	3.7E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.0E-03
				4,4'-DDD	1.0E-02	ug/L	7.1E-11	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.7E-11	7.5E-10	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	3.9E-10	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.3E-10	4.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	3.3E-10	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	5.7E-09	3.5E-09	(mg/kg/day)	3.0E-05	(mg/kg/day)	1.2E-04
				beta-BHC	4.2E-02	ug/L	3.0E-10	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.3E-10	3.2E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	2.4E-10	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.5E-09	2.6E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.2E-07
				Dieldrin	2.2E-02	ug/L	1.6E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.5E-09	1.7E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.3E-05
				Heptachlor	4.9E-03	ug/L	3.5E-11	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.6E-10	3.7E-10	(mg/kg/day)	5.0E-04	(mg/kg/day)	7.4E-07
				Heptachlor Epoxide	9.0E-04	ug/L	6.4E-12	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	5.8E-11	6.8E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	5.2E-06
				gamma-BHC (Lindane)	4.4E-02	ug/L	3.1E-10	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.4E-10	3.3E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.1E-05
				Dioxin-Like PCBs	2.5E-04	ug/L	1.8E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.3E-07	1.9E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	2.7E-02
				Nondioxin-Like PCBs	1.3E+02	ug/L	9.3E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	3.7E-07	9.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	8.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	8.6E-04
				Antimony	2.8E+01	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-06	(mg/kg/day)	4.0E-04	(mg/kg/day)	5.2E-03
				Arsenic	2.5E+01	ug/L	1.8E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.7E-07	1.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.3E-03
				Barium	1.2E+03	ug/L	8.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.2E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	4.6E-04
				Beryllium	8.0E+00	ug/L	5.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.0E-04
				Boron	2.4E+03	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	8.8E-04
				Cadmium	2.2E+01	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.3E-03
				Chromium	1.5E+02	ug/L	1.1E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	5.3E-07	1.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	3.8E-03
				Cobalt	1.3E+01	ug/L	8.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.2E-03
				Copper	2.8E+02	ug/L	2.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	5.3E-04
				Cyanide	1.1E+02	ug/L	7.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.4E-02
				Iron	5.3E+04	ug/L	3.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	5.7E-03
				Lead	2.3E+02	ug/L	1.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	3.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.5E-02
				Mercury	8.2E+00	ug/L	5.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	6.2E-03
				Nickel	1.3E+02	ug/L	9.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.9E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.0E-04
				Silver	2.6E+01	ug/L	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.9E-04
				Thallium	2.9E+00	ug/L	2.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	2.2E-02
				Vanadium	9.1E+01	ug/L	6.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.4E-03
				Zinc	1.6E+03	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	4.1E-04
			Exp. Route Total								3.8E-06					3.9E-01

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	1,3-Dichlorobenzene	7.7E-01	ug/L	4.9E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.6E-09	5.2E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	7.4E-05
				1,4-Dichlorobenzene	1.9E+00	ug/L	9.5E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	5.1E-09	1.0E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.4E-04
				Benzene	1.6E+00	ug/L	2.2E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.2E-08	2.4E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.9E-04
				Chlorobenzene	3.0E+01	ug/L	8.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.6E-03
				Trichloroethene	2.3E+00	ug/L	2.9E-07	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	1.4E-08	3.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	6.2E-03
				1,4-Dioxane	9.2E+01	ug/L	3.5E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.5E-08	3.7E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.2E-04
				Benzo(a)anthracene	5.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	9.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.6E-05	(mg/kg/day)	1.0E-03	(mg/kg/day)	9.6E-02
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	5.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.9E-04
				Pentachlorophenol	1.9E-01	ug/L	5.4E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.2E-07	5.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.2E-03
				Phenanthrene	8.2E+00	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	5.9E-03
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.0E-02	ug/L	7.1E-08	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.7E-08	7.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	4.2E-02	ug/L	2.3E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.1E-08	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	1.8E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.1E-07	1.9E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	2.4E-05
				Dieldrin	2.2E-02	ug/L	3.0E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.8E-07	3.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	6.3E-03
				Heptachlor	4.9E-03	ug/L	2.7E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.2E-07	2.8E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.7E-04
				Heptachlor Epoxide	9.0E-04	ug/L	8.2E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	7.5E-09	8.7E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	6.7E-04
				gamma-BHC (Lindane)	4.4E-02	ug/L	2.4E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	2.6E-08	2.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.4E-04
				Dioxin-Like PCBs	2.5E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.2E-03
				Antimony	2.8E+01	ug/L	2.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	4.9E-02
				Arsenic	2.5E+01	ug/L	2.5E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.8E-07	2.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.9E-03
				Barium	1.2E+03	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	9.2E-03
				Beryllium	8.0E+00	ug/L	8.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.5E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	6.0E-02
				Boron	2.4E+03	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.2E-03
				Cadmium	2.2E+01	ug/L	2.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-06	(mg/kg/day)	2.5E-05	(mg/kg/day)	9.3E-02
				Chromium	1.5E+02	ug/L	1.5E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	3.0E-05	1.6E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	2.1E-01
				Cobalt	1.3E+01	ug/L	5.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.8E-03
				Copper	2.8E+02	ug/L	2.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	7.4E-04
				Cyanide	1.1E+02	ug/L	8.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.4E-02
				Iron	5.3E+04	ug/L	5.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	8.0E-03
				Lead	2.3E+02	ug/L	2.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	4.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	5.1E-01
				Mercury	8.2E+00	ug/L	8.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	8.7E-03
				Nickel	1.3E+02	ug/L	2.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-06	(mg/kg/day)	8.0E-04	(mg/kg/day)	3.5E-03
				Silver	2.6E+01	ug/L	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	8.3E-03
				Thallium	2.9E+00	ug/L	2.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	3.1E-02
				Vanadium	9.1E+01	ug/L	9.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.6E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	7.4E-02
				Zinc	1.6E+03	ug/L	9.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	3.4E-04
			Exp. Route Total								3.2E-05					1.2E+00
		Exposure Point Total									3.5E-05					1.6E+00
	Exposure Medium Total										3.5E-05					1.6E+00

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air - Trench	Inside Landfill	Inhalation	1,3-Dichlorobenzene	5.0E-03	mg/m^3	6.4E-06	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	7.1E-08	6.8E-05	(mg/m^3)	8.0E-01	(mg/m^3)	8.5E-05
				1,4-Dichlorobenzene	1.2E-02	mg/m^3	1.6E-05	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	1.7E-07	1.7E-04	(mg/m^3)	8.0E-01	(mg/m^3)	2.1E-04
				Benzene	1.4E-02	mg/m^3	1.8E-05	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.4E-07	2.0E-04	(mg/m^3)	3.0E-02	(mg/m^3)	6.5E-03
				Chlorobenzene	2.2E-01	mg/m^3	2.9E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.1E-03	(mg/m^3)	5.0E-02	(mg/m^3)	6.1E-02
				Trichloroethene	1.6E-02	mg/m^3	2.1E-05	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	8.4E-08	2.2E-04	(mg/m^3)	2.0E-03	(mg/m^3)	1.1E-01
				1,4-Dioxane	6.0E-02	mg/m^3	7.8E-05	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	3.9E-07	8.2E-04	(mg/m^3)	3.0E-02	(mg/m^3)	2.7E-02
				Benzo(a)anthracene	5.8E-04	mg/m^3	7.4E-07	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	4.5E-08	7.9E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	3.7E-02	mg/m^3	4.7E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.0E-04	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	6.9E-03	mg/m^3	8.9E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	3.0E-07	9.5E-05	(mg/m^3)	3.0E-03	(mg/m^3)	3.2E-02
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	2.2E-02	mg/m^3	2.9E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	3.0E-04	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	5.8E-06	mg/m^3	7.4E-09	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	2.8E-04	7.9E-08	(mg/m^3)	4.0E-08	(mg/m^3)	2.0E+00
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	1.2E-04	mg/m^3	1.5E-07	(mg/m^3)	9.7E-05	$(ug/m^3)^{-1}$	1.5E-08	1.6E-06	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	9.7E-05	mg/m^3	1.2E-07	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	6.1E-07	1.3E-06	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.8E-05	mg/m^3	2.3E-08	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	2.9E-08	2.4E-07	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.2E-06	mg/m^3	1.5E-09	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	3.9E-09	1.6E-08	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	1.0E-06	mg/m^3	1.4E-09	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	5.1E-05	1.4E-08	(mg/m^3)	4.0E-08	(mg/m^3)	3.6E-01
				Nondioxin-Like PCBs	5.5E-01	mg/m^3	7.2E-04	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	7.2E-05	7.6E-03	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.7E+00	mg/m^3	2.2E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	2.3E-02	(mg/m^3)	8.0E-04	(mg/m^3)	2.9E+01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								4.1E-04					3.1E+01
		Exposure Point Total									4.1E-04					3.1E+01
	Exposure Medium Total										4.1E-04					3.1E+01
Medium Total											4.4E-04					3.3E+01

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Irrigation	Inside Landfill	Inhalation	1,3-Dichlorobenzene	1.8E-05	mg/m^3	1.7E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.9E-09	1.8E-06	(mg/m^3)	8.0E-01	(mg/m^3)	2.2E-06
				1,4-Dichlorobenzene	4.4E-05	mg/m^3	4.1E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	4.5E-09	4.4E-06	(mg/m^3)	8.0E-01	(mg/m^3)	5.4E-06
				Benzene	4.2E-05	mg/m^3	3.9E-07	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	3.1E-09	4.2E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.4E-04
				Chlorobenzene	7.3E-04	mg/m^3	6.8E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.3E-05	(mg/m^3)	5.0E-02	(mg/m^3)	1.5E-03
				Trichloroethene	6.5E-05	mg/m^3	6.1E-07	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	2.5E-09	6.5E-06	(mg/m^3)	2.0E-03	(mg/m^3)	3.2E-03
				1,4-Dioxane	1.3E-05	mg/m^3	1.2E-07	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	6.1E-10	1.3E-06	(mg/m^3)	3.0E-02	(mg/m^3)	4.3E-05
				Benzo(a)anthracene	2.0E-06	mg/m^3	1.8E-08	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	1.1E-09	2.0E-07	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	1.0E-04	mg/m^3	9.8E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.0E-05	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	1.8E-05	mg/m^3	1.7E-07	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	5.9E-09	1.8E-06	(mg/m^3)	3.0E-03	(mg/m^3)	6.1E-04
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	6.7E-05	mg/m^3	6.3E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	6.7E-06	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.2E-08	mg/m^3	2.1E-10	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	7.9E-06	2.2E-09	(mg/m^3)	4.0E-08	(mg/m^3)	5.5E-02
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	4.4E-07	mg/m^3	4.2E-09	(mg/m^3)	9.7E-05	(ug/m^3)$^{-1}$	4.1E-10	4.4E-08	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	3.9E-07	mg/m^3	3.7E-09	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.8E-08	3.9E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	7.5E-08	mg/m^3	7.1E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	9.2E-10	7.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	5.0E-09	mg/m^3	4.7E-11	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	1.2E-10	5.0E-10	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	4.1E-09	mg/m^3	3.9E-11	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	1.5E-06	4.1E-10	(mg/m^3)	4.0E-08	(mg/m^3)	1.0E-02
				Nondioxin-Like PCBs	2.2E-03	mg/m^3	2.1E-05	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	2.1E-06	2.2E-04	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	3.4E-03	mg/m^3	3.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.4E-04	(mg/m^3)	8.0E-04	(mg/m^3)	4.3E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								1.1E-05					5.0E-01
		Exposure Point Total									1.1E-05					5.0E-01
	Exposure Medium Total										1.1E-05					5.0E-01
Medium Total											1.1E-05					5.0E-01

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Showering	Inside Landfill	Inhalation	1,3-Dichlorobenzene	4.3E-06	mg/m^3	2.5E-07	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	2.7E-09	2.6E-06	(mg/m^3)	8.0E-01	(mg/m^3)	3.3E-06
				1,4-Dichlorobenzene	1.1E-05	mg/m^3	6.0E-07	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	6.6E-09	6.3E-06	(mg/m^3)	8.0E-01	(mg/m^3)	7.9E-06
				Benzene	1.3E-05	mg/m^3	7.2E-07	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	5.6E-09	7.6E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.5E-04
				Chlorobenzene	2.0E-04	mg/m^3	1.1E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.2E-04	(mg/m^3)	5.0E-02	(mg/m^3)	2.4E-03
				Trichloroethene	1.5E-05	mg/m^3	8.2E-07	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	3.4E-09	8.7E-06	(mg/m^3)	2.0E-03	(mg/m^3)	4.4E-03
				1,4-Dioxane	1.5E-05	mg/m^3	8.2E-07	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	4.1E-09	8.7E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.9E-04
				Benzo(a)anthracene	1.3E-07	mg/m^3	7.5E-09	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	4.5E-10	8.0E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	2.0E-05	mg/m^3	1.1E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.2E-05	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	4.7E-06	mg/m^3	2.7E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	9.0E-09	2.8E-06	(mg/m^3)	3.0E-03	(mg/m^3)	9.4E-04
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	7.0E-06	mg/m^3	3.9E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	4.2E-06	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	1.8E-09	mg/m^3	1.0E-10	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	3.9E-06	1.1E-09	(mg/m^3)	4.0E-08	(mg/m^3)	2.7E-02
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	3.5E-08	mg/m^3	2.0E-09	(mg/m^3)	9.7E-05	$(ug/m^3)^{-1}$	1.9E-10	2.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	2.9E-08	mg/m^3	1.6E-09	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	8.0E-09	1.7E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.1E-08	mg/m^3	6.0E-10	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	7.8E-10	6.4E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	2.8E-10	mg/m^3	1.6E-11	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	4.1E-11	1.7E-10	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	7.0E-10	mg/m^3	4.0E-11	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	1.5E-06	4.2E-10	(mg/m^3)	4.0E-08	(mg/m^3)	1.1E-02
				Nondioxin-Like PCBs	3.7E-04	mg/m^3	2.1E-05	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	2.1E-06	2.2E-04	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.4E-03	mg/m^3	8.1E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	8.6E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.1E+00
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								7.6E-06					1.1E+00
		Exposure Point Total									7.6E-06					1.1E+00
	Exposure Medium Total										7.6E-06					1.1E+00
Medium Total											7.6E-06					1.1E+00
										Total of Receptor Risks Across All Media	5E-04			Total of Receptor Hazards Across All Media		3.5E+01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.70E-01	ug/L	6.3E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.4E-09	1.5E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.1E-04
				1,4-Dichlorobenzene	1.89E+00	ug/L	1.6E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	8.4E-09	3.6E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	5.2E-04
				Benzene	1.60E+00	ug/L	1.3E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	7.3E-08	3.1E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	7.7E-03
				Chlorobenzene	3.03E+01	ug/L	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.9E-02
				Trichloroethene (Kidney)	2.30E+00	ug/L	1.5E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.4E-07	4.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.30E+00	ug/L	1.9E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	7.0E-08	4.4E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.8E-02
				1,4-Dioxane	9.19E+01	ug/L	7.6E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.6E-06	1.8E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	5.9E-02
				Benzo(a)anthracene	5.55E-01	ug/L	3.5E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.5E-07	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	5.2E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	5.2E-06	1.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	5.3E-02
				Benzo(b)fluoranthene	1.40E+00	ug/L	8.8E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.8E-07	2.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	3.3E-06	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	3.3E-08	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	1.0E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.4E-07	2.3E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.2E-02
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	3.9E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	3.9E-07	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	6.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	1.4E-01
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	3.0E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.0E-07	9.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	9.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.1E-03
				Pentachlorophenol	1.91E-01	ug/L	1.6E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.3E-08	3.7E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	7.3E-04
				Phenanthrene	8.21E+00	ug/L	6.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	5.3E-03
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	2.1E-09	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.7E-04	4.8E-08	(mg/kg/day)	7.0E-10	(mg/kg/day)	6.9E+01
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	2.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.8E-01
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	4.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	5.0E-01
				4,4'-DDD	1.00E-02	ug/L	8.2E-09	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	2.0E-09	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	4.5E-08	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.5E-08	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	3.9E-08	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	6.6E-07	9.0E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	3.0E-02
				beta-BHC	4.20E-02	ug/L	3.5E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	6.2E-08	8.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	2.8E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.8E-07	6.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	8.2E-05
				Dieldrin	2.20E-02	ug/L	1.8E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.9E-07	4.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	8.5E-03
				Heptachlor	4.90E-03	ug/L	4.0E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.8E-08	9.4E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9E-04
				Heptachlor Epoxide	9.00E-04	ug/L	7.4E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.8E-09	1.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.3E-03
				gamma-BHC (Lindane)	4.40E-02	ug/L	3.6E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	4.0E-08	8.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.8E-03
				Dioxin-Like PCBs	2.50E-04	ug/L	2.1E-10	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.7E-05	4.8E-09	(mg/kg/day)	7.0E-10	(mg/kg/day)	6.9E+00
				Nondioxin-Like PCBs	1.32E+02	ug/L	1.1E-04	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	4.4E-05	2.5E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	9.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.2E-01
				Antimony	2.78E+01	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	1.3E+00
				Arsenic	2.52E+01	ug/L	2.1E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.1E-05	4.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.6E+00
				Barium	1.22E+03	ug/L	1.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.2E-01
				Beryllium	8.00E+00	ug/L	6.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	7.7E-02
				Boron	2.35E+03	ug/L	1.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.3E-01
				Cadmium	2.19E+01	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.4E-01
				Chromium	1.51E+02	ug/L	9.5E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	4.8E-04	2.9E-03	(mg/kg/day)	3.0E-03	(mg/kg/day)	9.7E-01
				Cobalt	1.26E+01	ug/L	1.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.1E-01
				Copper	2.80E+02	ug/L	2.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.3E-01
				Cyanide	1.08E+02	ug/L	8.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-03	(mg/kg/day)	6.0E-04	(mg/kg/day)	3.5E+00
				Iron	5.29E+04	ug/L	4.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E+00	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.5E+00
				Lead	2.26E+02	ug/L	1.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	3.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	3.7E+00
				Mercury	8.20E+00	ug/L	6.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.6E+00
				Nickel	1.32E+02	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-03	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.3E-01
				Silver	2.63E+01	ug/L	2.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.1E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.0E-01
				Thallium	2.90E+00	ug/L	2.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-05	(mg/kg/day)	1.0E-05	(mg/kg/day)	5.6E+00
				Vanadium	9.07E+01	ug/L	7.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-03	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.5E-01
				Zinc	1.63E+03	ug/L	1.3E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-02	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.0E-01
			Exp. Route Total								8.6E-04					1.0E+02

TABLE 7.3.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.70E-01	ug/L	7.0E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.8E-09	1.6E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.3E-04
				1,4-Dichlorobenzene	1.89E+00	ug/L	1.3E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	7.2E-09	3.1E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	4.4E-04
				Benzene	1.60E+00	ug/L	2.4E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.3E-08	5.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.4E-03
				Chlorobenzene	3.03E+01	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.2E-02
				Trichloroethene (Kidney)	2.30E+00	ug/L	2.9E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	2.7E-08	8.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.30E+00	ug/L	3.7E-07	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.4E-08	8.7E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.7E-02
				1,4-Dioxane	9.19E+01	ug/L	3.2E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.2E-08	7.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.5E-04
				Benzo(a)anthracene	5.55E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.40E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.30E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.22E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.10E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.40E+00	ug/L	1.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	3.0E-01
				Indeno(1,2,3-cd)pyrene	4.80E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.10E+00	ug/L	7.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	8.2E-04
				Pentachlorophenol	1.91E-01	ug/L	7.3E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.9E-07	1.7E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.4E-03
				Phenanthrene	8.21E+00	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.8E-02
				2,3,7,8-TCDD Equivalents	2.50E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.90E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.20E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.00E-02	ug/L	9.5E-08	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	2.3E-08	2.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.50E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	4.20E-02	ug/L	3.0E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.5E-08	7.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.40E-02	ug/L	2.4E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.5E-07	5.6E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	7.0E-05
				Dieldrin	2.20E-02	ug/L	4.0E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	6.4E-07	9.4E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.9E-02
				Heptachlor	4.90E-03	ug/L	3.7E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.7E-07	8.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.7E-03
				Heptachlor Epoxide	9.00E-04	ug/L	1.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.0E-08	2.6E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	2.0E-03
				gamma-BHC (Lindane)	4.40E-02	ug/L	3.2E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.5E-08	7.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5E-03
				Dioxin-Like PCBs	2.50E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.32E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.15E+04	ug/L	4.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.0E-03
				Antimony	2.78E+01	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	4.2E-02
				Arsenic	2.52E+01	ug/L	9.7E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.5E-07	2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.5E-03
				Barium	1.22E+03	ug/L	4.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	1.4E-02	(mg/kg/day)	7.8E-03
				Beryllium	8.00E+00	ug/L	3.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.2E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	5.1E-02
				Boron	2.35E+03	ug/L	9.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.1E-03
				Cadmium	2.19E+01	ug/L	8.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	2.5E-05	(mg/kg/day)	7.9E-02
				Chromium	1.51E+02	ug/L	4.5E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	8.9E-05	1.4E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	1.8E-01
				Cobalt	1.26E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.5E-03
				Copper	2.80E+02	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	6.3E-04
				Cyanide	1.08E+02	ug/L	4.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.7E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.6E-02
				Iron	5.29E+04	ug/L	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	6.8E-03
				Lead	2.26E+02	ug/L	8.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.64E+03	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	4.3E-01
				Mercury	8.20E+00	ug/L	3.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.4E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	7.4E-03
				Nickel	1.32E+02	ug/L	1.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	8.0E-04	(mg/kg/day)	3.0E-03
				Silver	2.63E+01	ug/L	6.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	7.1E-03
				Thallium	2.90E+00	ug/L	1.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	2.6E-02
				Vanadium	9.07E+01	ug/L	3.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	6.3E-02
				Zinc	1.63E+03	ug/L	3.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.8E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.9E-04
			Exp. Route Total								9.1E-05					1.3E+00
		Exposure Point Total									9.5E-04					1.0E+02
	Exposure Medium Total										9.5E-04					1.0E+02
Medium Total											9.5E-04					1.0E+02
											Total of Receptor Risks Across All Media	1E-03				Total of Receptor Hazards Across All Media	1E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.7E-01	ug/L	9.5E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	5.1E-09	7.4E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.1E-04
				1,4-Dichlorobenzene	1.9E+00	ug/L	2.3E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.3E-08	1.8E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.6E-04
				Benzene	1.6E+00	ug/L	2.0E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.1E-07	1.5E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.8E-03
				Chlorobenzene	3.0E+01	ug/L	3.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.5E-02
				Trichloroethene (Kidney)	2.3E+00	ug/L	4.1E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	3.8E-08	2.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	2.8E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.1E-07	2.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.4E-02
				1,4-Dioxane	9.2E+01	ug/L	1.1E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.1E-05	8.8E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.9E-02
				Benzo(a)anthracene	5.6E-01	ug/L	9.9E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	9.9E-08	5.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	1.5E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.5E-06	8.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.7E-02
				Benzo(b)fluoranthene	1.4E+00	ug/L	2.5E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.5E-07	1.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	9.5E-07	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	9.5E-09	5.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	1.5E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	2.1E-07	1.2E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.9E-03
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	1.1E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.1E-07	5.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	9.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.1E-05	(mg/kg/day)	1.0E-03	(mg/kg/day)	7.1E-02
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	8.6E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.6E-08	4.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	1.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.3E-04
				Pentachlorophenol	1.9E-01	ug/L	2.4E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	9.4E-08	1.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.7E-04
				Phenanthrene	8.2E+00	ug/L	1.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.9E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	2.6E-03
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	3.1E-09	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	4.0E-04	2.4E-08	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.4E+01
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	3.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.4E-01
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	6.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.5E-01
				4,4'-DDD	1.0E-02	ug/L	1.2E-08	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	3.0E-09	9.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	6.8E-08	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	2.3E-08	5.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	5.8E-08	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	9.9E-07	4.5E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	1.5E-02
				beta-BHC	4.2E-02	ug/L	5.2E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	9.3E-08	4.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	4.2E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.6E-07	3.3E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	4.1E-05
				Dieldrin	2.2E-02	ug/L	2.7E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.4E-07	2.1E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	4.2E-03
				Heptachlor	4.9E-03	ug/L	6.1E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.7E-08	4.7E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	9.4E-05
				Heptachlor Epoxide	9.0E-04	ug/L	1.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.0E-08	8.7E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	6.7E-04
				gamma-BHC (Lindane)	4.4E-02	ug/L	5.4E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	6.0E-08	4.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-03
				Dioxin-Like PCBs	2.5E-04	ug/L	3.1E-10	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	4.0E-05	2.4E-09	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.4E+00
				Nondioxin-Like PCBs	1.3E+02	ug/L	1.6E-04	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.5E-05	1.3E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	1.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.1E-01
				Antimony	2.8E+01	ug/L	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	6.7E-01
				Arsenic	2.5E+01	ug/L	3.1E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.7E-05	2.4E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.1E-01
				Barium	1.2E+03	ug/L	1.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.9E-02
				Beryllium	8.0E+00	ug/L	9.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.7E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.8E-02
				Boron	2.4E+03	ug/L	2.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.1E-01
				Cadmium	2.2E+01	ug/L	2.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.2E-01
				Chromium	1.5E+02	ug/L	2.7E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.3E-04	1.5E-03	(mg/kg/day)	3.0E-03	(mg/kg/day)	4.8E-01
				Cobalt	1.3E+01	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.0E-01
				Copper	2.8E+02	ug/L	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	6.7E-02
				Cyanide	1.1E+02	ug/L	1.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.7E+00
				Iron	5.3E+04	ug/L	6.5E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	7.3E-01
				Lead	2.3E+02	ug/L	2.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	5.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.9E+00
				Mercury	8.2E+00	ug/L	1.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.9E-05	(mg/kg/day)	1.0E-04	(mg/kg/day)	7.9E-01
				Nickel	1.3E+02	ug/L	1.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-03	(mg/kg/day)	2.0E-02	(mg/kg/day)	6.3E-02
				Silver	2.6E+01	ug/L	3.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.1E-02
				Thallium	2.9E+00	ug/L	3.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-05	(mg/kg/day)	1.0E-05	(mg/kg/day)	2.8E+00
				Vanadium	9.1E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.7E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.7E-01
				Zinc	1.6E+03	ug/L	2.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-02	(mg/kg/day)	3.0E-01	(mg/kg/day)	5.2E-02
			Exp. Route Total								7.0E-04					5.0E+01

TABLE 7.4.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.7E-01	ug/L	9.4E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	5.1E-09	7.3E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.0E-04
				1,4-Dichlorobenzene	1.9E+00	ug/L	1.8E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	9.7E-09	1.4E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.0E-04
				Benzene	1.6E+00	ug/L	3.0E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.7E-08	2.4E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.9E-04
				Chlorobenzene	3.0E+01	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.5E-03
				Trichloroethene (Kidney)	2.3E+00	ug/L	7.2E-07	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	6.7E-09	3.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	5.0E-07	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.8E-08	3.9E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	7.7E-03
				1,4-Dioxane	9.2E+01	ug/L	4.9E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.9E-08	3.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.3E-04
				Benzo(a)anthracene	5.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	8.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Dibenzofuran	7.4E+00	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-04	(mg/kg/day)	1.0E-03	(mg/kg/day)	1.4E-01
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.1E+00	ug/L	9.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.8E-04
				Pentachlorophenol	1.9E-01	ug/L	1.1E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	4.4E-07	8.6E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.7E-03
				Phenanthrene	8.2E+00	ug/L	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	8.7E-03
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				4,4'-DDD	1.0E-02	ug/L	1.4E-07	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	3.4E-08	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	5.5E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	4.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	4.2E-02	ug/L	4.6E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	8.3E-08	3.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				delta-BHC	3.4E-02	ug/L	3.6E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	2.3E-07	2.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.5E-05
				Dieldrin	2.2E-02	ug/L	6.1E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	9.7E-07	4.7E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	9.4E-03
				Heptachlor	4.9E-03	ug/L	5.4E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.4E-07	4.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.4E-04
				Heptachlor Epoxide	9.0E-04	ug/L	1.7E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.5E-08	1.3E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.0E-03
				gamma-BHC (Lindane)	4.4E-02	ug/L	4.8E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	5.3E-08	3.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3E-03
				Dioxin-Like PCBs	2.5E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	1.2E+04	ug/L	5.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	4.5E-04
				Antimony	2.8E+01	ug/L	1.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-06	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.8E-02
				Arsenic	2.5E+01	ug/L	1.3E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.9E-07	9.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.3E-03
				Barium	1.2E+03	ug/L	6.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	3.4E-03
				Beryllium	8.0E+00	ug/L	4.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	2.2E-02
				Boron	2.4E+03	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.3E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	4.6E-04
				Cadmium	2.2E+01	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	3.4E-02
				Chromium	1.5E+02	ug/L	1.1E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.2E-05	5.9E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	7.9E-02
				Cobalt	1.3E+01	ug/L	2.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.6E-04
				Copper	2.8E+02	ug/L	1.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.8E-04
				Cyanide	1.1E+02	ug/L	4.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	5.3E-03
				Iron	5.3E+04	ug/L	2.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	3.0E-03
				Lead	2.3E+02	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	4.6E+03	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.9E-01
				Mercury	8.2E+00	ug/L	4.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	3.2E-03
				Nickel	1.3E+02	ug/L	1.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-06	(mg/kg/day)	8.0E-04	(mg/kg/day)	1.3E-03
				Silver	2.6E+01	ug/L	8.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	3.1E-03
				Thallium	2.9E+00	ug/L	1.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	1.1E-02
				Vanadium	9.1E+01	ug/L	4.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	2.7E-02
				Zinc	1.6E+03	ug/L	4.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-05	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.3E-04
			Exp. Route Total								2.4E-05					5.9E-01
		Exposure Point Total									7.3E-04					5.0E+01
	Exposure Medium Total										7.3E-04					5.0E+01

TABLE 7.4.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Inside Landfill	Inhalation	1,3-Dichlorobenzene	4.3E-06	mg/m^3	3.6E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	3.9E-09	2.8E-06	(mg/m^3)	8.0E-01	(mg/m^3)	3.5E-06
				1,4-Dichlorobenzene	1.1E-05	mg/m^3	8.7E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	9.6E-09	6.8E-06	(mg/m^3)	8.0E-01	(mg/m^3)	8.5E-06
				Benzene	1.3E-05	mg/m^3	1.0E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	8.1E-09	8.1E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.7E-04
				Chlorobenzene	2.0E-04	mg/m^3	1.6E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.3E-04	(mg/m^3)	5.0E-02	(mg/m^3)	2.5E-03
				Trichloroethene (Kidney)	1.5E-05	mg/m^3	1.7E-06	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	1.7E-09	9.3E-06	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Non-Kidney)	1.5E-05	mg/m^3	1.2E-06	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	3.7E-09	9.3E-06	(mg/m^3)	2.0E-03	(mg/m^3)	4.7E-03
				1,4-Dioxane	1.5E-05	mg/m^3	1.2E-06	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	6.0E-09	9.3E-06	(mg/m^3)	3.0E-02	(mg/m^3)	3.1E-04
				Benzo(a)anthracene	1.3E-07	mg/m^3	1.6E-08	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	9.5E-10	8.5E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzofuran	2.0E-05	mg/m^3	1.7E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.3E-05	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	4.7E-06	mg/m^3	3.9E-07	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	1.3E-08	3.0E-06	(mg/m^3)	3.0E-03	(mg/m^3)	1.0E-03
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Phenanthrene	7.0E-06	mg/m^3	5.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	4.5E-06	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	1.8E-09	mg/m^3	1.5E-10	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	5.7E-06	1.2E-09	(mg/m^3)	4.0E-08	(mg/m^3)	2.9E-02
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				4,4'-DDE	3.5E-08	mg/m^3	2.8E-09	(mg/m^3)	9.7E-05	(ug/m^3)$^{-1}$	2.8E-10	2.2E-08	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	2.9E-08	mg/m^3	2.4E-09	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.2E-08	1.9E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.1E-08	mg/m^3	8.7E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	1.1E-09	6.8E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	2.8E-10	mg/m^3	2.3E-11	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	6.0E-11	1.8E-10	(mg/m^3)	NA	(mg/m^3)	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	7.0E-10	mg/m^3	5.8E-11	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.2E-06	4.5E-10	(mg/m^3)	4.0E-08	(mg/m^3)	1.1E-02
				Nondioxin-Like PCBs	3.7E-04	mg/m^3	3.1E-05	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	3.1E-06	2.4E-04	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	1.4E-03	mg/m^3	1.2E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	9.2E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.2E+00
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								1.1E-05					1.2E+00
		Exposure Point Total									1.1E-05					1.2E+00
	Exposure Medium Total										1.1E-05					1.2E+00
Medium Total											7.4E-04					5.2E+01
										Total of Receptor Risks Across All Media	7E-04				Total of Receptor Hazards Across All Media	5E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Ingestion	1,3-Dichlorobenzene	7.7E-01	ug/L	1.6E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	8.6E-09	--	--	--	--	--
				1,4-Dichlorobenzene	1.9E+00	ug/L	3.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.1E-08	--	--	--	--	--
				Benzene	1.6E+00	ug/L	3.3E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.8E-07	--	--	--	--	--
				Chlorobenzene	3.0E+01	ug/L	6.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	2.3E+00	ug/L	1.9E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.7E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	4.7E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.8E-07	--	--	--	--	--
				1,4-Dioxane	9.2E+01	ug/L	1.9E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.9E-05	--	--	--	--	--
				Benzo(a)anthracene	5.6E-01	ug/L	4.5E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.5E-07	--	--	--	--	--
				Benzo(a)pyrene	8.3E-01	ug/L	6.7E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	6.7E-06	--	--	--	--	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	1.1E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.1E-06	--	--	--	--	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	4.3E-06	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	4.3E-08	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	2.5E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	3.5E-07	--	--	--	--	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	4.9E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	4.9E-07	--	--	--	--	--
				Dibenzofuran	7.4E+00	ug/L	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	3.9E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.9E-07	--	--	--	--	--
				Naphthalene	1.1E+00	ug/L	2.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	1.9E-01	ug/L	3.9E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.6E-07	--	--	--	--	--
				Phenanthrene	8.2E+00	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	5.2E-09	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	6.7E-04	--	--	--	--	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	6.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				4,4'-DDD	1.0E-02	ug/L	2.1E-08	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	4.9E-09	--	--	--	--	--
				4,4'-DDE	5.5E-02	ug/L	1.1E-07	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	3.9E-08	--	--	--	--	--
				Aldrin	4.7E-02	ug/L	9.7E-08	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.6E-06	--	--	--	--	--
				beta-BHC	4.2E-02	ug/L	8.7E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.6E-07	--	--	--	--	--
				delta-BHC	3.4E-02	ug/L	7.0E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	4.4E-07	--	--	--	--	--
				Dieldrin	2.2E-02	ug/L	4.5E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	7.3E-07	--	--	--	--	--
				Heptachlor	4.9E-03	ug/L	1.0E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.5E-08	--	--	--	--	--
				Heptachlor Epoxide	9.0E-04	ug/L	1.9E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.7E-08	--	--	--	--	--
				gamma-BHC (Lindane)	4.4E-02	ug/L	9.1E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.0E-07	--	--	--	--	--
				Dioxin-Like PCBs	2.5E-04	ug/L	5.2E-10	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	6.7E-05	--	--	--	--	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	2.7E-04	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.1E-04	--	--	--	--	--
				Aluminum	1.2E+04	ug/L	2.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	2.8E+01	ug/L	5.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	2.5E+01	ug/L	5.2E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.8E-05	--	--	--	--	--
				Barium	1.2E+03	ug/L	2.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	8.0E+00	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	2.4E+03	ug/L	4.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	2.2E+01	ug/L	4.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	1.5E+02	ug/L	1.2E-03	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	6.1E-04	--	--	--	--	--
				Cobalt	1.3E+01	ug/L	2.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.8E+02	ug/L	5.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.1E+02	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	5.3E+04	ug/L	1.1E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	2.3E+02	ug/L	4.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	4.6E+03	ug/L	9.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	8.2E+00	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nickel	1.3E+02	ug/L	2.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.6E+01	ug/L	5.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	2.9E+00	ug/L	6.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	9.1E+01	ug/L	1.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	1.6E+03	ug/L	3.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								1.6E-03					--

TABLE 7.5.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Inside Landfill	Dermal	1,3-Dichlorobenzene	7.7E-01	ug/L	1.6E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	8.8E-09	--	--	--	--	--
				1,4-Dichlorobenzene	1.9E+00	ug/L	3.1E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.7E-08	--	--	--	--	--
				Benzene	1.6E+00	ug/L	5.4E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.0E-08	--	--	--	--	--
				Chlorobenzene	3.0E+01	ug/L	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	2.3E+00	ug/L	3.6E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	3.3E-08	--	--	--	--	--
				Trichloroethene (Non-Kidney)	2.3E+00	ug/L	8.7E-07	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	3.2E-08	--	--	--	--	--
				1,4-Dioxane	9.2E+01	ug/L	8.1E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.1E-08	--	--	--	--	--
				Benzo(a)anthracene	5.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)pyrene	8.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(b)fluoranthene	1.4E+00	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(k)fluoranthene	5.3E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-02	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	1.2E+01	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	6.1E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dibenzofuran	7.4E+00	ug/L	3.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	4.8E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Naphthalene	1.1E+00	ug/L	1.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	1.9E-01	ug/L	1.8E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	7.3E-07	--	--	--	--	--
				Phenanthrene	8.2E+00	ug/L	5.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.5E-03	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	2.9E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	5.2E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				4,4'-DDD	1.0E-02	ug/L	2.4E-07	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	5.7E-08	--	--	--	--	--
				4,4'-DDE	5.5E-02	ug/L	0.0E+00	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aldrin	4.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				beta-BHC	4.2E-02	ug/L	7.7E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.4E-07	--	--	--	--	--
				delta-BHC	3.4E-02	ug/L	6.1E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	3.8E-07	--	--	--	--	--
				Dieldrin	2.2E-02	ug/L	1.0E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.6E-06	--	--	--	--	--
				Heptachlor	4.9E-03	ug/L	9.1E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.1E-07	--	--	--	--	--
				Heptachlor Epoxide	9.0E-04	ug/L	2.8E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.5E-08	--	--	--	--	--
				gamma-BHC (Lindane)	4.4E-02	ug/L	8.0E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	8.8E-08	--	--	--	--	--
				Dioxin-Like PCBs	2.5E-04	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nondioxin-Like PCBs	1.3E+02	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aluminum	1.2E+04	ug/L	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	2.8E+01	ug/L	2.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	2.5E+01	ug/L	2.2E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.4E-07	--	--	--	--	--
				Barium	1.2E+03	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	8.0E+00	ug/L	7.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	2.4E+03	ug/L	2.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	2.2E+01	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	1.5E+02	ug/L	5.6E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.1E-04	--	--	--	--	--
				Cobalt	1.3E+01	ug/L	4.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.8E+02	ug/L	2.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.1E+02	ug/L	8.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	5.3E+04	ug/L	4.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	2.3E+02	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	4.6E+03	ug/L	4.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	8.2E+00	ug/L	7.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nickel	1.3E+02	ug/L	2.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.6E+01	ug/L	1.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	2.9E+00	ug/L	2.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	9.1E+01	ug/L	8.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	1.6E+03	ug/L	8.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								1.2E-04					--
		Exposure Point Total									1.7E-03					--
	Exposure Medium Total										1.7E-03					--

TABLE 7.5.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Inside Landfill	Inhalation	1,3-Dichlorobenzene	4.3E-06	mg/m^3	3.6E-07	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	3.9E-09	--	--	--	--	--
				1,4-Dichlorobenzene	1.1E-05	mg/m^3	8.7E-07	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	9.6E-09	--	--	--	--	--
				Benzene	1.3E-05	mg/m^3	1.0E-06	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	8.1E-09	--	--	--	--	--
				Chlorobenzene	2.0E-04	mg/m^3	1.6E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	1.5E-05	mg/m^3	1.7E-06	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	1.7E-09	--	--	--	--	--
				Trichloroethene (Non-Kidney)	1.5E-05	mg/m^3	1.2E-06	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	3.7E-09	--	--	--	--	--
				1,4-Dioxane	1.5E-05	mg/m^3	1.2E-06	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	6.0E-09	--	--	--	--	--
				Benzo(a)anthracene	1.3E-07	mg/m^3	1.6E-08	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	9.5E-10	--	--	--	--	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Benzo(b)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Benzo(k)fluoranthene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-06	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dibenzofuran	2.0E-05	mg/m^3	1.7E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Naphthalene	4.7E-06	mg/m^3	3.9E-07	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.3E-08	--	--	--	--	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Phenanthrene	7.0E-06	mg/m^3	5.7E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	1.8E-09	mg/m^3	1.5E-10	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	5.7E-06	--	--	--	--	--
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				4,4'-DDD	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.9E-05	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				4,4'-DDE	3.5E-08	mg/m^3	2.8E-09	(mg/m^3)	9.7E-05	$(ug/m^3)^{-1}$	2.8E-10	--	--	--	--	--
				Aldrin	2.9E-08	mg/m^3	2.4E-09	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	1.2E-08	--	--	--	--	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Heptachlor	1.1E-08	mg/m^3	8.7E-10	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	1.1E-09	--	--	--	--	--
				Heptachlor Epoxide	2.8E-10	mg/m^3	2.3E-11	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	6.0E-11	--	--	--	--	--
				gamma-BHC (Lindane)	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	3.1E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dioxin-Like PCBs	7.0E-10	mg/m^3	5.8E-11	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	2.2E-06	--	--	--	--	--
				Nondioxin-Like PCBs	3.7E-04	mg/m^3	3.1E-05	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	3.1E-06	--	--	--	--	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.4E-03	mg/m^3	1.2E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								1.1E-05					--
		Exposure Point Total									1.1E-05					--
	Exposure Medium Total										1.1E-05					--
Medium Total											1.7E-03					--
										Total of Receptor Risks Across All Media	2E-03			Total of Receptor Hazards Across All Media		--

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.2E-01	ug/L	8.8E-11	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	5.0E-12	6.2E-09	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.5E-06
				1,2-Dibromo-3-Chloropropane	2.3E-01	ug/L	1.7E-10	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.4E-10	1.2E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.9E-06
				1,2-Dichloroethane	1.1E+00	ug/L	8.1E-10	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	7.3E-11	5.7E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.8E-06
				1,4-Dichlorobenzene	9.2E-01	ug/L	6.8E-10	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.6E-12	4.7E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	6.8E-07
				2-Hexanone	5.6E+00	ug/L	4.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.8E-05
				Benzene	5.8E+00	ug/L	4.3E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.3E-10	3.0E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	3.0E-05
				cis-1,2-Dichloroethene	5.4E+01	ug/L	4.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.4E-04
				Ethylbenzene	4.4E+00	ug/L	3.2E-09	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	3.6E-11	2.3E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)	2.3E-06
				m+p-Xylenes	2.6E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	4.0E-01	(mg/kg/day)	3.3E-06
				Trichloroethene	6.2E+00	ug/L	4.5E-09	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	2.1E-10	3.2E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				Vinyl Chloride	4.2E+00	ug/L	3.1E-09	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.2E-09	2.2E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	7.2E-05
				1,4-Dioxane	5.7E+01	ug/L	4.2E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.2E-09	2.9E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)	5.8E-06
				2,6-Dinitrotoluene	8.6E+00	ug/L	6.3E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	9.5E-09	4.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.1E-04
				2-Methylnaphthalene	9.3E+00	ug/L	6.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.2E-04
				Benzo(a)anthracene	2.6E-01	ug/L	1.9E-10	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.9E-11	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.2E-01	ug/L	8.8E-11	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	8.8E-11	6.2E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.1E-05
				Bis(2-Chloroethyl)Ether	1.2E+00	ug/L	8.8E-10	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	9.7E-10	6.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.0E+00	ug/L	5.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-07	(mg/kg/day)	6.0E-01	(mg/kg/day)	6.8E-07
				Pentadecafluorooctanoic Acid	1.9E+00	ug/L	1.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-08	(mg/kg/day)	2.0E-04	(mg/kg/day)	4.8E-04
				Perfluorooctane Sulfonic Acid	2.6E-01	ug/L	1.9E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-08	(mg/kg/day)	8.0E-05	(mg/kg/day)	1.7E-04
				Pentachlorophenol	4.9E-01	ug/L	3.6E-10	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.4E-10	2.5E-08	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.0E-06
				2,3,7,8-TCDD Equivalents	3.2E-06	ug/L	2.3E-15	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.1E-10	1.6E-13	(mg/kg/day)	2.0E-08	(mg/kg/day)	8.2E-06
				Aldrin	1.1E-03	ug/L	8.1E-13	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.4E-11	5.7E-11	(mg/kg/day)	4.0E-05	(mg/kg/day)	1.4E-06
				beta-BHC	3.6E-02	ug/L	2.6E-11	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.8E-11	1.8E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.7E-02	ug/L	1.2E-11	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.0E-10	8.7E-10	(mg/kg/day)	1.0E-04	(mg/kg/day)	8.7E-06
				Heptachlor	1.1E-03	ug/L	8.1E-13	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.6E-12	5.7E-11	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E-07
				Heptachlor Epoxide	9.5E-04	ug/L	7.0E-13	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.3E-12	4.9E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	3.8E-06
				Dioxin-Like PCBs	1.4E-06	ug/L	1.0E-15	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.3E-10	7.2E-14	(mg/kg/day)	2.0E-08	(mg/kg/day)	3.6E-06
				Nondioxin-Like PCBs	2.1E-01	ug/L	1.6E-10	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.3E-11	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.9E+03	ug/L	5.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	4.1E-04
				Antimony	5.3E+00	ug/L	3.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	6.8E-04
				Arsenic	1.9E+01	ug/L	1.4E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.1E-08	9.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.2E-03
				Barium	5.2E+02	ug/L	3.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.3E-04
				Boron	7.4E+02	ug/L	5.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.9E-04
				Cadmium	1.8E+00	ug/L	1.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9E-04
				Chromium	8.0E+00	ug/L	5.9E-09	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.9E-09	4.1E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.3E-05
				Cobalt	1.3E+01	ug/L	9.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.2E-04
				Copper	2.2E+01	ug/L	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.9E-05
				Cyanide	1.7E+01	ug/L	1.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.6E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	4.3E-05
				Iron	4.0E+04	ug/L	2.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.9E-03
				Lead	8.8E+01	ug/L	6.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.1E+04	ug/L	7.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	2.3E-02
				Mercury	7.5E-02	ug/L	5.5E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)	2.6E-09
				Silver	2.5E+01	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.6E-04
				Thallium	3.9E+00	ug/L	2.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	1.1E+01	ug/L	8.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	5.7E-05
				Zinc	3.7E+01	ug/L	2.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	6.4E-06
			Exp. Route Total								4.2E-08					3.3E-02

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.2E-01	ug/L	1.6E-10	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	9.1E-12	1.1E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.8E-06
				1,2-Dibromo-3-Chloropropane	2.3E-01	ug/L	6.7E-10	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	5.4E-10	4.7E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.3E-05
				1,2-Dichloroethane	1.1E+00	ug/L	1.1E-09	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.0E-10	7.9E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.9E-06
				1,4-Dichlorobenzene	9.2E-01	ug/L	1.1E-08	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	5.8E-11	7.5E-07	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.1E-05
				2-Hexanone	5.6E+00	ug/L	4.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	6.8E-05
				Benzene	5.8E+00	ug/L	2.0E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.1E-09	1.4E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	1.4E-04
				cis-1,2-Dichloroethene	5.4E+01	ug/L	1.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.9E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.0E-04
				Ethylbenzene	4.4E+00	ug/L	4.9E-08	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	5.3E-10	3.4E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)	3.4E-05
				m+p-Xylenes	2.6E+01	ug/L	2.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-05	(mg/kg/day)	4.0E-01	(mg/kg/day)	5.1E-05
				Trichloroethene	6.2E+00	ug/L	1.9E-08	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	8.6E-10	1.3E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	--
				Vinyl Chloride	4.2E+00	ug/L	8.0E-09	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	5.8E-09	5.6E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.9E-04
				1,4-Dioxane	5.7E+01	ug/L	4.5E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.5E-10	3.2E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)	6.3E-07
				2,6-Dinitrotoluene	8.6E+00	ug/L	1.0E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.5E-08	7.1E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.8E-04
				2-Methylnaphthalene	9.3E+00	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.6E-03
				Benzo(a)anthracene	2.6E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.2E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.2E+00	ug/L	5.9E-10	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	6.5E-10	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.0E+00	ug/L	9.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-06	(mg/kg/day)	6.0E-01	(mg/kg/day)	1.0E-05
				Pentadecafluorooctanoic Acid	1.9E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-04	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.6E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	8.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.9E-01	ug/L	2.9E-08	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.2E-08	2.0E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.1E-04
				2,3,7,8-TCDD Equivalents	3.2E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Aldrin	1.1E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	4.0E-05	(mg/kg/day)	--
				beta-BHC	3.6E-02	ug/L	4.0E-10	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	7.3E-10	2.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.7E-02	ug/L	4.8E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	7.7E-09	3.4E-08	(mg/kg/day)	1.0E-04	(mg/kg/day)	3.4E-04
				Heptachlor	1.1E-03	ug/L	1.3E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	5.8E-10	9.1E-09	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.8E-05
				Heptachlor Epoxide	9.5E-04	ug/L	1.8E-11	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.7E-10	1.3E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	9.8E-05
				Dioxin-Like PCBs	1.4E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-08	(mg/kg/day)	--
				Nondioxin-Like PCBs	2.1E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.9E+03	ug/L	1.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.1E-04
				Antimony	5.3E+00	ug/L	1.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.7E-08	(mg/kg/day)	6.0E-05	(mg/kg/day)	1.3E-03
				Arsenic	1.9E+01	ug/L	3.9E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.8E-09	2.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	9.0E-04
				Barium	5.2E+02	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-06	(mg/kg/day)	1.4E-02	(mg/kg/day)	5.3E-04
				Boron	7.4E+02	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.3E-05
				Cadmium	1.8E+00	ug/L	3.8E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	1.1E-03
				Chromium	8.0E+00	ug/L	1.7E-09	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	3.3E-08	1.2E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	9.3E-04
				Cobalt	1.3E+01	ug/L	1.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.5E-05
				Copper	2.2E+01	ug/L	4.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	4.0E-02	(mg/kg/day)	8.1E-06
				Cyanide	1.7E+01	ug/L	3.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.2E-05
				Iron	4.0E+04	ug/L	8.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	8.2E-04
				Lead	8.8E+01	ug/L	1.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.1E+04	ug/L	2.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.6E-01
				Mercury	7.5E-02	ug/L	1.6E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)	7.2E-10
				Silver	2.5E+01	ug/L	3.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.1E-03
				Thallium	3.9E+00	ug/L	8.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Vanadium	1.1E+01	ug/L	2.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-07	(mg/kg/day)	2.6E-04	(mg/kg/day)	6.2E-04
				Zinc	3.7E+01	ug/L	4.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.1E-06
			Exp. Route Total								8.5E-08					1.8E-01
		Exposure Point Total									1.3E-07					2.1E-01
	Exposure Medium Total										1.3E-07					2.1E-01

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Trench	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	7.8E-04	mg/m^3	1.5E-07	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	2.4E-09	1.1E-05	(mg/m^3)	2.0E-03	(mg/m^3)	5.3E-03
				1,2-Dibromo-3-Chloropropane	9.0E-04	mg/m^3	1.8E-07	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	1.1E-06	1.2E-05	(mg/m^3)	2.0E-03	(mg/m^3)	6.1E-03
				1,2-Dichloroethane	8.4E-03	mg/m^3	1.6E-06	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	4.3E-08	1.2E-04	(mg/m^3)	7.0E-02	(mg/m^3)	1.6E-03
				1,4-Dichlorobenzene	5.9E-03	mg/m^3	1.2E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	1.3E-08	8.1E-05	(mg/m^3)	1.2E+00	(mg/m^3)	6.8E-05
				2-Hexanone	2.8E-02	mg/m^3	5.4E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.8E-04	(mg/m^3)	3.0E-02	(mg/m^3)	1.3E-02
				Benzene	5.2E-02	mg/m^3	1.0E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	7.9E-08	7.1E-04	(mg/m^3)	8.0E-02	(mg/m^3)	8.9E-03
				cis-1,2-Dichloroethene	4.3E-01	mg/m^3	8.5E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	5.9E-03	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.4E-02	mg/m^3	6.6E-06	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	1.7E-08	4.6E-04	(mg/m^3)	9.0E+00	(mg/m^3)	5.2E-05
				m+p-Xylenes	2.0E-01	mg/m^3	3.9E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.7E-03	(mg/m^3)	4.0E-01	(mg/m^3)	6.8E-03
				Trichloroethene	4.3E-02	mg/m^3	8.4E-06	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	3.4E-08	5.9E-04	(mg/m^3)	2.0E-03	(mg/m^3)	--
				Vinyl Chloride	4.2E-02	mg/m^3	8.3E-06	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	3.6E-08	5.8E-04	(mg/m^3)	1.0E-01	(mg/m^3)	5.8E-03
				1,4-Dioxane	3.7E-02	mg/m^3	7.3E-06	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	3.6E-08	5.1E-04	(mg/m^3)	7.2E-01	(mg/m^3)	7.1E-04
				2,6-Dinitrotoluene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	5.6E-02	mg/m^3	1.1E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.7E-04	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	2.7E-04	mg/m^3	5.3E-08	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	3.2E-09	3.7E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	1.9E-03	mg/m^3	3.8E-07	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	1.3E-07	2.7E-05	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	5.0E-02	mg/m^3	9.8E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	3.3E-07	6.9E-04	(mg/m^3)	3.0E-03	(mg/m^3)	2.3E-01
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	7.4E-09	mg/m^3	1.4E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	5.5E-08	1.0E-10	(mg/m^3)	4.0E-08	(mg/m^3)	2.5E-03
				Aldrin	2.3E-06	mg/m^3	4.4E-10	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	2.2E-09	3.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	3.9E-06	mg/m^3	7.7E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	1.0E-09	5.4E-08	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.2E-06	mg/m^3	2.4E-10	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	6.2E-10	1.7E-08	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	5.9E-09	mg/m^3	1.1E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	4.4E-08	8.0E-11	(mg/m^3)	4.0E-08	(mg/m^3)	2.0E-03
				Nondioxin-Like PCBs	8.9E-04	mg/m^3	1.7E-07	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	1.7E-08	1.2E-05	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	3.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.6E-01	mg/m^3	5.1E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.6E-03	(mg/m^3)	8.0E-04	(mg/m^3)	4.5E+00
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								1.9E-06					5.1E+00
		Exposure Point Total									1.9E-06					5.1E+00
	Exposure Medium Total										1.9E-06					5.1E+00
Medium Total											2.0E-06					5.3E+00
										Total of Receptor Risks Across All Media	2E-06				Total of Receptor Hazards Across All Media		5E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	8.5E-10	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	4.8E-11	9.0E-09	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.3E-06
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	1.6E-09	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.3E-09	1.7E-08	(mg/kg/day)	2.0E-04	(mg/kg/day)	8.6E-05
				1,2-Dichloroethane	1.10E+00	ug/L	7.8E-09	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	7.1E-10	8.3E-08	(mg/kg/day)	6.0E-03	(mg/kg/day)	1.4E-05
				1,4-Dichlorobenzene	9.20E-01	ug/L	6.5E-09	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.5E-11	6.9E-08	(mg/kg/day)	7.0E-02	(mg/kg/day)	9.9E-07
				2-Hexanone	5.60E+00	ug/L	4.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.4E-05
				Benzene	5.80E+00	ug/L	4.1E-08	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.3E-09	4.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.1E-04
				cis-1,2-Dichloroethene	5.40E+01	ug/L	3.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.0E-03
				Ethylbenzene	4.40E+00	ug/L	3.1E-08	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	3.4E-10	3.3E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)	3.3E-06
				m+p-Xylenes	2.60E+01	ug/L	1.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	9.8E-06
				Trichloroethene	6.20E+00	ug/L	4.4E-08	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	2.0E-09	4.7E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	9.3E-04
				Vinyl Chloride	4.20E+00	ug/L	3.0E-08	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.1E-08	3.2E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.1E-04
				1,4-Dioxane	5.66E+01	ug/L	4.0E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.0E-08	4.2E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.4E-04
				2,6-Dinitrotoluene	8.60E+00	ug/L	6.1E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	9.1E-08	6.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.2E-03
				2-Methylnaphthalene	9.30E+00	ug/L	6.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.7E-04
				Benzo(a)anthracene	2.60E-01	ug/L	1.8E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.8E-10	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	8.5E-10	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	8.5E-10	9.0E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.0E-05
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	8.5E-09	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	9.3E-09	9.0E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	5.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.0E-05
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	1.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	6.9E-03
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	1.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-08	(mg/kg/day)	2.0E-05	(mg/kg/day)	9.8E-04
				Pentachlorophenol	4.90E-01	ug/L	3.5E-09	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.4E-09	3.7E-08	(mg/kg/day)	5.0E-03	(mg/kg/day)	7.4E-06
				2,3,7,8-TCDD Equivalents	3.20E-06	ug/L	2.3E-14	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.9E-09	2.4E-13	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.4E-04
				Aldrin	1.10E-03	ug/L	7.8E-12	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.3E-10	8.3E-11	(mg/kg/day)	3.0E-05	(mg/kg/day)	2.8E-06
				beta-BHC	3.60E-02	ug/L	2.5E-10	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.6E-10	2.7E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	1.2E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.9E-09	1.3E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	2.6E-05
				Heptachlor	1.10E-03	ug/L	7.8E-12	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.5E-11	8.3E-11	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.7E-07
				Heptachlor Epoxide	9.50E-04	ug/L	6.7E-12	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.1E-11	7.1E-11	(mg/kg/day)	1.3E-05	(mg/kg/day)	5.5E-06
				Dioxin-Like PCBs	1.40E-06	ug/L	9.9E-15	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.3E-09	1.1E-13	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.5E-04
				Nondioxin-Like PCBs	2.13E-01	ug/L	1.5E-09	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.0E-10	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	5.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.9E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	5.9E-04
				Antimony	5.30E+00	ug/L	3.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	9.9E-04
				Arsenic	1.87E+01	ug/L	1.3E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.0E-07	1.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.7E-03
				Barium	5.15E+02	ug/L	3.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.9E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.9E-04
				Boron	7.38E+02	ug/L	5.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.8E-04
				Cadmium	1.84E+00	ug/L	1.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.8E-04
				Chromium	8.03E+00	ug/L	5.7E-08	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.8E-08	6.0E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.0E-04
				Cobalt	1.30E+01	ug/L	9.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.3E-03
				Copper	2.24E+01	ug/L	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	4.2E-05
				Cyanide	1.68E+01	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.1E-03
				Iron	3.96E+04	ug/L	2.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	4.2E-03
				Lead	8.76E+01	ug/L	6.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	7.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	3.4E-02
				Mercury	7.50E-02	ug/L	5.3E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	5.6E-05
				Silver	2.53E+01	ug/L	1.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.8E-04
				Thallium	3.90E+00	ug/L	2.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	2.9E-02
				Vanadium	1.11E+01	ug/L	7.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.3E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.7E-04
				Zinc	3.72E+01	ug/L	2.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	9.3E-06
			Exp. Route Total								4.1E-07					9.5E-02

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	7.0E-09	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	4.0E-10	7.4E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.9E-05
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	3.1E-08	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	2.5E-08	3.3E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.7E-03
				1,2-Dichloroethane	1.10E+00	ug/L	4.8E-08	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	4.4E-09	5.1E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	8.5E-05
				1,4-Dichlorobenzene	9.20E-01	ug/L	4.6E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	2.5E-09	4.9E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	7.0E-05
				2-Hexanone	5.60E+00	ug/L	2.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.8E-04
				Benzene	5.80E+00	ug/L	8.1E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	4.4E-08	8.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.1E-03
				cis-1,2-Dichloroethene	5.40E+01	ug/L	5.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.1E-02
				Ethylbenzene	4.40E+00	ug/L	2.0E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	2.2E-08	2.2E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	2.2E-04
				m+p-Xylenes	2.60E+01	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	6.5E-04
				Trichloroethene	6.20E+00	ug/L	7.9E-07	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	3.6E-08	8.4E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.7E-02
				Vinyl Chloride	4.20E+00	ug/L	3.2E-07	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.3E-07	3.4E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.1E-03
				1,4-Dioxane	5.66E+01	ug/L	2.2E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.2E-08	2.3E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	7.7E-05
				2,6-Dinitrotoluene	8.60E+00	ug/L	4.9E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.3E-07	5.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.7E-02
				2-Methylnaphthalene	9.30E+00	ug/L	9.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.6E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.4E-02
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	2.8E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.1E-08	3.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	4.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.1E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	1.4E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	5.6E-07	1.5E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.0E-03
				2,3,7,8-TCDD Equivalents	3.20E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	1.9E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	3.5E-08	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	2.3E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.7E-07	2.5E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	4.9E-03
				Heptachlor	1.10E-03	ug/L	6.0E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	2.7E-08	6.4E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.3E-04
				Heptachlor Epoxide	9.50E-04	ug/L	8.7E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	7.9E-09	9.2E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	7.1E-04
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	2.13E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	7.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	8.4E-04
				Antimony	5.30E+00	ug/L	5.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.6E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	9.3E-03
				Arsenic	1.87E+01	ug/L	1.9E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.8E-07	2.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.6E-03
				Barium	5.15E+02	ug/L	5.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	3.9E-03
				Boron	7.38E+02	ug/L	7.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.9E-04
				Cadmium	1.84E+00	ug/L	1.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	7.8E-03
				Chromium	8.03E+00	ug/L	8.0E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.6E-06	8.5E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	1.1E-02
				Cobalt	1.30E+01	ug/L	5.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.8E-03
				Copper	2.24E+01	ug/L	2.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	5.9E-05
				Cyanide	1.68E+01	ug/L	1.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.2E-03
				Iron	3.96E+04	ug/L	3.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	6.0E-03
				Lead	8.76E+01	ug/L	8.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-03	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.2E+00
				Mercury	7.50E-02	ug/L	7.5E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.9E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	7.9E-05
				Silver	2.53E+01	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	8.0E-03
				Thallium	3.90E+00	ug/L	3.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.1E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	4.1E-02
				Vanadium	1.11E+01	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	9.0E-03
				Zinc	3.72E+01	ug/L	2.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	7.9E-06
			Exp. Route Total								4.0E-06					1.4E+00
		Exposure Point Total									4.4E-06					1.5E+00
	Exposure Medium Total										4.4E-06					1.5E+00

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Trench	Outside Landfill	Inhalation	1,1,2-Trichloroethane	7.79E-04	mg/m^3	1.0E-06	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	1.6E-08	1.1E-05	(mg/m^3)	2.0E-04	(mg/m^3)	5.3E-02
		Shallow Wells		1,2-Dibromo-3-Chloropropane	8.97E-04	mg/m^3	1.2E-06	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	6.9E-06	1.2E-05	(mg/m^3)	2.0E-04	(mg/m^3)	6.1E-02
				1,2-Dichloroethane	8.43E-03	mg/m^3	1.1E-05	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	2.8E-07	1.2E-04	(mg/m^3)	7.0E-03	(mg/m^3)	1.6E-02
				1,4-Dichlorobenzene	5.93E-03	mg/m^3	7.7E-06	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	8.4E-08	8.1E-05	(mg/m^3)	8.0E-01	(mg/m^3)	1.0E-04
				2-Hexanone	2.78E-02	mg/m^3	3.6E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.8E-04	(mg/m^3)	3.0E-02	(mg/m^3)	1.3E-02
				Benzene	5.19E-02	mg/m^3	6.7E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	5.2E-07	7.1E-04	(mg/m^3)	3.0E-02	(mg/m^3)	2.4E-02
				cis-1,2-Dichloroethene	4.32E-01	mg/m^3	5.6E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	5.9E-03	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.39E-02	mg/m^3	4.4E-05	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	1.1E-07	4.6E-04	(mg/m^3)	1.0E+00	(mg/m^3)	4.6E-04
				m+p-Xylenes	2.00E-01	mg/m^3	2.6E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.7E-03	(mg/m^3)	1.0E-01	(mg/m^3)	2.7E-02
				Trichloroethene	4.30E-02	mg/m^3	5.5E-05	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	2.3E-07	5.9E-04	(mg/m^3)	2.0E-03	(mg/m^3)	2.9E-01
				Vinyl Chloride	4.23E-02	mg/m^3	5.5E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	2.4E-07	5.8E-04	(mg/m^3)	1.0E-01	(mg/m^3)	5.8E-03
				1,4-Dioxane	3.71E-02	mg/m^3	4.8E-05	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	2.4E-07	5.1E-04	(mg/m^3)	3.0E-02	(mg/m^3)	1.7E-02
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	5.65E-02	mg/m^3	7.3E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.7E-04	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	2.69E-04	mg/m^3	3.5E-07	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	2.1E-08	3.7E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	1.94E-03	mg/m^3	2.5E-06	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	8.3E-07	2.7E-05	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	5.03E-02	mg/m^3	6.5E-05	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	2.2E-06	6.9E-04	(mg/m^3)	3.0E-03	(mg/m^3)	2.3E-01
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	7.38E-09	mg/m^3	9.5E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	3.6E-07	1.0E-10	(mg/m^3)	4.0E-08	(mg/m^3)	2.5E-03
				Aldrin	2.26E-06	mg/m^3	2.9E-09	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.4E-08	3.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	3.94E-06	mg/m^3	5.1E-09	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	6.6E-09	5.4E-08	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	1.22E-06	mg/m^3	1.6E-09	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	4.1E-09	1.7E-08	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	5.88E-09	mg/m^3	7.6E-12	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	2.9E-07	8.0E-11	(mg/m^3)	4.0E-08	(mg/m^3)	2.0E-03
				Nondioxin-Like PCBs	8.94E-04	mg/m^3	1.2E-06	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	1.2E-07	1.2E-05	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.62E-01	mg/m^3	3.4E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	3.6E-03	(mg/m^3)	8.0E-04	(mg/m^3)	4.5E+00
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								1.3E-05					5.2E+00
		Exposure Point Total									1.3E-05					5.2E+00
	Exposure Medium Total										1.3E-05					5.2E+00
Medium Total											1.7E-05					6.7E+00

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Irrigation	Outside Landfill	Inhalation	1,1,2-Trichloroethane	2.3E-06	mg/m^3	2.2E-08	(mg/m^3)	1.6E-05	$(ug/m^3)^{-1}$	3.5E-10	2.3E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.1E-03
		Shallow Wells		1,2-Dibromo-3-Chloropropane	2.9E-06	mg/m^3	2.8E-08	(mg/m^3)	6.0E-03	$(ug/m^3)^{-1}$	1.7E-07	2.9E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.5E-03
				1,2-Dichloroethane	2.2E-05	mg/m^3	2.1E-07	(mg/m^3)	2.6E-05	$(ug/m^3)^{-1}$	5.5E-09	2.2E-06	(mg/m^3)	7.0E-03	(mg/m^3)	3.2E-04
				1,4-Dichlorobenzene	2.1E-05	mg/m^3	2.0E-07	(mg/m^3)	1.1E-05	$(ug/m^3)^{-1}$	2.2E-09	2.1E-06	(mg/m^3)	8.0E-01	(mg/m^3)	2.6E-06
				2-Hexanone	6.2E-05	mg/m^3	5.8E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	6.2E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.1E-04
				Benzene	6.2E-05	mg/m^3	5.8E-07	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	4.6E-09	6.2E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.1E-04
				cis-1,2-Dichloroethene	1.3E-03	mg/m^3	1.3E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.3E-04	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	1.2E-04	mg/m^3	1.1E-06	(mg/m^3)	2.5E-06	$(ug/m^3)^{-1}$	2.8E-09	1.2E-05	(mg/m^3)	1.0E+00	(mg/m^3)	1.2E-05
				m+p-Xylenes	7.0E-04	mg/m^3	6.6E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	7.0E-05	(mg/m^3)	1.0E-01	(mg/m^3)	7.0E-04
				Trichloroethene	1.7E-04	mg/m^3	1.6E-06	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	6.8E-09	1.7E-05	(mg/m^3)	2.0E-03	(mg/m^3)	8.7E-03
				Vinyl Chloride	1.3E-04	mg/m^3	1.3E-06	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	5.6E-09	1.3E-05	(mg/m^3)	1.0E-01	(mg/m^3)	1.3E-04
				1,4-Dioxane	8.0E-06	mg/m^3	7.6E-08	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	3.8E-10	8.0E-07	(mg/m^3)	3.0E-02	(mg/m^3)	2.7E-05
				2,6-Dinitrotoluene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	1.6E-04	mg/m^3	1.5E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	1.6E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	9.1E-07	mg/m^3	8.6E-09	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	5.2E-10	9.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	5.8E-06	mg/m^3	5.4E-08	(mg/m^3)	3.3E-04	$(ug/m^3)^{-1}$	1.8E-08	5.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	1.3E-04	mg/m^3	1.3E-06	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	4.3E-08	1.3E-05	(mg/m^3)	3.0E-03	(mg/m^3)	4.5E-03
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.8E-11	mg/m^3	2.6E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	1.0E-08	2.8E-12	(mg/m^3)	4.0E-08	(mg/m^3)	7.0E-05
				Aldrin	9.1E-09	mg/m^3	8.6E-11	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	4.2E-10	9.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	1.7E-08	mg/m^3	1.6E-10	(mg/m^3)	1.3E-03	$(ug/m^3)^{-1}$	2.1E-10	1.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	5.3E-09	mg/m^3	5.0E-11	(mg/m^3)	2.6E-03	$(ug/m^3)^{-1}$	1.3E-10	5.3E-10	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	2.3E-11	mg/m^3	2.2E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	8.3E-09	2.3E-12	(mg/m^3)	4.0E-08	(mg/m^3)	5.8E-05
				Nondioxin-Like PCBs	3.5E-06	mg/m^3	3.3E-08	(mg/m^3)	1.0E-04	$(ug/m^3)^{-1}$	3.3E-09	3.5E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	5.3E-04	mg/m^3	5.0E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	5.3E-05	(mg/m^3)	8.0E-04	(mg/m^3)	6.6E-02
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								2.8E-07					8.4E-02
		Exposure Point Total									2.8E-07					8.4E-02
	Exposure Medium Total										2.8E-07					8.4E-02
Medium Total											2.8E-07					8.4E-02

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Groundwater	Air - Shower	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	6.0E-07	mg/m^3	3.4E-08	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	5.4E-10	3.6E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.8E-03
				1,2-Dibromo-3-Chloropropane	4.3E-07	mg/m^3	2.4E-08	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	1.5E-07	2.6E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.3E-03
				1,2-Dichloroethane	6.8E-06	mg/m^3	3.8E-07	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	1.0E-08	4.1E-06	(mg/m^3)	7.0E-03	(mg/m^3)	5.8E-04
				1,4-Dichlorobenzene	5.1E-06	mg/m^3	2.9E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	3.2E-09	3.1E-06	(mg/m^3)	8.0E-01	(mg/m^3)	3.9E-06
				2-Hexanone	1.2E-05	mg/m^3	6.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.1E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.4E-04
				Benzene	4.6E-05	mg/m^3	2.6E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	2.0E-08	2.8E-05	(mg/m^3)	3.0E-02	(mg/m^3)	9.2E-04
				cis-1,2-Dichloroethene	3.8E-04	mg/m^3	2.2E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.3E-04	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.1E-05	mg/m^3	1.7E-06	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	4.3E-09	1.8E-05	(mg/m^3)	1.0E+00	(mg/m^3)	1.8E-05
				m+p-Xylenes	1.8E-04	mg/m^3	1.0E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.1E-04	(mg/m^3)	1.0E-01	(mg/m^3)	1.1E-03
				Trichloroethene	3.9E-05	mg/m^3	2.2E-06	(mg/m^3)	4.1E-06	(ug/m^3)$^{-1}$	9.1E-09	2.4E-05	(mg/m^3)	2.0E-03	(mg/m^3)	1.2E-02
				Vinyl Chloride	3.8E-05	mg/m^3	2.1E-06	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	9.5E-09	2.3E-05	(mg/m^3)	1.0E-01	(mg/m^3)	2.3E-04
				1,4-Dioxane	9.0E-06	mg/m^3	5.1E-07	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	2.5E-09	5.4E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.8E-04
				2,6-Dinitrotoluene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	4.0E-05	mg/m^3	2.3E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.4E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	6.2E-08	mg/m^3	3.5E-09	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	2.1E-10	3.7E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	5.0E-07	mg/m^3	2.8E-08	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	9.4E-09	3.0E-07	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	3.4E-05	mg/m^3	1.9E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	6.6E-08	2.0E-05	(mg/m^3)	3.0E-03	(mg/m^3)	6.8E-03
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	2.3E-12	mg/m^3	1.3E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	5.0E-09	1.4E-12	(mg/m^3)	4.0E-08	(mg/m^3)	3.5E-05
				Aldrin	6.8E-10	mg/m^3	3.8E-11	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.9E-10	4.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	2.4E-09	mg/m^3	1.3E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	1.8E-10	1.4E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	2.9E-10	mg/m^3	1.7E-11	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	4.3E-11	1.8E-10	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	3.9E-12	mg/m^3	2.2E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	8.5E-09	2.4E-12	(mg/m^3)	4.0E-08	(mg/m^3)	5.9E-05
				Nondioxin-Like PCBs	6.0E-07	mg/m^3	3.4E-08	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	3.4E-09	3.6E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.2E-04	mg/m^3	1.3E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.3E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.7E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								3.0E-07					1.9E-01
		Exposure Point Total									3.0E-07					1.9E-01
	Exposure Medium Total										3.0E-07					1.9E-01
Medium Total											3.0E-07					1.9E-01
										Total of Receptor Risks Across All Media	2E-05				Total of Receptor Hazards Across All Media	7E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	9.9E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	5.6E-09	2.3E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.8E-04
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	1.5E-06	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.2E-06	4.4E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	2.2E-02
				1,2-Dichloroethane	1.10E+00	ug/L	9.1E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	8.3E-08	2.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	3.5E-03
				1,4-Dichlorobenzene	9.20E-01	ug/L	7.6E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	4.1E-09	1.8E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.5E-04
				2-Hexanone	5.60E+00	ug/L	4.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.2E-02
				Benzene	5.80E+00	ug/L	4.8E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	2.6E-07	1.1E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.8E-02
				cis-1,2-Dichloroethene	5.40E+01	ug/L	4.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.2E-01
				Ethylbenzene	4.40E+00	ug/L	3.6E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	4.0E-08	8.5E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	8.5E-04
				m+p-Xylenes	2.60E+01	ug/L	2.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.5E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	3.9E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	3.6E-07	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	5.1E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.9E-07	1.2E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.4E-01
				Vinyl Chloride	4.20E+00	ug/L	1.3E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	9.3E-05	8.1E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.7E-02
				1,4-Dioxane	5.66E+01	ug/L	4.7E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.7E-06	1.1E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.6E-02
				2,6-Dinitrotoluene	8.60E+00	ug/L	7.1E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.1E-05	1.7E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	5.5E-01
				2-Methylnaphthalene	9.30E+00	ug/L	7.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	4.5E-02
				Benzo(a)anthracene	2.60E-01	ug/L	1.6E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.6E-07	5.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	7.6E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	7.6E-07	2.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	7.7E-03
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	9.9E-07	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.1E-06	2.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	6.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.7E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.8E+00
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.5E-01
				Pentachlorophenol	4.90E-01	ug/L	4.0E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.6E-07	9.4E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.9E-03
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	1.7E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.3E-07	4.1E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	5.8E-02
				Aldrin	1.10E-03	ug/L	9.1E-10	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.5E-08	2.1E-08	(mg/kg/day)	3.0E-05	(mg/kg/day)	7.1E-04
				beta-BHC	3.60E-02	ug/L	3.0E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	5.3E-08	6.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	1.4E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.2E-07	3.3E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	6.5E-03
				Heptachlor	1.10E-03	ug/L	9.1E-10	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	4.1E-09	2.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.2E-05
				Heptachlor Epoxide	9.50E-04	ug/L	7.8E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	7.1E-09	1.8E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.4E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	1.2E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	1.5E-07	2.7E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.8E-02
				Nondioxin-Like PCBs	1.99E-01	ug/L	1.6E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	6.6E-08	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	6.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.5E-01
				Antimony	5.30E+00	ug/L	4.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	2.5E-01
				Arsenic	1.87E+01	ug/L	1.5E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.3E-05	3.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.2E+00
				Barium	5.15E+02	ug/L	4.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	5.0E-02
				Boron	7.38E+02	ug/L	6.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-02	(mg/kg/day)	2.0E-01	(mg/kg/day)	7.1E-02
				Cadmium	1.84E+00	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	7.1E-02
				Chromium	8.03E+00	ug/L	5.1E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.5E-05	1.5E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	5.1E-02
				Cobalt	1.30E+01	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.3E-01
				Copper	2.24E+01	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	1.1E-02
				Cyanide	1.68E+01	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	5.4E-01
				Iron	3.96E+04	ug/L	3.3E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.1E+00
				Lead	8.76E+01	ug/L	7.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	8.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	8.7E+00
				Mercury	7.50E-02	ug/L	6.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	1.4E-02
				Silver	2.53E+01	ug/L	2.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	9.7E-02
				Thallium	3.90E+00	ug/L	3.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.5E-05	(mg/kg/day)	1.0E-05	(mg/kg/day)	7.5E+00
				Vanadium	1.11E+01	ug/L	9.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.3E-02
				Zinc	3.72E+01	ug/L	3.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.2E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.4E-03
			Exp. Route Total								1.6E-04					24

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	8.6E-09	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	4.9E-10	2.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.0E-05
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	3.3E-07	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	2.7E-07	1.0E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	5.1E-03
				1,2-Dichloroethane	1.10E+00	ug/L	5.2E-08	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	4.8E-09	1.2E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	2.0E-04
				1,4-Dichlorobenzene	9.20E-01	ug/L	6.5E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	3.5E-09	1.5E-05	(mg/kg/day)	7.0E-02	(mg/kg/day)	2.2E-04
				2-Hexanone	5.60E+00	ug/L	2.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.1E-03
				Benzene	5.80E+00	ug/L	8.6E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	4.7E-08	2.0E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	5.0E-03
				cis-1,2-Dichloroethene	5.40E+01	ug/L	6.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	7.8E-02
				Ethylbenzene	4.40E+00	ug/L	2.6E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	2.8E-08	6.0E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	6.0E-04
				m+p-Xylenes	2.60E+01	ug/L	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.8E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	7.7E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	7.2E-08	2.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	1.0E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	3.7E-08	2.4E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	4.7E-02
				Vinyl Chloride	4.20E+00	ug/L	1.2E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	8.5E-06	7.4E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.5E-03
				1,4-Dioxane	5.66E+01	ug/L	2.0E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.0E-08	4.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.5E-04
				2,6-Dinitrotoluene	8.60E+00	ug/L	6.2E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	9.3E-07	1.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.8E-02
				2-Methylnaphthalene	9.30E+00	ug/L	1.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	7.5E-02
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	3.2E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	3.5E-08	7.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	5.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	6.0E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	1.9E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	7.5E-07	4.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	8.7E-03
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	2.6E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	4.7E-08	6.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	3.1E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	5.0E-07	7.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.4E-02
				Heptachlor	1.10E-03	ug/L	8.4E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	3.8E-08	2.0E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.9E-04
				Heptachlor Epoxide	9.50E-04	ug/L	1.2E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-08	2.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	2.1E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	3.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	7.1E-04
				Antimony	5.30E+00	ug/L	2.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	7.9E-03
				Arsenic	1.87E+01	ug/L	7.2E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.1E-07	1.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	5.6E-03
				Barium	5.15E+02	ug/L	2.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.6E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	3.3E-03
				Boron	7.38E+02	ug/L	2.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.3E-04
				Cadmium	1.84E+00	ug/L	7.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	6.6E-03
				Chromium	8.03E+00	ug/L	2.4E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	4.7E-06	7.2E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	9.6E-03
				Cobalt	1.30E+01	ug/L	2.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.6E-03
				Copper	2.24E+01	ug/L	8.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	5.0E-05
				Cyanide	1.68E+01	ug/L	6.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.5E-03
				Iron	3.96E+04	ug/L	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	5.1E-03
				Lead	8.76E+01	ug/L	3.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	4.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.7E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.0E+00
				Mercury	7.50E-02	ug/L	2.9E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.7E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	6.7E-05
				Silver	2.53E+01	ug/L	5.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	6.8E-03
				Thallium	3.90E+00	ug/L	1.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	3.5E-02
				Vanadium	1.11E+01	ug/L	4.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	7.7E-03
				Zinc	3.72E+01	ug/L	8.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	6.7E-06
			Exp. Route Total								1.6E-05					1.4E+00
		Exposure Point Total									1.8E-04					2.6E+01
	Exposure Medium Total										1.8E-04					2.6E+01
Medium Total											1.8E-04					2.6E+01
										Total of Receptor Risks Across All Media	2E-04				Total of Receptor Hazards Across All Media	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	1.5E-07	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	8.5E-09	1.2E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.9E-04
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	4.1E-07	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	3.3E-07	2.2E-06	(mg/kg/day)	2.0E-04	(mg/kg/day)	1.1E-02
				1,2-Dichloroethane	1.10E+00	ug/L	1.4E-06	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.2E-07	1.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	1.8E-03
				1,4-Dichlorobenzene	9.20E-01	ug/L	1.1E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	6.1E-09	8.8E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	1.3E-04
				2-Hexanone	5.60E+00	ug/L	6.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.1E-02
				Benzene	5.80E+00	ug/L	7.2E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.9E-07	5.6E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.4E-02
				cis-1,2-Dichloroethene	5.40E+01	ug/L	6.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.2E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.6E-01
				Ethylbenzene	4.40E+00	ug/L	5.4E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	6.0E-08	4.2E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	4.2E-04
				m+p-Xylenes	2.60E+01	ug/L	3.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.3E-03
				Trichloroethene (Kidney)	6.20E+00	ug/L	1.1E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.0E-07	6.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	7.7E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.8E-07	6.0E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.2E-01
				Vinyl Chloride	4.20E+00	ug/L	5.2E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	3.7E-06	4.0E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.3E-02
				1,4-Dioxane	5.66E+01	ug/L	7.0E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.0E-06	5.4E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.8E-02
				2,6-Dinitrotoluene	8.60E+00	ug/L	1.1E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.6E-05	8.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.8E-01
				2-Methylnaphthalene	9.30E+00	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.2E-02
				Benzo(a)anthracene	2.60E-01	ug/L	4.6E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.6E-08	2.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	2.1E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.1E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.8E-03
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	1.5E-06	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	1.6E-06	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	9.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.7E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.8E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	2.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-05	(mg/kg/day)	2.0E-05	(mg/kg/day)	8.9E-01
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	3.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-06	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.3E-01
				Pentachlorophenol	4.90E-01	ug/L	6.1E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	2.4E-07	4.7E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	9.4E-04
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	2.6E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.4E-07	2.0E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	2.9E-02
				Aldrin	1.10E-03	ug/L	1.4E-09	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	2.3E-08	1.1E-08	(mg/kg/day)	3.0E-05	(mg/kg/day)	3.5E-04
				beta-BHC	3.60E-02	ug/L	4.5E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	8.0E-08	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	2.1E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.4E-07	1.6E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.3E-03
				Heptachlor	1.10E-03	ug/L	1.4E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	6.1E-09	1.1E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.1E-05
				Heptachlor Epoxide	9.50E-04	ug/L	1.2E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.1E-08	9.1E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	7.0E-04
				Dioxin-Like PCBs	1.40E-06	ug/L	1.7E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.3E-07	1.3E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	1.9E-02
				Nondioxin-Like PCBs	1.99E-01	ug/L	2.5E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	9.8E-08	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	9.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	7.6E-02
				Antimony	5.30E+00	ug/L	6.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.1E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	1.3E-01
				Arsenic	1.87E+01	ug/L	2.3E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.5E-05	1.8E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.0E-01
				Barium	5.15E+02	ug/L	6.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.5E-02
				Boron	7.38E+02	ug/L	9.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.1E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.5E-02
				Cadmium	1.84E+00	ug/L	2.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	3.5E-02
				Chromium	8.03E+00	ug/L	1.4E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	7.2E-06	7.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.6E-02
				Cobalt	1.30E+01	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.2E-01
				Copper	2.24E+01	ug/L	2.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	5.4E-03
				Cyanide	1.68E+01	ug/L	2.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	2.7E-01
				Iron	3.96E+04	ug/L	4.9E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	5.4E-01
				Lead	8.76E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.4E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	1.3E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-01	(mg/kg/day)	2.4E-02	(mg/kg/day)	4.3E+00
				Mercury	7.50E-02	ug/L	9.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.2E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	7.2E-03
				Silver	2.53E+01	ug/L	3.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.9E-02
				Thallium	3.90E+00	ug/L	4.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-05	(mg/kg/day)	1.0E-05	(mg/kg/day)	3.8E+00
				Vanadium	1.11E+01	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	2.1E-02
				Zinc	3.72E+01	ug/L	4.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.6E-04	(mg/kg/day)	3.0E-01	(mg/kg/day)	1.2E-03
			Exp. Route Total								7.3E-05					1.2E+01

TABLE 7.9.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	1.2E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	6.7E-10	9.1E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.3E-05
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	9.1E-08	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	7.3E-08	4.9E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	2.5E-03
				1,2-Dichloroethane	1.10E+00	ug/L	7.0E-08	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	6.4E-09	5.5E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	9.1E-05
				1,4-Dichlorobenzene	9.20E-01	ug/L	8.7E-07	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	4.7E-09	6.8E-06	(mg/kg/day)	7.0E-02	(mg/kg/day)	9.7E-05
				2-Hexanone	5.60E+00	ug/L	3.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	5.1E-04
				Benzene	5.80E+00	ug/L	1.1E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.1E-08	8.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.1E-03
				cis-1,2-Dichloroethene	5.40E+01	ug/L	8.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	3.4E-02
				Ethylbenzene	4.40E+00	ug/L	3.4E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	3.7E-08	2.6E-05	(mg/kg/day)	1.0E-01	(mg/kg/day)	2.6E-04
				m+p-Xylenes	2.60E+01	ug/L	2.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	7.9E-04
				Trichloroethene (Kidney)	6.20E+00	ug/L	1.9E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.8E-08	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	1.3E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	5.0E-08	1.0E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.1E-02
				Vinyl Chloride	4.20E+00	ug/L	4.0E-07	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.9E-07	3.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.0E-03
				1,4-Dioxane	5.66E+01	ug/L	3.0E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.0E-08	2.3E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	7.8E-05
				2,6-Dinitrotoluene	8.60E+00	ug/L	9.3E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.4E-06	7.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.4E-02
				2-Methylnaphthalene	9.30E+00	ug/L	1.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-04	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.5E-02
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	4.8E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	5.3E-08	3.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	8.00E+00	ug/L	7.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.8E-03
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Pentachlorophenol	4.90E-01	ug/L	2.8E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.1E-06	2.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	4.4E-03
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				beta-BHC	3.60E-02	ug/L	3.9E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	7.1E-08	3.1E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	1.70E-02	ug/L	4.7E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	7.5E-07	3.6E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	7.3E-03
				Heptachlor	1.10E-03	ug/L	1.2E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	5.5E-08	9.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9E-04
				Heptachlor Epoxide	9.50E-04	ug/L	1.8E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.6E-08	1.4E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	1.1E-03
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	7.92E+03	ug/L	4.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	3.1E-04
				Antimony	5.30E+00	ug/L	2.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	3.5E-03
				Arsenic	1.87E+01	ug/L	9.5E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.4E-07	7.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5E-03
				Barium	5.15E+02	ug/L	2.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.4E-03
				Boron	7.38E+02	ug/L	3.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.5E-04
				Cadmium	1.84E+00	ug/L	9.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.2E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	2.9E-03
				Chromium	8.03E+00	ug/L	5.9E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.2E-06	3.2E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	4.2E-03
				Cobalt	1.30E+01	ug/L	2.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.8E-04
				Copper	2.24E+01	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.8E-07	(mg/kg/day)	4.0E-02	(mg/kg/day)	2.2E-05
				Cyanide	1.68E+01	ug/L	6.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.0E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	8.3E-04
				Iron	3.96E+04	ug/L	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.2E-03
				Lead	8.76E+01	ug/L	4.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	1.08E+04	ug/L	5.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	4.4E-01
				Mercury	7.50E-02	ug/L	3.8E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-09	(mg/kg/day)	1.0E-04	(mg/kg/day)	3.0E-05
				Silver	2.53E+01	ug/L	7.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-07	(mg/kg/day)	2.0E-04	(mg/kg/day)	3.0E-03
				Thallium	3.90E+00	ug/L	2.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	1.5E-02
				Vanadium	1.11E+01	ug/L	5.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	3.4E-03
				Zinc	3.72E+01	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.8E-07	(mg/kg/day)	3.0E-01	(mg/kg/day)	2.9E-06
			Exp. Route Total								5.4E-06					6.2E-01
		Exposure Point Total									7.8E-05					1.3E+01
	Exposure Medium Total										7.8E-05					1.3E+01

TABLE 7.9.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	6.00E-07	mg/m^3	4.9E-08	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	7.9E-10	3.8E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.9E-03
				1,2-Dibromo-3-Chloropropane	4.30E-07	mg/m^3	5.1E-08	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	3.1E-07	2.8E-07	(mg/m^3)	2.0E-04	(mg/m^3)	1.4E-03
				1,2-Dichloroethane	6.79E-06	mg/m^3	5.6E-07	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	1.5E-08	4.4E-06	(mg/m^3)	7.0E-03	(mg/m^3)	6.2E-04
				1,4-Dichlorobenzene	5.14E-06	mg/m^3	4.2E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	4.7E-09	3.3E-06	(mg/m^3)	8.0E-01	(mg/m^3)	4.1E-06
				2-Hexanone	1.18E-05	mg/m^3	9.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	7.5E-06	(mg/m^3)	3.0E-02	(mg/m^3)	2.5E-04
				Benzene	4.59E-05	mg/m^3	3.8E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	2.9E-08	2.9E-05	(mg/m^3)	3.0E-02	(mg/m^3)	9.8E-04
				cis-1,2-Dichloroethene	3.81E-04	mg/m^3	3.1E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.4E-04	(mg/m^3)	NA	(mg/m^3)	--
				Ethylbenzene	3.05E-05	mg/m^3	2.5E-06	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	6.3E-09	2.0E-05	(mg/m^3)	1.0E+00	(mg/m^3)	2.0E-05
				m+p-Xylenes	1.79E-04	mg/m^3	1.5E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.2E-04	(mg/m^3)	1.0E-01	(mg/m^3)	1.2E-03
				Trichloroethene (Kidney)	3.92E-05	mg/m^3	4.7E-06	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	4.7E-09	2.5E-05	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Non-Kidney)	3.92E-05	mg/m^3	3.2E-06	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.0E-08	2.5E-05	(mg/m^3)	2.0E-03	(mg/m^3)	1.3E-02
				Vinyl Chloride	3.80E-05	mg/m^3	3.1E-06	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	1.4E-08	2.4E-05	(mg/m^3)	1.0E-01	(mg/m^3)	2.4E-04
				1,4-Dioxane	8.96E-06	mg/m^3	7.4E-07	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	3.7E-09	5.7E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.9E-04
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2-Methylnaphthalene	3.99E-05	mg/m^3	3.3E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	2.6E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)anthracene	6.21E-08	mg/m^3	7.4E-09	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	4.4E-10	4.0E-08	(mg/m^3)	NA	(mg/m^3)	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-Chloroethyl)Ether	5.03E-07	mg/m^3	4.1E-08	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	1.4E-08	3.2E-07	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	3.42E-05	mg/m^3	2.8E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	9.6E-08	2.2E-05	(mg/m^3)	3.0E-03	(mg/m^3)	7.3E-03
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				2,3,7,8-TCDD Equivalents	1.55E-12	mg/m^3	1.3E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	4.8E-09	9.9E-13	(mg/m^3)	4.0E-08	(mg/m^3)	2.5E-05
				Aldrin	6.77E-10	mg/m^3	5.6E-11	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	2.7E-10	4.3E-10	(mg/m^3)	NA	(mg/m^3)	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor	2.38E-09	mg/m^3	2.0E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	2.6E-10	1.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				Heptachlor Epoxide	2.94E-10	mg/m^3	2.4E-11	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	6.3E-11	1.9E-10	(mg/m^3)	NA	(mg/m^3)	--
				Dioxin-Like PCBs	3.93E-12	mg/m^3	3.2E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	1.2E-08	2.5E-12	(mg/m^3)	4.0E-08	(mg/m^3)	6.3E-05
				Nondioxin-Like PCBs	5.59E-07	mg/m^3	4.6E-08	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	4.6E-09	3.6E-07	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-02	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Cyanide	2.24E-04	mg/m^3	1.8E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	1.4E-04	(mg/m^3)	8.0E-04	(mg/m^3)	1.8E-01
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								5.3E-07					2.1E-01
		Exposure Point Total									5.3E-07					2.1E-01
	Exposure Medium Total										5.3E-07					2.1E-01
Medium Total											7.9E-05					1.3E+01
										Total of Receptor Risks Across All Media	8E-05				Total of Receptor Hazards Across All Media	1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.10.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Ingestion	1,1,2-Trichloroethane	1.20E-01	ug/L	2.5E-07	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	1.4E-08	--	--	--	--	--
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	1.9E-06	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	1.5E-06	--	--	--	--	--
				1,2-Dichloroethane	1.10E+00	ug/L	2.3E-06	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	2.1E-07	--	--	--	--	--
				1,4-Dichlorobenzene	9.20E-01	ug/L	1.9E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	1.0E-08	--	--	--	--	--
				2-Hexanone	5.60E+00	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzene	5.80E+00	ug/L	1.2E-05	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.6E-07	--	--	--	--	--
				cis-1,2-Dichloroethene	5.40E+01	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Ethylbenzene	4.40E+00	ug/L	9.1E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	1.0E-07	--	--	--	--	--
				m+p-Xylenes	2.60E+01	ug/L	5.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	6.20E+00	ug/L	5.0E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	4.7E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	1.3E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	4.7E-07	--	--	--	--	--
				Vinyl Chloride	4.20E+00	ug/L	1.3E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	9.7E-05	--	--	--	--	--
				1,4-Dioxane	5.66E+01	ug/L	1.2E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.2E-05	--	--	--	--	--
				2,6-Dinitrotoluene	8.60E+00	ug/L	1.8E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.7E-05	--	--	--	--	--
				2-Methylnaphthalene	9.30E+00	ug/L	1.9E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)anthracene	2.60E-01	ug/L	2.1E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.1E-07	--	--	--	--	--
				Benzo(a)pyrene	1.20E-01	ug/L	9.7E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	9.7E-07	--	--	--	--	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	2.5E-06	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	2.7E-06	--	--	--	--	--
				Naphthalene	8.00E+00	ug/L	1.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	3.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	5.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	4.90E-01	ug/L	1.0E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	4.0E-07	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	4.4E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	5.7E-07	--	--	--	--	--
				Aldrin	1.10E-03	ug/L	2.3E-09	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	3.9E-08	--	--	--	--	--
				beta-BHC	3.60E-02	ug/L	7.4E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.3E-07	--	--	--	--	--
				Dieldrin	1.70E-02	ug/L	3.5E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	5.6E-07	--	--	--	--	--
				Heptachlor	1.10E-03	ug/L	2.3E-09	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	1.0E-08	--	--	--	--	--
				Heptachlor Epoxide	9.50E-04	ug/L	2.0E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.8E-08	--	--	--	--	--
				Dioxin-Like PCBs	1.40E-06	ug/L	2.9E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.8E-07	--	--	--	--	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	4.1E-07	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.6E-07	--	--	--	--	--
				Aluminum	7.92E+03	ug/L	1.6E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.30E+00	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	1.87E+01	ug/L	3.9E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.8E-05	--	--	--	--	--
				Barium	5.15E+02	ug/L	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	7.38E+02	ug/L	1.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.84E+00	ug/L	3.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	8.03E+00	ug/L	6.5E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	3.3E-05	--	--	--	--	--
				Cobalt	1.30E+01	ug/L	2.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.24E+01	ug/L	4.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.68E+01	ug/L	3.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.96E+04	ug/L	8.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	8.76E+01	ug/L	1.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	1.08E+04	ug/L	2.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	7.50E-02	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.53E+01	ug/L	5.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	3.90E+00	ug/L	8.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	1.11E+01	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	3.72E+01	ug/L	7.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								2.4E-04					--

TABLE 7.10.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Shallow Wells	Dermal	1,1,2-Trichloroethane	1.20E-01	ug/L	2.0E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	1.2E-09	--	--	--	--	--
				1,2-Dibromo-3-Chloropropane	2.30E-01	ug/L	4.2E-07	(mg/kg/day)	8.0E-01	$(mg/kg/day)^{-1}$	3.4E-07	--	--	--	--	--
				1,2-Dichloroethane	1.10E+00	ug/L	1.2E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.1E-08	--	--	--	--	--
				1,4-Dichlorobenzene	9.20E-01	ug/L	1.5E-06	(mg/kg/day)	5.4E-03	$(mg/kg/day)^{-1}$	8.2E-09	--	--	--	--	--
				2-Hexanone	5.60E+00	ug/L	5.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzene	5.80E+00	ug/L	2.0E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	1.1E-07	--	--	--	--	--
				cis-1,2-Dichloroethene	5.40E+01	ug/L	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Ethylbenzene	4.40E+00	ug/L	6.0E-06	(mg/kg/day)	1.1E-02	$(mg/kg/day)^{-1}$	6.6E-08	--	--	--	--	--
				m+p-Xylenes	2.60E+01	ug/L	3.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	6.20E+00	ug/L	9.7E-06	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	9.0E-08	--	--	--	--	--
				Trichloroethene (Non-Kidney)	6.20E+00	ug/L	2.3E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	8.7E-08	--	--	--	--	--
				Vinyl Chloride	4.20E+00	ug/L	1.2E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	8.8E-06	--	--	--	--	--
				1,4-Dioxane	5.66E+01	ug/L	5.0E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	5.0E-08	--	--	--	--	--
				2,6-Dinitrotoluene	8.60E+00	ug/L	1.6E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.3E-06	--	--	--	--	--
				2-Methylnaphthalene	9.30E+00	ug/L	3.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)anthracene	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Benzo(a)pyrene	1.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Bis(2-Chloroethyl)Ether	1.20E+00	ug/L	8.1E-08	(mg/kg/day)	1.1E+00	$(mg/kg/day)^{-1}$	8.9E-08	--	--	--	--	--
				Naphthalene	8.00E+00	ug/L	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	1.85E+00	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	2.60E-01	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	4.90E-01	ug/L	4.7E-06	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	1.9E-06	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.12E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aldrin	1.10E-03	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				beta-BHC	3.60E-02	ug/L	6.6E-08	(mg/kg/day)	1.8E+00	$(mg/kg/day)^{-1}$	1.2E-07	--	--	--	--	--
				Dieldrin	1.70E-02	ug/L	7.8E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.2E-06	--	--	--	--	--
				Heptachlor	1.10E-03	ug/L	2.1E-08	(mg/kg/day)	4.5E+00	$(mg/kg/day)^{-1}$	9.2E-08	--	--	--	--	--
				Heptachlor Epoxide	9.50E-04	ug/L	2.9E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.7E-08	--	--	--	--	--
				Dioxin-Like PCBs	1.40E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Nondioxin-Like PCBs	1.99E-01	ug/L	0.0E+00	(mg/kg/day)	4.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Aluminum	7.92E+03	ug/L	7.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.30E+00	ug/L	4.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	1.87E+01	ug/L	1.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.5E-07	--	--	--	--	--
				Barium	5.15E+02	ug/L	4.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Boron	7.38E+02	ug/L	6.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.84E+00	ug/L	1.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	8.03E+00	ug/L	3.0E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	5.9E-06	--	--	--	--	--
				Cobalt	1.30E+01	ug/L	4.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Copper	2.24E+01	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.68E+01	ug/L	1.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.96E+04	ug/L	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	8.76E+01	ug/L	7.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	1.08E+04	ug/L	9.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Mercury	7.50E-02	ug/L	6.7E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Silver	2.53E+01	ug/L	1.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Thallium	3.90E+00	ug/L	3.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	1.11E+01	ug/L	9.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Zinc	3.72E+01	ug/L	2.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								2.2E-05					--
		Exposure Point Total									2.6E-04					--
	Exposure Medium Total										2.6E-04					--

TABLE 7.10.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air-Shower	Outside Landfill Shallow Wells	Inhalation	1,1,2-Trichloroethane	6.00E-07	mg/m^3	4.9E-08	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	7.9E-10	--	--	--	--	--
				1,2-Dibromo-3-Chloropropane	4.30E-07	mg/m^3	5.1E-08	(mg/m^3)	6.0E-03	(ug/m^3)$^{-1}$	3.1E-07	--	--	--	--	--
				1,2-Dichloroethane	6.79E-06	mg/m^3	5.6E-07	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	1.5E-08	--	--	--	--	--
				1,4-Dichlorobenzene	5.14E-06	mg/m^3	4.2E-07	(mg/m^3)	1.1E-05	(ug/m^3)$^{-1}$	4.7E-09	--	--	--	--	--
				2-Hexanone	1.18E-05	mg/m^3	9.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Benzene	4.59E-05	mg/m^3	3.8E-06	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	2.9E-08	--	--	--	--	--
				cis-1,2-Dichloroethene	3.81E-04	mg/m^3	3.1E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Ethylbenzene	3.05E-05	mg/m^3	2.5E-06	(mg/m^3)	2.5E-06	(ug/m^3)$^{-1}$	6.3E-09	--	--	--	--	--
				m+p-Xylenes	1.79E-04	mg/m^3	1.5E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	3.92E-05	mg/m^3	4.7E-06	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	4.7E-09	--	--	--	--	--
				Trichloroethene (Non-Kidney)	3.92E-05	mg/m^3	3.2E-06	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.0E-08	--	--	--	--	--
				Vinyl Chloride	3.80E-05	mg/m^3	3.1E-06	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	1.4E-08	--	--	--	--	--
				1,4-Dioxane	8.96E-06	mg/m^3	7.4E-07	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	3.7E-09	--	--	--	--	--
				2,6-Dinitrotoluene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				2-Methylnaphthalene	3.99E-05	mg/m^3	3.3E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Benzo(a)anthracene	6.21E-08	mg/m^3	7.4E-09	(mg/m^3)	6.0E-05	(ug/m^3)$^{-1}$	4.4E-10	--	--	--	--	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Bis(2-Chloroethyl)Ether	5.03E-07	mg/m^3	4.1E-08	(mg/m^3)	3.3E-04	(ug/m^3)$^{-1}$	1.4E-08	--	--	--	--	--
				Naphthalene	3.42E-05	mg/m^3	2.8E-06	(mg/m^3)	3.4E-05	(ug/m^3)$^{-1}$	9.6E-08	--	--	--	--	--
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Pentachlorophenol	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.1E-06	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	1.55E-12	mg/m^3	1.3E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	4.8E-09	--	--	--	--	--
				Aldrin	6.77E-10	mg/m^3	5.6E-11	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	2.7E-10	--	--	--	--	--
				beta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	5.3E-04	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Heptachlor	2.38E-09	mg/m^3	2.0E-10	(mg/m^3)	1.3E-03	(ug/m^3)$^{-1}$	2.6E-10	--	--	--	--	--
				Heptachlor Epoxide	2.94E-10	mg/m^3	2.4E-11	(mg/m^3)	2.6E-03	(ug/m^3)$^{-1}$	6.3E-11	--	--	--	--	--
				Dioxin-Like PCBs	3.93E-12	mg/m^3	3.2E-13	(mg/m^3)	3.8E+01	(ug/m^3)$^{-1}$	1.2E-08	--	--	--	--	--
				Nondioxin-Like PCBs	5.59E-07	mg/m^3	4.6E-08	(mg/m^3)	1.0E-04	(ug/m^3)$^{-1}$	4.6E-09	--	--	--	--	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Boron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Copper	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Cyanide	2.24E-04	mg/m^3	1.8E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Mercury	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Silver	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Thallium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
				Zinc	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								5.3E-07					--
		Exposure Point Total									5.3E-07					--
	Exposure Medium Total										5.3E-07					--
Medium Total											2.6E-04					--
											Total of Receptor Risks Across All Media	3E-04			Total of Receptor Hazards Across All Media	--

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.11.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.7E+00	ug/L	2.6E-08	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.5E-10	2.8E-07	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.4E-06
				Benzene	7.6E-01	ug/L	5.4E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.0E-10	5.7E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.4E-05
				Chloroform	1.2E+00	ug/L	8.5E-09	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.6E-10	9.0E-08	(mg/kg/day)	1.0E-02	(mg/kg/day)	9.0E-06
				cis-1,2-Dichloroethene	2.0E+03	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.5E-04	(mg/kg/day)	2.0E-03	(mg/kg/day)	7.5E-02
				Trichloroethene	3.3E+02	ug/L	2.3E-06	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	1.1E-07	2.5E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.0E-02
				Vinyl Chloride	1.1E+01	ug/L	7.8E-08	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	5.6E-08	8.3E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.8E-04
				1,4-Dioxane	2.2E+01	ug/L	1.6E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.6E-08	1.7E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	5.5E-05
				Benzo(a)pyrene	7.7E-02	ug/L	5.4E-10	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	5.4E-10	5.8E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.9E-05
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	5.0E-08	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	6.9E-10	5.3E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	2.6E-05
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	2.3E-09	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.3E-09	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	2.8E-09	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.8E-10	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.5E-01	ug/L	1.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.1E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.6E-07
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	2.0E-14	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	2.6E-09	2.1E-13	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.0E-04
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	3.5E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	3.8E-09	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.9E-04
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	3.1E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	3.3E-09	(mg/kg/day)	2.0E-05	(mg/kg/day)	1.7E-04
				Dieldrin	2.2E-03	ug/L	1.6E-11	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.5E-10	1.7E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	3.4E-06
				delta-BHC	1.3E-02	ug/L	9.2E-11	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	5.8E-10	9.8E-10	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.2E-07
				Aluminum	3.1E+04	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.3E-03
				Antimony	5.5E+00	ug/L	3.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	4.1E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	1.0E-03
				Arsenic	4.6E+00	ug/L	3.2E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.9E-08	3.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.1E-03
				Barium	2.1E+02	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	7.8E-05
				Beryllium	1.2E+00	ug/L	8.5E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	9.0E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)	4.5E-05
				Cadmium	1.4E+00	ug/L	9.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.1E-07	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.1E-04
				Chromium	3.0E+01	ug/L	2.1E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.1E-07	2.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	7.6E-04
				Cobalt	2.7E+01	ug/L	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.8E-03
				Cyanide	1.1E+01	ug/L	7.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	8.3E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.4E-03
				Iron	3.7E+04	ug/L	2.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.8E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	3.9E-03
				Lead	3.7E+00	ug/L	2.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.3E+03	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.5E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.0E-02
				Vanadium	8.2E+00	ug/L	5.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	6.2E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.2E-04
			Exp. Route Total								3.4E-07					1.5E-01
			Dermal	1,1-Dichloroethane	3.7E+00	ug/L	2.5E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.4E-09	2.7E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.3E-05
				Benzene	7.6E-01	ug/L	1.1E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.8E-09	1.1E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.8E-04
				Chloroform	1.2E+00	ug/L	8.8E-08	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.7E-09	9.3E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	9.3E-05
				cis-1,2-Dichloroethene	2.0E+03	ug/L	2.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.3E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.2E+00
				Trichloroethene	3.3E+02	ug/L	4.2E-05	(mg/kg/day)	4.6E-02	$(mg/kg/day)^{-1}$	1.9E-06	4.5E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	8.9E-01
				Vinyl Chloride	1.1E+01	ug/L	8.4E-07	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	6.0E-07	8.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	3.0E-03
				1,4-Dioxane	2.2E+01	ug/L	8.4E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	8.4E-09	9.0E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.0E-05
				Benzo(a)pyrene	7.7E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	7.0E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	3.2E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.9E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.5E-01	ug/L	7.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	7.9E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.9E-05
				2,3,7,8-TCDD Equivalents	2.8E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	5.0E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	4.4E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Dieldrin	2.2E-03	ug/L	3.0E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.9E-08	3.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	6.5E-04
				delta-BHC	1.3E-02	ug/L	6.9E-09	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	4.3E-08	7.3E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	9.1E-06
				Aluminum	3.1E+04	ug/L	3.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	3.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	3.3E-03
				Antimony	5.5E+00	ug/L	5.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	5.8E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	9.7E-03
				Arsenic	4.6E+00	ug/L	4.6E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.9E-08	4.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.6E-03
				Barium	2.1E+02	ug/L	2.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	2.2E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.6E-03
				Beryllium	1.2E+00	ug/L	1.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.3E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	9.1E-03
				Cadmium	1.4E+00	ug/L	1.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.5E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	5.9E-03
				Chromium	3.0E+01	ug/L	3.0E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	6.1E-06	3.2E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	4.3E-02

TABLE 7.11.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Dermal	Cobalt	2.7E+01	ug/L	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.8E-03
				Cyanide	1.1E+01	ug/L	8.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	8.8E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.5E-03
				Iron	3.7E+04	ug/L	3.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	3.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	5.5E-03
				Lead	3.7E+00	ug/L	3.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	3.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.3E+03	ug/L	3.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	3.5E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	3.7E-01
				Vanadium	8.2E+00	ug/L	8.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	0.0E+00	8.7E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	6.7E-03
			Exp. Route Total								8.8E-06					2.5E+00
		Exposure Point Total									9.1E-06					2.7E+00
	Exposure Medium Total										9.1E-06					2.7E+00
	Air - Irrigation	Outside Landfill Deep Wells	Inhalation	1,1-Dichloroethane	9.7E-05	mg/m^3	9.1E-07	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	1.5E-09	9.7E-06	(mg/m^3)	NA	(mg/m^3)	--
				Benzene	2.0E-05	mg/m^3	1.9E-07	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.5E-09	2.0E-06	(mg/m^3)	3.0E-02	(mg/m^3)	6.6E-05
				Chloroform	2.9E-05	mg/m^3	2.8E-07	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	6.4E-09	2.9E-06	(mg/m^3)	9.8E-02	(mg/m^3)	3.0E-05
				cis-1,2-Dichloroethene	5.0E-02	mg/m^3	4.7E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	5.0E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene	9.3E-03	mg/m^3	8.8E-05	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	3.6E-07	9.3E-04	(mg/m^3)	2.0E-03	(mg/m^3)	4.7E-01
				Vinyl Chloride	3.5E-04	mg/m^3	3.3E-06	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	1.5E-08	3.5E-05	(mg/m^3)	1.0E-01	(mg/m^3)	3.5E-04
				1,4-Dioxane	3.1E-06	mg/m^3	2.9E-08	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	1.5E-10	3.1E-07	(mg/m^3)	3.0E-02	(mg/m^3)	1.0E-05
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	2.5E-06	mg/m^3	2.4E-08	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	8.1E-10	2.5E-07	(mg/m^3)	3.0E-03	(mg/m^3)	8.4E-05
				2,3,7,8-TCDD Equivalents	2.5E-11	mg/m^3	2.3E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	8.8E-09	2.5E-12	(mg/m^3)	4.0E-08	(mg/m^3)	6.1E-05
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	3.5E-04	mg/m^3	3.3E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	3.5E-05	(mg/m^3)	8.0E-04	(mg/m^3)	4.4E-02
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								3.9E-07					5.1E-01
		Exposure Point Total									3.9E-07					5.1E-01
	Exposure Medium Total										3.9E-07					5.1E-01
Medium Total											9.5E-06					3.2E+00
Groundwater	Air - Showering	Outside Landfill Deep Wells	Inhalation	1,1-Dichloroethane	2.6E-05	mg/m^3	1.5E-06	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	2.4E-09	1.6E-05	(mg/m^3)	NA	(mg/m^3)	--
				Benzene	6.0E-06	mg/m^3	3.4E-07	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	2.7E-09	3.6E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.2E-04
				Chloroform	7.6E-06	mg/m^3	4.3E-07	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	9.9E-09	4.6E-06	(mg/m^3)	9.8E-02	(mg/m^3)	4.7E-05
				cis-1,2-Dichloroethene	1.4E-02	mg/m^3	8.0E-04	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	8.5E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene	2.1E-03	mg/m^3	1.2E-04	(mg/m^3)	4.1E-06	$(ug/m^3)^{-1}$	4.8E-07	1.3E-03	(mg/m^3)	2.0E-03	(mg/m^3)	6.3E-01
				Vinyl Chloride	9.9E-05	mg/m^3	5.6E-06	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	2.5E-08	6.0E-05	(mg/m^3)	1.0E-01	(mg/m^3)	6.0E-04
				1,4-Dioxane	3.5E-06	mg/m^3	2.0E-07	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	9.8E-10	2.1E-06	(mg/m^3)	3.0E-02	(mg/m^3)	7.0E-05
				Benzo(a)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--

TABLE 7.11.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air - Showering	Outside Landfill	Inhalation	Naphthalene	6.4E-07	mg/m^3	3.6E-08	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.2E-09	3.8E-07	(mg/m^3)	3.0E-03	(mg/m^3)	1.3E-04
		Deep Wells		2,3,7,8-TCDD Equivalents	2.0E-12	mg/m^3	1.2E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	4.4E-09	1.2E-12	(mg/m^3)	4.0E-08	(mg/m^3)	3.1E-05
				Pentadecafluorooctanoic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	1.5E-04	mg/m^3	8.4E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	8.9E-05	(mg/m^3)	8.0E-04	(mg/m^3)	1.1E-01
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	0.0E+00	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								5.3E-07					7.4E-01
		Exposure Point Total									5.3E-07					7.4E-01
	Exposure Medium Total										5.3E-07					7.4E-01
Medium Total											5.3E-07					7.4E-01
										Total of Receptor Risks Across All Media	1E-05				Total of Receptor Hazards Across All Media	4E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.12.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.70E+00	ug/L	3.0E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.7E-08	7.1E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.6E-04
				Benzene	7.60E-01	ug/L	6.3E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	3.4E-08	1.5E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	3.7E-03
				Chloroform	1.20E+00	ug/L	9.9E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	3.1E-08	2.3E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	2.3E-03
				cis-1,2-Dichloroethene	2.00E+03	ug/L	1.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.8E-02	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.9E+01
				Trichloroethene (Kidney)	3.30E+02	ug/L	2.1E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.9E-05	6.3E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	2.7E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.0E-05	6.3E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.3E+01
				Vinyl Chloride	1.10E+01	ug/L	3.4E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.4E-04	2.1E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	7.1E-02
				1,4-Dioxane	2.20E+01	ug/L	1.8E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.8E-06	4.2E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	1.4E-02
				Benzo(a)pyrene	7.70E-02	ug/L	4.9E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	4.9E-07	1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	4.9E-03
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	5.8E-06	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	8.1E-08	1.3E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	6.7E-03
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	2.0E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.0E-06	6.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	2.5E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.5E-07	7.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.50E-01	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.4E-04
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	2.3E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	3.0E-07	5.4E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	7.7E-02
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	4.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.6E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	4.8E-02
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	3.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.5E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	4.2E-02
				Dieldrin	2.24E-03	ug/L	1.8E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.0E-08	4.3E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	8.6E-04
				delta-BHC	1.30E-02	ug/L	1.1E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	6.8E-08	2.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	3.1E-05
				Aluminum	3.12E+04	ug/L	2.6E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	6.0E-01
				Antimony	5.50E+00	ug/L	4.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	4.0E-04	(mg/kg/day)	2.6E-01
				Arsenic	4.58E+00	ug/L	3.8E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.7E-06	8.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.9E-01
				Barium	2.07E+02	ug/L	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.0E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	2.0E-02
				Beryllium	1.20E+00	ug/L	9.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.2E-02
				Cadmium	1.40E+00	ug/L	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	5.4E-02
				Chromium	3.04E+01	ug/L	1.9E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	9.6E-05	5.8E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	1.9E-01
				Cobalt	2.72E+01	ug/L	2.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.2E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.7E+00
				Cyanide	1.11E+01	ug/L	9.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	3.6E-01
				Iron	3.67E+04	ug/L	3.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	1.0E+00
				Lead	3.65E+00	ug/L	3.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.31E+03	ug/L	2.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.4E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	2.7E+00
				Vanadium	8.21E+00	ug/L	6.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	3.2E-02
			Exp. Route Total								3.8E-04					3.9E+01
			Dermal	1,1-Dichloroethane	3.70E+00	ug/L	2.8E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.6E-09	6.6E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	3.3E-05
				Benzene	7.60E-01	ug/L	1.1E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.2E-09	2.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	6.6E-04
				Chloroform	1.20E+00	ug/L	1.1E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	3.3E-09	2.5E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	2.5E-04
				cis-1,2-Dichloroethene	2.00E+03	ug/L	2.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	2.9E+00
				Trichloroethene (Kidney)	3.30E+02	ug/L	4.1E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	3.8E-06	1.3E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	5.4E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.0E-06	1.3E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.5E+00
				Vinyl Chloride	1.10E+01	ug/L	3.1E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.2E-05	1.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	6.4E-03
				1,4-Dioxane	2.20E+01	ug/L	7.7E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.7E-09	1.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	6.0E-05
				Benzo(a)pyrene	7.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.50E-01	ug/L	9.6E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	1.1E-04
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Dieldrin	2.24E-03	ug/L	4.1E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	6.5E-08	9.5E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	1.9E-03
				delta-BHC	1.30E-02	ug/L	9.2E-09	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	5.8E-08	2.1E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	2.7E-05
				Aluminum	3.12E+04	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	2.8E-03
				Antimony	5.50E+00	ug/L	2.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.9E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	8.2E-03
				Arsenic	4.58E+00	ug/L	1.8E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.6E-08	4.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-03
				Barium	2.07E+02	ug/L	8.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-05	(mg/kg/day)	1.4E-02	(mg/kg/day)	1.3E-03
				Beryllium	1.20E+00	ug/L	4.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-07	(mg/kg/day)	1.4E-05	(mg/kg/day)	7.7E-03
				Cadmium	1.40E+00	ug/L	5.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-07	(mg/kg/day)	2.5E-05	(mg/kg/day)	5.0E-03
				Chromium	3.04E+01	ug/L	9.0E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.8E-05	2.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	3.6E-02

TABLE 7.12.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Dermal	Cobalt	2.72E+01	ug/L	4.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	3.3E-03
				Cyanide	1.11E+01	ug/L	4.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-06	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.7E-03
				Iron	3.67E+04	ug/L	1.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	4.7E-03
				Lead	3.65E+00	ug/L	1.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.31E+03	ug/L	1.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	3.1E-01
				Vanadium	8.21E+00	ug/L	3.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.4E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	5.7E-03
			Exp. Route Total								4.6E-05					5.8E+00
		Exposure Point Total									4.3E-04					4.5E+01
	Exposure Medium Total										4.3E-04					4.5E+01
Medium Total											4.3E-04					4.5E+01
										Total of Receptor Risks Across All Media	4E-04				Total of Receptor Hazards Across All Media	5E+01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.13.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.70E+00	ug/L	4.6E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	2.6E-08	3.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.8E-04
				Benzene	7.60E-01	ug/L	9.4E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.2E-08	7.3E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	1.8E-03
				Chloroform	1.20E+00	ug/L	1.5E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	4.6E-08	1.2E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	1.2E-03
				cis-1,2-Dichloroethene	2.00E+03	ug/L	2.5E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-02	(mg/kg/day)	2.0E-03	(mg/kg/day)	9.6E+00
				Trichloroethene (Kidney)	3.30E+02	ug/L	5.9E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	5.5E-06	3.2E-03	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	4.1E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.5E-05	3.2E-03	(mg/kg/day)	5.0E-04	(mg/kg/day)	6.3E+00
				Vinyl Chloride	1.10E+01	ug/L	1.4E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	9.8E-06	1.1E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	3.5E-02
				1,4-Dioxane	2.20E+01	ug/L	2.7E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.7E-06	2.1E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	7.1E-03
				Benzo(a)pyrene	7.70E-02	ug/L	1.4E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	1.4E-07	7.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	2.5E-03
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	8.7E-06	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.2E-07	6.7E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	3.4E-03
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	5.7E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	5.7E-07	3.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	7.0E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.0E-08	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.50E-01	ug/L	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	7.2E-05
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	3.5E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	4.5E-07	2.7E-11	(mg/kg/day)	7.0E-10	(mg/kg/day)	3.8E-02
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	6.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.4E-02
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	5.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.2E-07	(mg/kg/day)	2.0E-05	(mg/kg/day)	2.1E-02
				Dieldrin	2.24E-03	ug/L	2.8E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.4E-08	2.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	4.3E-04
				delta-BHC	1.30E-02	ug/L	1.6E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.0E-07	1.3E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.6E-05
				Aluminum	3.12E+04	ug/L	3.9E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	3.0E-01
				Antimony	5.50E+00	ug/L	6.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.3E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	1.3E-01
				Arsenic	4.58E+00	ug/L	5.7E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.5E-06	4.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.5E-01
				Barium	2.07E+02	ug/L	2.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.0E-02
				Beryllium	1.20E+00	ug/L	1.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	5.8E-03
				Cadmium	1.40E+00	ug/L	1.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	2.7E-02
				Chromium	3.04E+01	ug/L	5.4E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.7E-05	2.9E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	9.7E-02
				Cobalt	2.72E+01	ug/L	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	8.7E-01
				Cyanide	1.11E+01	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	6.0E-04	(mg/kg/day)	1.8E-01
				Iron	3.67E+04	ug/L	4.5E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	5.0E-01
				Lead	3.65E+00	ug/L	4.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.31E+03	ug/L	4.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	1.3E+00
				Vanadium	8.21E+00	ug/L	1.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.9E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	1.6E-02
			Exp. Route Total								7.0E-05					2.0E+01
			Dermal	1,1-Dichloroethane	3.70E+00	ug/L	3.7E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	2.1E-09	2.9E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	1.4E-05
				Benzene	7.60E-01	ug/L	1.4E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	8.0E-09	1.1E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	2.8E-04
				Chloroform	1.20E+00	ug/L	1.4E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	4.4E-09	1.1E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	1.1E-04
				cis-1,2-Dichloroethene	2.00E+03	ug/L	3.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.5E-03	(mg/kg/day)	2.0E-03	(mg/kg/day)	1.3E+00
				Trichloroethene (Kidney)	3.30E+02	ug/L	1.0E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	9.6E-07	5.6E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	7.1E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.6E-06	5.6E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.1E+00
				Vinyl Chloride	1.10E+01	ug/L	1.0E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	7.5E-07	8.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	2.7E-03
				1,4-Dioxane	2.20E+01	ug/L	1.2E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	1.2E-08	9.1E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	3.0E-05
				Benzo(a)pyrene	7.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	3.0E-04	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-02	(mg/kg/day)	--
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Naphthalene	1.50E-01	ug/L	1.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	5.2E-05
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	7.0E-10	(mg/kg/day)	--
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	0.0E+00	(mg/kg/day)	2.0E-05	(mg/kg/day)	--
				Dieldrin	2.24E-03	ug/L	6.2E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	9.9E-08	4.8E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	9.6E-04
				delta-BHC	1.30E-02	ug/L	1.4E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	8.8E-08	1.1E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	1.4E-05
				Aluminum	3.12E+04	ug/L	1.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	1.2E-03
				Antimony	5.50E+00	ug/L	2.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.2E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	3.6E-03
				Arsenic	4.58E+00	ug/L	2.3E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.5E-08	1.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	6.0E-04
				Barium	2.07E+02	ug/L	1.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.1E-06	(mg/kg/day)	1.4E-02	(mg/kg/day)	5.8E-04
				Beryllium	1.20E+00	ug/L	6.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.7E-08	(mg/kg/day)	1.4E-05	(mg/kg/day)	3.4E-03
				Cadmium	1.40E+00	ug/L	7.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.5E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	2.2E-03
				Chromium	3.04E+01	ug/L	2.2E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	4.4E-06	1.2E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	1.6E-02
				Cobalt	2.72E+01	ug/L	5.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.4E-03

TABLE 7.13.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill	Dermal	Cyanide	1.11E+01	ug/L	4.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.3E-07	(mg/kg/day)	6.0E-04	(mg/kg/day)	5.5E-04
		Deep Wells		Iron	3.67E+04	ug/L	1.9E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	2.1E-03
				Lead	3.65E+00	ug/L	1.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	3.31E+03	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.3E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	1.4E-01
				Vanadium	8.21E+00	ug/L	4.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	2.5E-03
			Exp. Route Total								9.0E-06					2.5E+00
		Exposure Point Total									7.9E-05					2.2E+01
	Exposure Medium Total										7.9E-05					2.2E+01
	Air-Shower	Outside Landfill	Inhalation	1,1-Dichloroethane	2.62E-05	mg/m^3	2.2E-06	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	3.5E-09	1.7E-05	(mg/m^3)	NA	(mg/m^3)	--
		Deep Wells		Benzene	6.01E-06	mg/m^3	5.0E-07	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	3.9E-09	3.9E-06	(mg/m^3)	3.0E-02	(mg/m^3)	1.3E-04
				Chloroform	7.63E-06	mg/m^3	6.3E-07	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	1.4E-08	4.9E-06	(mg/m^3)	9.8E-02	(mg/m^3)	5.0E-05
				cis-1,2-Dichloroethene	1.41E-02	mg/m^3	1.2E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.0E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Kidney)	2.09E-03	mg/m^3	2.5E-04	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	2.5E-07	1.3E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Non-Kidney)	2.09E-03	mg/m^3	1.7E-04	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	5.3E-07	1.3E-03	(mg/m^3)	2.0E-03	(mg/m^3)	6.7E-01
				Vinyl Chloride	9.95E-05	mg/m^3	8.2E-06	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	3.6E-08	6.4E-05	(mg/m^3)	1.0E-01	(mg/m^3)	6.4E-04
				1,4-Dioxane	3.48E-06	mg/m^3	2.9E-07	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	1.4E-09	2.2E-06	(mg/m^3)	3.0E-02	(mg/m^3)	7.4E-05
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-06	(mg/m^3)	--
				Bis(2-ethylhexyl)phthalate	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dibenzo(a,h)anthracene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Indeno(1,2,3-cd)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Naphthalene	6.41E-07	mg/m^3	5.3E-08	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.8E-09	4.1E-07	(mg/m^3)	3.0E-03	(mg/m^3)	1.4E-04
				2,3,7,8-TCDD Equivalents	2.04E-12	mg/m^3	1.7E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	6.4E-09	1.3E-12	(mg/m^3)	4.0E-08	(mg/m^3)	3.3E-05
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-04	(mg/m^3)	--
				Beryllium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	2.0E-05	(mg/m^3)	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	1.48E-04	mg/m^3	1.2E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	9.5E-05	(mg/m^3)	8.0E-04	(mg/m^3)	1.2E-01
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								8.5E-07					7.9E-01
		Exposure Point Total									8.5E-07					7.9E-01
	Exposure Medium Total										8.5E-07					7.9E-01
Medium Total											8E-05					2.3E+01
										Total of Receptor Risks Across All Media	8E-05			Total of Receptor Hazards Across All Media		2E+01

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.14.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Ingestion	1,1-Dichloroethane	3.70E+00	ug/L	7.6E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	4.3E-08	--	--	--	--	--
				Benzene	7.60E-01	ug/L	1.6E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	8.6E-08	--	--	--	--	--
				Chloroform	1.20E+00	ug/L	2.5E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	7.7E-08	--	--	--	--	--
				cis-1,2-Dichloroethene	2.00E+03	ug/L	4.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	3.30E+02	ug/L	2.7E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	2.5E-05	--	--	--	--	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	6.8E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.5E-05	--	--	--	--	--
				Vinyl Chloride	1.10E+01	ug/L	3.5E-04	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.5E-04	--	--	--	--	--
				1,4-Dioxane	2.20E+01	ug/L	4.5E-05	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.5E-06	--	--	--	--	--
				Benzo(a)pyrene	7.70E-02	ug/L	6.2E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	6.2E-07	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	1.4E-05	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	2.0E-07	--	--	--	--	--
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	2.6E-06	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	2.6E-06	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	3.2E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.2E-07	--	--	--	--	--
				Naphthalene	1.50E-01	ug/L	3.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	5.8E-12	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	7.5E-07	--	--	--	--	--
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	1.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	9.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dieldrin	2.24E-03	ug/L	4.6E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	7.4E-08	--	--	--	--	--
				delta-BHC	1.30E-02	ug/L	2.7E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.7E-07	--	--	--	--	--
				Aluminum	3.12E+04	ug/L	6.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.50E+00	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	4.58E+00	ug/L	9.4E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.4E-05	--	--	--	--	--
				Barium	2.07E+02	ug/L	4.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	1.20E+00	ug/L	2.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.40E+00	ug/L	2.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	3.04E+01	ug/L	2.5E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.2E-04	--	--	--	--	--
				Cobalt	2.72E+01	ug/L	5.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.11E+01	ug/L	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.67E+04	ug/L	7.6E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	3.65E+00	ug/L	7.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	3.31E+03	ug/L	6.8E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	8.21E+00	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								4.5E-04					--
			Dermal	1,1-Dichloroethane	3.70E+00	ug/L	2.4E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.3E-08	--	--	--	--	--
				Benzene	7.60E-01	ug/L	9.4E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.2E-08	--	--	--	--	--
				Chloroform	1.20E+00	ug/L	9.0E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.8E-08	--	--	--	--	--
				cis-1,2-Dichloroethene	2.00E+03	ug/L	2.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	3.30E+02	ug/L	1.2E-03	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.1E-05	--	--	--	--	--
				Trichloroethene (Non-Kidney)	3.30E+02	ug/L	4.5E-04	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.7E-05	--	--	--	--	--
				Vinyl Chloride	1.10E+01	ug/L	3.7E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.7E-05	--	--	--	--	--
				1,4-Dioxane	2.20E+01	ug/L	7.3E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	7.3E-08	--	--	--	--	--
				Benzo(a)pyrene	7.70E-02	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	7.00E+00	ug/L	0.0E+00	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	3.20E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	3.90E-01	ug/L	0.0E+00	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Naphthalene	1.50E-01	ug/L	8.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.80E-06	ug/L	0.0E+00	(mg/kg/day)	1.3E+05	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Pentadecafluorooctanoic Acid	5.00E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	4.40E-02	ug/L	0.0E+00	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Dieldrin	2.24E-03	ug/L	3.9E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	6.2E-07	--	--	--	--	--
				delta-BHC	1.30E-02	ug/L	8.7E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	5.5E-07	--	--	--	--	--
				Aluminum	3.12E+04	ug/L	1.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Antimony	5.50E+00	ug/L	2.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Arsenic	4.58E+00	ug/L	2.4E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.5E-07	--	--	--	--	--
				Barium	2.07E+02	ug/L	1.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Beryllium	1.20E+00	ug/L	6.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Cadmium	1.40E+00	ug/L	7.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Chromium	3.04E+01	ug/L	3.8E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	7.6E-05	--	--	--	--	--
				Cobalt	2.72E+01	ug/L	5.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--

TABLE 7.14.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Outside Landfill Deep Wells	Dermal	Cyanide	1.11E+01	ug/L	4.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Iron	3.67E+04	ug/L	1.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Lead	3.65E+00	ug/L	1.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Manganese	3.31E+03	ug/L	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
				Vanadium	8.21E+00	ug/L	4.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								1.3E-04					--
		Exposure Point Total									5.8E-04					--
	Exposure Medium Total										5.8E-04					--
	Air-Shower	Outside Landfill Deep Wells	Inhalation	1,1-Dichloroethane	2.62E-05	mg/m^3	2.2E-06	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	3.5E-09	--	--	--	--	--
				Benzene	6.01E-06	mg/m^3	5.0E-07	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	3.9E-09	--	--	--	--	--
				Chloroform	7.63E-06	mg/m^3	6.3E-07	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	1.4E-08	--	--	--	--	--
				cis-1,2-Dichloroethene	1.41E-02	mg/m^3	1.2E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Trichloroethene (Kidney)	2.09E-03	mg/m^3	2.5E-04	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	2.5E-07	--	--	--	--	--
				Trichloroethene (Non-Kidney)	2.09E-03	mg/m^3	1.7E-04	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	5.3E-07	--	--	--	--	--
				Vinyl Chloride	9.95E-05	mg/m^3	8.2E-06	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	3.6E-08	--	--	--	--	--
				1,4-Dioxane	3.48E-06	mg/m^3	2.9E-07	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	1.4E-09	--	--	--	--	--
				Benzo(a)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Bis(2-ethylhexyl)phthalate	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-06	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dibenzo(a,h)anthracene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Indeno(1,2,3-cd)pyrene	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-05	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Naphthalene	6.41E-07	mg/m^3	5.3E-08	(mg/m^3)	3.4E-05	$(ug/m^3)^{-1}$	1.8E-09	--	--	--	--	--
				2,3,7,8-TCDD Equivalents	2.04E-12	mg/m^3	1.7E-13	(mg/m^3)	3.8E+01	$(ug/m^3)^{-1}$	6.4E-09	--	--	--	--	--
				Pentadecafluorooctanoic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Perfluorooctane Sulfonic Acid	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Dieldrin	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				delta-BHC	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Aluminum	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Antimony	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Arsenic	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Barium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Beryllium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	2.4E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cadmium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Chromium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cobalt	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Cyanide	1.48E-04	mg/m^3	1.2E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Iron	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Lead	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Manganese	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
				Vanadium	0.00E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -	--	--	--	--	--
			Exp. Route Total								8.5E-07					--
		Exposure Point Total									8.5E-07					--
	Exposure Medium Total										8.5E-07					--
Medium Total											6E-04					--
										Total of Receptor Risks Across All Media	6E-04			Total of Receptor Hazards Across All Media		--

Notes:

1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 9

Summary of Receptor Risks and Hazards for COPCs

LIST OF TABLES

RAGS PART D TABLE 9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

9.1.RME Construction Workers - Groundwater Inside Landfill
9.2.RME Industrial Workers - Groundwater Inside Landfill
9.3.RME Child Residents - Groundwater Inside Landfill
9.4.RME Adult Residents - Groundwater Inside Landfill
9.5.RME Lifetime Residents - Groundwater Inside Landfill
9.6.RME Construction Workers - Groundwater Outside Landfill - Shallow Wells
9.7.RME Industrial Workers - Groundwater Outside Landfill - Shallow Wells
9.8.RME Child Residents - Groundwater Outside Landfill - Shallow Wells
9.9.RME Adult Residents - Groundwater Outside Landfill - Shallow Wells
9.10.RME Lifetime Residents - Groundwater Outside Landfill - Shallow Wells
9.11.RME Industrial Workers - Groundwater Outside Landfill - Deep Wells
9.12.RME Child Residents - Groundwater Outside Landfill - Deep Wells
9.13.RME Adult Residents - Groundwater Outside Landfill - Deep Wells
9.14.RME Lifetime Residents - Groundwater Outside Landfill - Deep Wells

Central Tendency Exposures

9.1.CTE Construction Workers - Groundwater Inside Landfill
9.2.CTE Industrial Workers - Groundwater Inside Landfill
9.3.CTE Child Residents - Groundwater Inside Landfill
9.4.CTE Adult Residents - Groundwater Inside Landfill
9.5.CTE Lifetime Residents - Groundwater Inside Landfill
9.6.CTE Construction Workers - Groundwater Outside Landfill - Shallow Wells
9.7.CTE Industrial Workers - Groundwater Outside Landfill - Shallow Wells
9.8.CTE Child Residents - Groundwater Outside Landfill - Shallow Wells
9.9.CTE Adult Residents - Groundwater Outside Landfill - Shallow Wells
9.10.CTE Lifetime Residents - Groundwater Outside Landfill - Shallow Wells
9.11.CTE Industrial Workers - Groundwater Outside Landfill - Deep Wells
9.12.CTE Child Residents - Groundwater Outside Landfill - Deep Wells
9.13.CTE Adult Residents - Groundwater Outside Landfill - Deep Wells
9.14.CTE Lifetime Residents - Groundwater Outside Landfill - Deep Wells

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	3.1E-12	- -	1.0E-10	--	1E-10	Hepatic	5.7E-07	--	1.9E-05	2E-05
			1,4-Dichlorobenzene	7.5E-12	- -	2.0E-10	--	2E-10	Hepatic	1.4E-06	--	3.7E-05	4E-05
			Benzene	6.5E-11	- -	5.6E-10	--	6E-10	Hematologic	8.2E-06	--	7.1E-05	8E-05
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic, Urinary	2.2E-05	--	3.6E-04	4E-04
			Trichloroethene	7.8E-11	- -	5.6E-10	--	6E-10	Immune, Developmental	2.4E-04	--	1.7E-03	2E-03
			1,4-Dioxane	6.7E-09	- -	1.4E-09	--	8E-09	Hepatic	9.4E-06	--	1.9E-06	1E-05
			Benzo(a)anthracene	4.1E-11	- -	- -	--	4E-11	NA	--	--	--	--
			Benzo(a)pyrene	6.1E-10	- -	- -	--	6E-10	Developmental, Immune, Reproductive	1.4E-04	--	--	1E-04
			Benzo(b)fluoranthene	1.0E-10	- -	- -	--	1E-10	NA	--	--	--	--
			Benzo(k)fluoranthene	3.9E-12	- -	- -	--	4E-12	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.3E-10	- -	- -	--	1E-10	Reproductive	6.3E-06	--	--	6E-06
			Dibenzo(a,h)anthracene	4.5E-11	- -	- -	--	4E-11	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	--	- -	Whole Body	9.5E-05	--	5.2E-03	5E-03
			Indeno(1,2,3-cd)pyrene	3.5E-11	- -	- -	--	4E-11	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Nervous	9.4E-08	--	2.5E-06	3E-06
			Pentachlorophenol	5.6E-11	- -	6.4E-09	--	6E-09	Hepatic	2.0E-06	--	2.2E-04	2E-04
			Phenanthrene	- -	- -	- -	--	- -	Urinary	1.4E-06	--	1.1E-04	1E-04
			2,3,7,8-TCDD Equivalents	2.4E-07	- -	- -	--	2E-07	Immune	6.4E-03	--	--	6E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	7.4E-05	--	--	7E-05
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	3.3E-04	--	--	3E-04
			4,4'-DDD	1.8E-12	- -	5.0E-10	--	5E-10	NA	--	--	--	--
			4,4'-DDE	1.4E-11	- -	- -	--	1E-11	NA	--	--	--	--
			Aldrin	5.9E-10	- -	- -	--	6E-10	Urinary	6.0E-05	--	--	6E-05
			beta-BHC	5.5E-11	- -	1.2E-09	--	1E-09	NA	--	--	--	--
			delta-BHC	1.6E-10	- -	3.3E-09	--	3E-09	Liver	2.2E-07	--	4.6E-06	5E-06
			Dieldrin	2.6E-10	- -	1.4E-08	--	1E-08	Nervous	1.1E-05	--	6.1E-04	6E-04
			Heptachlor	1.6E-11	- -	3.7E-09	--	4E-09	Hepatic	5.0E-07	--	1.1E-04	1E-04
			Heptachlor Epoxide	6.0E-12	- -	2.2E-10	--	2E-10	Hepatic	3.6E-06	--	1.3E-04	1E-04
			gamma-BHC (Lindane)	3.6E-11	- -	7.7E-10	--	8E-10	Immune	7.5E-06	--	1.6E-04	2E-04
			Dioxin-Like PCBs	2.4E-08	- -	- -	--	2E-08	Immune	6.4E-04	--	--	6E-04
			Nondioxin-Like PCBs	3.9E-08	- -	- -	--	4E-08	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	5.9E-04	--	3.3E-04	9E-04
			Antimony	- -	- -	- -	--	- -	Whole Body	3.6E-03	--	1.3E-02	2E-02
			Arsenic	2.8E-08	- -	1.6E-08	--	4E-08	CVS, Dermal	4.3E-03	--	2.4E-03	7E-03
			Barium	- -	- -	- -	--	- -	Urinary	3.1E-04	--	2.5E-03	3E-03
			Beryllium	- -	- -	- -	--	- -	None Specified	8.2E-05	--	6.6E-03	7E-03
			Boron	- -	- -	- -	--	- -	Developmental	6.0E-04	--	3.4E-04	9E-04
			Cadmium	- -	- -	- -	--	- -	Urinary	2.3E-03	--	2.5E-02	3E-02
			Chromium	5.5E-08	- -	1.3E-06	--	1E-06	Hematologic	1.6E-03	--	3.5E-02	4E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.2E-04	--	4.9E-05	3E-04
			Copper	- -	- -	- -	--	- -	GS	3.6E-04	--	2.0E-04	6E-04
			Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	2.8E-04	--	1.6E-04	4E-04
			Iron	- -	- -	- -	--	- -	GS	3.9E-03	--	2.2E-03	6E-03
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	9.9E-03	--	1.4E-01	2E-01
			Mercury	- -	- -	- -	--	- -	Nervous	2.8E-07	--	1.6E-07	4E-07
			Nickel	- -	- -	- -	--	- -	Body Weight	3.4E-04	--	9.6E-04	1E-03
			Silver	- -	- -	- -	--	- -	Dermal	2.7E-04	--	2.3E-03	3E-03
			Thallium	- -	- -	- -	--	- -	Hair	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Hematologic	4.7E-04	--	1.0E-02	1E-02
			Zinc	- -	- -	- -	--	- -	Hematologic	2.8E-04	--	9.4E-05	4E-04
			Chemical Total	3.9E-07	- -	1.3E-06	--	2E-06		3.7E-02	--	2.5E-01	3E-01
		Exposure Point Total						2E-06					3E-01
	Exposure Medium Total							2E-06					3E-01
	Air - Trench	Inside Landfill	1,3-Dichlorobenzene	- -	2.1E-08	- -	--	2E-08	Hepatic	--	1.1E-04	--	1E-04
			1,4-Dichlorobenzene	- -	5.2E-08	- -	--	5E-08	Hepatic	--	2.8E-04	--	3E-04
			Benzene	- -	4.4E-08	- -	--	4E-08	Immune	--	4.9E-03	--	5E-03
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic, Urinary	--	1.2E-02	--	1E-02
			Trichloroethene	- -	2.6E-08	- -	--	3E-08	CVS, Immune, Developmental	--	2.2E-01	--	2E-01
			1,4-Dioxane	- -	1.2E-07	- -	--	1E-07	Respiratory	--	2.3E-03	--	2E-03
			Benzo(a)anthracene	- -	1.4E-08	- -	--	1E-08	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Inside Landfill	Dibenzofuran	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	9.2E-08	- -	--	9E-08	Respiratory, Nervous	--	6.3E-02	--	6E-02
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	8.6E-05	- -	--	9E-05	Reproductive, Developmental, Endocrine	--	3.9E+00	--	4E+00
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDE	- -	4.4E-09	- -	--	4E-09	NA	--	--	--	--
			Aldrin	- -	1.9E-07	- -	--	2E-07	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	8.9E-09	- -	--	9E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	1.2E-09	- -	--	1E-09	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	1.6E-05	- -	--	2E-05	Reproductive, Developmental, Endocrine	--	7.2E-01	--	7E-01
			Nondioxin-Like PCBs	- -	2.2E-05	- -	--	2E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	5.8E+01	--	6E+01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	1.2E-04	- -	--	1E-04		- -	6.3E+01	- -	6E+01
		Exposure Point Total						1E-04					6E+01
	Exposure Medium Total							1E-04					6E+01
Medium Total								1E-04					6E+01
Receptor Total							Receptor Risk Total	1E-04				Receptor HI Total	6E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	5E-02
Total Body Weight HI	1E-03
Total Nervous HI	2E-01
Total CVS HI	2E-01
Total Developmental HI	5E+00
Total Endocrine HI	6E+01
Total GS HI	7E-03
Total Immune HI	2E-01
Total Hepatic HI	1E-02
Total Reproductive HI	5E+00
Total Respiratory HI	7E-02
Total Dermal HI	9E-03
Total Thyroid HI	7E-04
Total Urinary HI	4E-02
Total Whole Body HI	2E-02
Total None Specified HI	7E-03

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	1.3E-10	- -	1.9E-08	- -	2E-08	Hepatic	9.4E-07	--	1.4E-04	1E-04
			1,4-Dichlorobenzene	3.1E-10	- -	3.7E-08	- -	4E-08	Hepatic	2.3E-06	--	2.7E-04	3E-04
			Benzene	2.7E-09	- -	9.9E-08	- -	1E-07	Immune	3.4E-05	--	1.3E-03	1E-03
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic	1.3E-04	--	9.3E-03	9E-03
			Trichloroethene	3.2E-09	- -	1.0E-07	- -	1E-07	CVS, Immune, Developmental	3.9E-04	--	1.3E-02	1E-02
			1,4-Dioxane	2.8E-07	- -	2.8E-07	- -	6E-07	Hepatic, Urinary	2.6E-04	--	2.6E-04	5E-04
			Benzo(a)anthracene	1.7E-09	- -	- -	- -	2E-09	NA	--	--	--	--
			Benzo(a)pyrene	2.5E-08	- -	- -	- -	3E-08	Developmental, Immune, Reproductive	2.4E-04	--	--	2E-04
			Benzo(b)fluoranthene	4.3E-09	- -	- -	- -	4E-09	NA	--	--	--	--
			Benzo(k)fluoranthene	1.6E-10	- -	- -	- -	2E-10	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	5.2E-09	- -	- -	- -	5E-09	Hepatic	5.2E-05	--	--	5E-05
			Dibenzo(a,h)anthracene	1.9E-09	- -	- -	- -	2E-09	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	Whole Body	6.3E-04	--	1.7E-01	2E-01
			Indeno(1,2,3-cd)pyrene	1.5E-09	- -	- -	- -	1E-09	NA	--	--	--	--
			Naphthalene	- -	- -	- -	- -	- -	Body Weight	4.7E-06	--	5.7E-04	6E-04
			Pentachlorophenol	2.3E-09	- -	1.3E-06	- -	1E-06	Hepatic	3.3E-06	--	1.9E-03	2E-03
			Phenanthrene	- -	- -	- -	- -	- -	Urinary	2.3E-05	--	9.4E-03	9E-03
			2,3,7,8-TCDD Equivalents	9.9E-06	- -	- -	- -	1E-05	Reproductive, Developmental, Endocrine	3.1E-01	--	--	3E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	Developmental	1.2E-03	--	--	1E-03
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	Developmental	2.2E-03	--	--	2E-03
			4,4'-DDD	7.3E-11	- -	1.0E-07	- -	1E-07	NA	--	--	--	--
			4,4'-DDE	5.7E-10	- -	- -	- -	6E-10	NA	--	--	--	--
			Aldrin	2.4E-08	- -	- -	- -	2E-08	Hepatic	1.3E-04	--	--	1E-04
			beta-BHC	2.3E-09	- -	2.5E-07	- -	3E-07	NA	--	--	--	--
			delta-BHC	6.5E-09	- -	6.9E-07	- -	7E-07	Hepatic	3.6E-07	--	3.8E-05	4E-05
			Dieldrin	1.1E-08	- -	2.9E-06	- -	3E-06	Hepatic	3.8E-05	--	1.0E-02	1E-02
			Heptachlor	6.7E-10	- -	7.3E-07	- -	7E-07	Hepatic	8.4E-07	--	9.1E-04	9E-04
			Heptachlor Epoxide	2.5E-10	- -	4.6E-08	- -	5E-08	Hepatic	5.9E-06	--	1.1E-03	1E-03
			gamma-BHC (Lindane)	1.5E-09	- -	1.6E-07	- -	2E-07	Hepatic, Urinary	1.3E-05	--	1.4E-03	1E-03
			Dioxin-Like PCBs	9.9E-07	- -	- -	- -	1E-06	Reproductive, Developmental, Endocrine	3.1E-02	--	--	3E-02
			Nondioxin-Like PCBs	1.6E-06	- -	- -	- -	2E-06	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	9.9E-04	--	2.8E-03	4E-03
			Antimony	- -	- -	- -	- -	- -	Hematologic	6.0E-03	--	1.1E-01	1E-01
			Arsenic	1.2E-06	- -	3.3E-06	- -	4E-06	CVS, Dermal	7.2E-03	--	2.0E-02	3E-02
			Barium	- -	- -	- -	- -	- -	Urinary	5.2E-04	--	2.1E-02	2E-02
			Beryllium	- -	- -	- -	- -	- -	GS	3.4E-04	--	1.4E-01	1E-01
			Boron	- -	- -	- -	- -	- -	Developmental	1.0E-03	--	2.8E-03	4E-03
			Cadmium	- -	- -	- -	- -	- -	Urinary	3.8E-03	--	2.1E-01	2E-01
			Chromium	2.3E-06	- -	2.6E-04	- -	3E-04	None Specified	4.3E-03	--	4.9E-01	5E-01
			Cobalt	- -	- -	- -	- -	- -	Thyroid	3.6E-03	--	4.1E-03	8E-03
			Copper	- -	- -	- -	- -	- -	GS	6.0E-04	--	1.7E-03	2E-03
			Cyanide	- -	- -	- -	- -	- -	Reproductive	1.5E-02	--	3.3E-02	5E-02
			Iron	- -	- -	- -	- -	- -	GS	6.5E-03	--	1.8E-02	2E-02
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	1.7E-02	--	1.2E+00	1E+00
			Mercury	- -	- -	- -	- -	- -	Developmental, Nervous	7.0E-03	--	2.0E-02	3E-02
			Nickel	- -	- -	- -	- -	- -	Body Weight	5.7E-04	--	8.0E-03	9E-03
			Silver	- -	- -	- -	- -	- -	Dermal	4.5E-04	--	1.9E-02	2E-02
			Thallium	- -	- -	- -	- -	- -	Hair	2.5E-02	--	7.0E-02	9E-02
			Vanadium	- -	- -	- -	- -	- -	Dermal	1.6E-03	--	1.7E-01	2E-01
			Zinc	- -	- -	- -	- -	- -	Immune, Hematologic	4.6E-04	--	7.9E-04	1E-03
			Chemical Total	1.6E-05	- -	2.7E-04	- -	3E-04		4.4E-01	--	2.7E+00	3E+00
		Exposure Point Total						3E-04					3E+00
	Exposure Medium Total							3E-04					3E+00

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air-Trench	Inside Landfill	1,3-Dichlorobenzene	- -	5.4E-07	- -	- -	5E-07	Hepatic	--	1.7E-04	--	2E-04
			1,4-Dichlorobenzene	- -	1.3E-06	- -	- -	1E-06	Hepatic	--	4.2E-04	--	4E-04
			Benzene	- -	1.1E-06	- -	- -	1E-06	Immune	--	1.3E-02	--	1E-02
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic, Urinary	--	1.2E-01	--	1E-01
			Trichloroethene	- -	6.4E-07	- -	- -	6E-07	CVS, Immune, Developmental	--	2.2E-01	--	2E-01
			1,4-Dioxane	- -	2.9E-06	- -	- -	3E-06	Nervous, Respiratory	--	5.5E-02	--	5E-02
			Benzo(a)anthracene	- -	3.4E-07	- -	- -	3E-07	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	- -	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Naphthalene	- -	2.3E-06	- -	- -	2E-06	Nervous, Respiratory	--	6.3E-02	--	6E-02
			Pentachlorophenol	- -	- -	- -	- -	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.1E-03	- -	- -	2E-03	Reproductive, Developmental, Endocrine	--	3.9E+00	--	4E+00
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDE	- -	1.1E-07	- -	- -	1E-07	NA	--	--	--	--
			Aldrin	- -	4.6E-06	- -	- -	5E-06	NA	--	--	--	--
			beta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	- -	- -	NA	--	--	--	--
			Heptachlor	- -	2.2E-07	- -	- -	2E-07	NA	--	--	--	--
			Heptachlor Epoxide	- -	2.9E-08	- -	- -	3E-08	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	3.9E-04	- -	- -	4E-04	Reproductive, Developmental, Endocrine	--	7.2E-01	--	7E-01
			Nondioxin-Like PCBs	- -	5.4E-04	- -	- -	5E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	- -	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	- -	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	- -	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	- -	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	- -	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	5.8E+01	--	6E+01
			Iron	- -	- -	- -	- -	- -	NA	--	--	--	--
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	- -	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	- -	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	- -	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	- -	- -	NA	--	--	--	--
			Chemical Total	- -	3.1E-03	- -	- -	3E-03		- -	6.3E+01	- -	6E+01
		Exposure Point Total						3E-03					6E+01
	Exposure Medium Total							3E-03					6E+01
Medium Total								3E-03					7E+01

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air -Irrigation	Inside Landfill	1,3-Dichlorobenzene	- -	1.6E-08	- -	- -	2E-08	Hepatic	--	5.1E-06	--	5E-06
			1,4-Dichlorobenzene	- -	3.9E-08	- -	- -	4E-08	Hepatic	--	1.2E-05	--	1E-05
			Benzene	- -	2.7E-08	- -	- -	3E-08	Immune	--	3.2E-04	--	3E-04
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic, Urinary	--	3.3E-03	--	3E-03
			Trichloroethene	- -	2.2E-08	- -	- -	2E-08	CVS, Immune, Developmental	--	7.4E-03	--	7E-03
			1,4-Dioxane	- -	5.3E-09	- -	- -	5E-09	Nervous, Respiratory	--	9.9E-05	--	1E-04
			Benzo(a)anthracene	- -	9.5E-09	- -	- -	1E-08	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	- -	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Naphthalene	- -	5.1E-08	- -	- -	5E-08	Nervous, Respiratory	--	1.4E-03	--	1E-03
			Pentachlorophenol	- -	- -	- -	- -	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	6.8E-05	- -	- -	7E-05	Reproductive, Developmental, Endocrine	--	1.3E-01	--	1E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDE	- -	3.5E-09	- -	- -	4E-09	NA	--	--	--	--
			Aldrin	- -	1.6E-07	- -	- -	2E-07	NA	--	--	--	--
			beta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	- -	- -	NA	--	--	--	--
			Heptachlor	- -	7.9E-09	- -	- -	8E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	1.1E-09	- -	- -	1E-09	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	1.3E-05	- -	- -	1E-05	Reproductive, Developmental, Endocrine	--	2.4E-02	--	2E-02
			Nondioxin-Like PCBs	- -	1.8E-05	- -	- -	2E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	- -	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	- -	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	- -	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	- -	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	- -	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	9.7E-01	--	1E+00
			Iron	- -	- -	- -	- -	- -	NA	--	--	--	--
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	- -	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	- -	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	- -	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	- -	- -	NA	--	--	--	--
			Chemical Total	- -	9.9E-05	- -	- -	1E-04		- -	1.1E+00	- -	1E+00
		Exposure Point Total						1E-04					1E+00
	Exposure Medium Total							1E-04					1E+00
Medium Total								1E-04					1E+00

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Showering	Inside Landfill	1,3-Dichlorobenzene	- -	1.2E-08	- -	- -	1E-08	Hepatic	--	3.7E-06	--	4E-06
			1,4-Dichlorobenzene	- -	2.8E-08	- -	- -	3E-08	Hepatic	--	9.0E-06	--	9E-06
			Benzene	- -	2.4E-08	- -	- -	2E-08	Immune	--	2.9E-04	--	3E-04
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic, Urinary	--	2.7E-03	--	3E-03
			Trichloroethene	- -	1.5E-08	- -	- -	1E-08	CVS, Immune, Developmental	--	5.0E-03	--	5E-03
			1,4-Dioxane	- -	1.8E-08	- -	- -	2E-08	Nervous, Respiratory	--	3.3E-04	--	3E-04
			Benzo(a)anthracene	- -	1.9E-09	- -	- -	2E-09	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	- -	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Naphthalene	- -	3.9E-08	- -	- -	4E-08	Nervous, Respiratory	--	1.1E-03	--	1E-03
			Pentachlorophenol	- -	- -	- -	- -	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	1.7E-05	- -	- -	2E-05	Reproductive, Developmental, Endocrine	--	3.1E-02	--	3E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDE	- -	8.2E-10	- -	- -	8E-10	NA	--	--	--	--
			Aldrin	- -	3.5E-08	- -	- -	3E-08	NA	--	--	--	--
			beta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	- -	- -	NA	--	--	--	--
			Heptachlor	- -	3.4E-09	- -	- -	3E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	1.8E-10	- -	- -	2E-10	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	6.5E-06	- -	- -	7E-06	Reproductive, Developmental, Endocrine	--	1.2E-02	--	1E-02
			Nondioxin-Like PCBs	- -	9.1E-06	- -	- -	9E-06	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	- -	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	- -	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	- -	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	- -	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	- -	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	1.2E+00	--	1E+00
			Iron	- -	- -	- -	- -	- -	NA	--	--	--	--
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	- -	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	- -	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	- -	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	- -	- -	NA	--	--	--	--
			Chemical Total	- -	3.3E-05	- -	- -	3E-05		- -	1.3E+00	- -	1E+00
		Exposure Point Total						3E-05					1E+00
	Exposure Medium Total							3E-05					1E+00
Medium Total								3E-05					1E+00
Receptor Total							Receptor Risk Total	4E-03				Receptor HI Total	7E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Hematologic HI	1E-01
Total Body Weight HI	9E-03
Total Nervous HI	1E+00
Total CVS HI	3E-01
Total Developmental HI	5E+00
Total Endocrine HI	7E+01
Total GS HI	2E-01
Total Hair HI	9E-02
Total Immune HI	3E-01
Total Hepatic HI	2E-01
Total Reproductive HI	5E+00
Total Respiratory HI	1E-01
Total Dermal HI	2E-01
Total Thyroid HI	8E-03
Total Urinary HI	4E-01
Total Whole Body HI	2E-01
Total None Specified HI	5E-01

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	1.8E-08	- -	1.4E-08	--	3E-08	Hepatic	5.5E-04	--	4.4E-04	1E-03
			1,4-Dichlorobenzene	4.4E-08	- -	2.7E-08	--	7E-08	Hepatic	1.3E-03	--	8.5E-04	2E-03
			Benzene	3.8E-07	- -	5.0E-08	--	4E-07	Immune	2.0E-02	--	2.6E-03	2E-02
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic	7.6E-02	--	2.4E-02	1E-01
			Trichloroethene (Kidney)	4.9E-07	- -	7.1E-08	--	6E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	3.6E-07	- -	5.3E-08	--	4E-07	CVS, Immune, Developmental	2.3E-01	--	3.3E-02	3E-01
			1,4-Dioxane	3.9E-05	- -	1.2E-07	--	4E-05	Hepatic, Urinary	1.5E-01	--	4.8E-04	2E-01
			Benzo(a)anthracene	1.3E-06	- -	- -	--	1E-06	NA	--	--	--	--
			Benzo(a)pyrene	1.9E-05	- -	- -	--	2E-05	Developmental, Immune, Reproductive	1.4E-01	--	--	1E-01
			Benzo(b)fluoranthene	3.2E-06	- -	- -	--	3E-06	NA	--	--	--	--
			Benzo(k)fluoranthene	1.2E-07	- -	- -	--	1E-07	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	7.3E-07	- -	- -	--	7E-07	Hepatic	3.0E-02	--	--	3E-02
			Dibenzo(a,h)anthracene	1.4E-06	- -	- -	--	1E-06	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	--	- -	Whole Body	3.7E-01	--	5.7E-01	9E-01
			Indeno(1,2,3-cd)pyrene	1.1E-06	- -	- -	--	1E-06	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	2.7E-03	--	1.6E-03	4E-03
			Pentachlorophenol	3.3E-07	- -	1.1E-06	--	1E-06	Hepatic	1.9E-03	--	6.5E-03	8E-03
			Phenanthrene	- -	- -	- -	--	- -	Urinary	1.4E-02	--	3.4E-02	5E-02
			2,3,7,8-TCDD Equivalents	1.4E-03	- -	- -	--	1E-03	Reproductive, Developmental, Endocrine	1.8E+02	--	--	2E+02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	7.2E-01	--	--	7E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.3E+00	--	--	1E+00
			4,4'-DDD	1.0E-08	- -	8.7E-08	--	1E-07	NA	--	--	--	--
			4,4'-DDE	8.0E-08	- -	- -	--	8E-08	NA	--	--	--	--
			Aldrin	3.4E-06	- -	- -	--	3E-06	Hepatic	7.8E-02	--	--	8E-02
			beta-BHC	3.2E-07	- -	2.1E-07	--	5E-07	NA	--	--	--	--
			delta-BHC	9.2E-07	- -	5.8E-07	--	1E-06	Hepatic	2.1E-04	--	1.3E-04	3E-04
			Dieldrin	1.5E-06	- -	2.5E-06	--	4E-06	Hepatic	2.2E-02	--	3.6E-02	6E-02
			Heptachlor	9.4E-08	- -	6.4E-07	--	7E-07	Hepatic	4.9E-04	--	3.3E-03	4E-03
			Heptachlor Epoxide	3.5E-08	- -	3.9E-08	--	7E-08	Hepatic	3.5E-03	--	3.8E-03	7E-03
			gamma-BHC (Lindane)	2.1E-07	- -	1.3E-07	--	3E-07	Hepatic, Urinary	7.3E-03	--	4.8E-03	1E-02
			Dioxin-Like PCBs	1.4E-04	- -	- -	--	1E-04	Reproductive, Developmental, Endocrine	1.8E+01	--	--	2E+01
			Nondioxin-Like PCBs	2.3E-04	- -	- -	--	2E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	5.7E-01	--	2.5E-03	6E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	3.5E+00	--	1.0E-01	4E+00
			Arsenic	1.6E-04	- -	7.1E-07	--	2E-04	CVS, Dermal	4.2E+00	--	1.8E-02	4E+00
			Barium	- -	- -	- -	--	- -	Urinary	3.0E-01	--	1.9E-02	3E-01
			Beryllium	- -	- -	- -	--	- -	GS	2.0E-01	--	1.3E-01	3E-01
			Boron	- -	- -	- -	--	- -	Developmental	5.9E-01	--	2.6E-03	6E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	2.2E+00	--	1.9E-01	2E+00
			Chromium	1.7E-03	- -	3.0E-04	--	2E-03	None Specified	2.5E+00	--	4.4E-01	3E+00
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.1E+00	--	3.7E-03	2E+00
			Copper	- -	- -	- -	--	- -	GS	3.5E-01	--	1.5E-03	4E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	9.0E+00	--	4.0E-02	9E+00
			Iron	- -	- -	- -	--	- -	GS	3.8E+00	--	1.7E-02	4E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	9.6E+00	--	1	1E+01
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	4.1E+00	--	1.8E-02	4E+00
			Nickel	- -	- -	- -	--	- -	Body Weight	3.3E-01	--	7.3E-03	3E-01
			Silver	- -	- -	- -	--	- -	Dermal	2.6E-01	--	1.7E-02	3E-01
			Thallium	- -	- -	- -	--	- -	Hair	1.4E+01	--	6.4E-02	1E+01
			Vanadium	- -	- -	- -	--	- -	Dermal	9.0E-01	--	1.5E-01	1E+00
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	2.7E-01	--	7.1E-04	3E-01
			Chemical Total	3.7E-03	- -	3.1E-04	--	4E-03		2.6E+02	--	3.0E+00	3E+02
		Exposure Point Total						4E-03					3E+02
	Exposure Medium Total							4E-03					3E+02
Medium Total								4E-03					3E+02
Receptor Total							Receptor Risk Total	4E-03				Receptor HI Total	3E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Hematologic HI	4E+00
Total Body Weight HI	3E-01
Total Nervous HI	2E+01
Total CVS HI	4E+00
Total Developmental HI	2E+02
Total Endocrine HI	2E+02
Total GS HI	4E+00
Total Hair HI	1E+01
Total Immune HI	7E-01
Total Hepatic HI	5E-01
Total Reproductive HI	2E+02
Total Dermal HI	6E+00
Total Thyroid HI	2E+00
Total Urinary HI	3E+00
Total Whole Body HI	9E-01
Total None Specified HI	3E+00

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	3.6E-08	- -	2.8E-08	--	6E-08	Hepatic	3.3E-04	--	2.6E-04	6E-04
			1,4-Dichlorobenzene	8.7E-08	- -	5.4E-08	--	1E-07	Hepatic	8.1E-04	--	5.0E-04	1E-03
			Benzene	7.5E-07	- -	9.6E-08	--	8E-07	Immune	1.2E-02	--	1.5E-03	1E-02
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic	4.5E-02	--	1.4E-02	6E-02
			Trichloroethene (Kidney)	3.7E-07	- -	5.2E-08	--	4E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	7.3E-07	- -	1.0E-07	--	8E-07	CVS, Immune, Developmental	1.4E-01	--	2.0E-02	2E-01
			1,4-Dioxane	7.9E-05	- -	2.7E-07	--	8E-05	Hepatic, Urinary	9.2E-02	--	3.2E-04	9E-02
			Benzo(a)anthracene	9.5E-07	- -	- -	--	1E-06	NA	--	--	--	--
			Benzo(a)pyrene	1.4E-05	- -	- -	--	1E-05	Developmental, Immune, Reproductive	8.3E-02	--	--	8E-02
			Benzo(b)fluoranthene	2.4E-06	- -	- -	--	2E-06	NA	--	--	--	--
			Benzo(k)fluoranthene	9.1E-08	- -	- -	--	9E-08	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.5E-06	- -	- -	--	1E-06	Hepatic	1.8E-02	--	--	2E-02
			Dibenzo(a,h)anthracene	1.0E-06	- -	- -	--	1E-06	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	--	- -	Whole Body	2.2E-01	--	3.6E-01	6E-01
			Indeno(1,2,3-cd)pyrene	8.2E-07	- -	- -	--	8E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	1.6E-03	--	9.6E-04	3E-03
			Pentachlorophenol	6.5E-07	- -	2.5E-06	--	3E-06	Hepatic	1.1E-03	--	4.3E-03	5E-03
			Phenanthrene	- -	- -	- -	--	- -	Urinary	8.2E-03	--	2.2E-02	3E-02
			2,3,7,8-TCDD Equivalents	2.8E-03	- -	- -	--	3E-03	Reproductive, Developmental, Endocrine	1.1E+02	--	--	1E+02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.3E-01	--	--	4E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	7.8E-01	--	--	8E-01
			4,4'-DDD	2.1E-08	- -	1.9E-07	--	2E-07	NA	--	--	--	--
			4,4'-DDE	1.6E-07	- -	- -	--	2E-07	NA	--	--	--	--
			Aldrin	6.8E-06	- -	- -	--	7E-06	Hepatic	4.7E-02	--	--	5E-02
			beta-BHC	6.5E-07	- -	4.6E-07	--	1E-06	NA	--	--	--	--
			delta-BHC	1.8E-06	- -	1.3E-06	--	3E-06	Hepatic	1.3E-04	--	8.9E-05	2E-04
			Dieldrin	3.0E-06	- -	5.4E-06	--	8E-06	Hepatic	1.3E-02	--	2.4E-02	4E-02
			Heptachlor	1.9E-07	- -	1.4E-06	--	2E-06	Hepatic	2.9E-04	--	2.1E-03	2E-03
			Heptachlor Epoxide	7.0E-08	- -	8.5E-08	--	2E-07	Hepatic	2.1E-03	--	2.5E-03	5E-03
			gamma-BHC (Lindane)	4.1E-07	- -	3.0E-07	--	7E-07	Hepatic, Urinary	4.4E-03	--	3.2E-03	8E-03
			Dioxin-Like PCBs	2.8E-04	- -	- -	--	3E-04	Reproductive, Developmental, Endocrine	1.1E+01	--	--	1E+01
			Nondioxin-Like PCBs	4.5E-04	- -	- -	--	5E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	3.5E-01	--	1.9E-03	3E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	2.1E+00	--	7.7E-02	2E+00
			Arsenic	3.2E-04	- -	1.8E-06	--	3E-04	CVS, Dermal	2.5E+00	--	1.4E-02	3E+00
			Barium	- -	- -	- -	--	- -	Urinary	1.8E-01	--	1.5E-02	2E-01
			Beryllium	- -	- -	- -	--	- -	GS	1.2E-01	--	9.6E-02	2E-01
			Boron	- -	- -	- -	--	- -	Developmental	3.5E-01	--	2.0E-03	4E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	1.3E+00	--	1.5E-01	1E+00
			Chromium	1.3E-03	- -	2.9E-04	--	2E-03	None Specified	1.5E+00	--	3.4E-01	2E+00
			Cobalt	- -	- -	- -	--	- -	Thyroid	1.3E+00	--	2.8E-03	1E+00
			Copper	- -	- -	- -	--	- -	GS	2.1E-01	--	1.2E-03	2E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	5.4E+00	--	2.3E-02	5E+00
			Iron	- -	- -	- -	--	- -	GS	2.3E+00	--	1.3E-02	2E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	5.8E+00	--	8.1E-01	7E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	2.5E+00	--	1.4E-02	2E+00
			Nickel	- -	- -	- -	--	- -	Body Weight	2.0E-01	--	5.5E-03	2E-01
			Silver	- -	- -	- -	--	- -	Dermal	1.6E-01	--	1.3E-02	2E-01
			Thallium	- -	- -	- -	--	- -	Hair	8.7E+00	--	4.9E-02	9E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	5.4E-01	--	1.2E-01	7E-01
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	1.6E-01	--	5.4E-04	2E-01
			Chemical Total	5.2E-03	- -	3.0E-04	--	6E-03		1.6E+02	--	2.2E+00	2E+02
		Exposure Point Total						6E-03					2E+02
	Exposure Medium Total							6E-03					2E+02
	Air-Shower	Inside Landfill	1,3-Dichlorobenzene	- -	1.7E-07	- -	--	2E-07	Hepatic	--	6.7E-05	--	7E-05
			1,4-Dichlorobenzene	- -	4.1E-07	- -	--	4E-07	Hepatic	--	1.6E-04	--	2E-04
			Benzene	- -	3.5E-07	- -	--	4E-07	Immune	--	5.2E-03	--	5E-03
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic, Urinary	--	4.9E-02	--	5E-02
			Trichloroethene (Kidney)	- -	1.0E-07	- -	--	1E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	1.6E-07	- -	--	2E-07	CVS, Immune, Developmental	--	9.0E-02	--	9E-02
			1,4-Dioxane	- -	2.6E-07	- -	--	3E-07	Nervous, Respiratory	--	6.0E-03	--	6E-03
			Benzo(a)anthracene	- -	5.7E-08	- -	--	6E-08	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Inside Landfill	Dibenzofuran	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	5.7E-07	- -	--	6E-07	Nervous, Respiratory	--	1.9E-02	--	2E-02
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.5E-04	- -	--	2E-04	Reproductive, Developmental, Endocrine	--	5.7E-01	--	6E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDE	- -	1.2E-08	- -	--	1E-08	NA	--	--	--	--
			Aldrin	- -	5.0E-07	- -	--	5E-07	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	4.9E-08	- -	--	5E-08	NA	--	--	--	--
			Heptachlor Epoxide	- -	2.6E-09	- -	--	3E-09	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	9.5E-05	- -	--	9E-05	Reproductive, Developmental, Endocrine	--	2.2E-01	--	2E-01
			Nondioxin-Like PCBs	- -	1.3E-04	- -	--	1E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	2.2E+01	--	2E+01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	4.8E-04	- -	--	5E-04		- -	2.3E+01	- -	2E+01
		Exposure Point Total						5E-04					2E+01
	Exposure Medium Total							5E-04					2E+01
Medium Total								6E-03					2E+02
Receptor Total							Receptor Risk Total	6E-03				Receptor HI Total	2E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	2E+00
Total Body Weight HI	2E-01
Total Nervous HI	9E+00
Total CVS HI	3E+00
Total Developmental HI	1E+02
Total Endocrine HI	1E+02
Total GS HI	3E+00
Total Hair HI	9E+00
Total Immune HI	5E-01
Total Hepatic HI	3E-01
Total Reproductive HI	1E+02
Total Respiratory HI	3E-02
Total Dermal HI	3E+00
Total Thyroid HI	1E+00
Total Urinary HI	2E+00
Total Whole Body HI	6E-01
Total None Specified HI	2E+00

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	5.3E-08	- -	4.3E-08	--	1E-07					
			1,4-Dichlorobenzene	1.3E-07	- -	8.2E-08	--	2E-07					
			Benzene	1.1E-06	- -	1.5E-07	--	1E-06					
			Chlorobenzene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	8.5E-07	- -	1.2E-07	--	1E-06					
			Trichloroethene (Non-Kidney)	1.1E-06	- -	1.6E-07	--	1E-06					
			1,4-Dioxane	1.2E-04	- -	4.0E-07	--	1E-04					
			Benzo(a)anthracene	2.2E-06	- -	- -	--	2E-06					
			Benzo(a)pyrene	3.3E-05	- -	- -	--	3E-05					
			Benzo(b)fluoranthene	5.6E-06	- -	- -	--	6E-06					
			Benzo(k)fluoranthene	2.1E-07	- -	- -	--	2E-07					
			Bis(2-ethylhexyl)phthalate	2.2E-06	- -	- -	--	2E-06					
			Dibenzo(a,h)anthracene	2.4E-06	- -	- -	--	2E-06					
			Dibenzofuran	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	1.9E-06	- -	- -	--	2E-06					
			Naphthalene	- -	- -	- -	--	- -					
			Pentachlorophenol	9.8E-07	- -	3.6E-06	--	5E-06					
			Phenanthrene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	4.2E-03	- -	- -	--	4E-03					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			4,4'-DDD	3.1E-08	- -	2.8E-07	--	3E-07					
			4,4'-DDE	2.4E-07	- -	- -	--	2E-07					
			Aldrin	1.0E-05	- -	- -	--	1E-05					
			beta-BHC	9.7E-07	- -	6.7E-07	--	2E-06					
			delta-BHC	2.7E-06	- -	1.9E-06	--	5E-06					
			Dieldrin	4.5E-06	- -	7.9E-06	--	1E-05					
			Heptachlor	2.8E-07	- -	2.0E-06	--	2E-06					
			Heptachlor Epoxide	1.1E-07	- -	1.2E-07	--	2E-07					
			gamma-BHC (Lindane)	6.2E-07	- -	4.3E-07	--	1E-06					
			Dioxin-Like PCBs	4.2E-04	- -	- -	--	4E-04					
			Nondioxin-Like PCBs	6.8E-04	- -	- -	--	7E-04					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	4.9E-04	- -	2.5E-06	--	5E-04					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	3.0E-03	- -	5.9E-04	--	4E-03					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Nickel	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	9.0E-03	- -	6.1E-04	--	1E-02					
		Exposure Point Total						1E-02					
	Exposure Medium Total							1E-02					
	Air-Shower	Inside Landfill	1,3-Dichlorobenzene	- -	1.7E-07	- -	--	2E-07					
			1,4-Dichlorobenzene	- -	4.1E-07	- -	--	4E-07					
			Benzene	- -	3.5E-07	- -	--	4E-07					
			Chlorobenzene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	- -	1.0E-07	- -	--	1E-07					
			Trichloroethene (Non-Kidney)	- -	1.6E-07	- -	--	2E-07					
			1,4-Dioxane	- -	2.6E-07	- -	--	3E-07					
			Benzo(a)anthracene	- -	5.7E-08	- -	--	6E-08					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Benzo(b)fluoranthene	- -	- -	- -	--	- -					
			Benzo(k)fluoranthene	- -	- -	- -	--	- -					
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Inside Landfill	Dibenzofuran	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -					
			Naphthalene	- -	5.7E-07	- -	--	6E-07					
			Pentachlorophenol	- -	- -	- -	--	- -					
			Phenanthrene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	2.5E-04	- -	--	2E-04					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			4,4'-DDD	- -	- -	- -	--	- -					
			4,4'-DDE	- -	1.2E-08	- -	--	1E-08					
			Aldrin	- -	5.0E-07	- -	--	5E-07					
			beta-BHC	- -	- -	- -	--	- -					
			delta-BHC	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			Heptachlor	- -	4.9E-08	- -	--	5E-08					
			Heptachlor Epoxide	- -	2.6E-09	- -	--	3E-09					
			gamma-BHC (Lindane)	- -	- -	- -	--	- -					
			Dioxin-Like PCBs	- -	9.5E-05	- -	--	9E-05					
			Nondioxin-Like PCBs	- -	1.3E-04	- -	--	1E-04					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Nickel	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	- -	4.8E-04	- -	--	5E-04					
		Exposure Point Total						5E-04					
	Exposure Medium Total							5E-04					
Medium Total								1E-02					
Receptor Total							Receptor Risk Total	1E-02					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	5.0E-12	- -	1.6E-11	--	2E-11	Hepatic	1.5E-06	--	4.9E-06	6E-06
			1,2-Dibromo-3-Chloropropane	1.4E-10	- -	8.0E-10	--	9E-10	Reproductive	5.9E-06	--	3.5E-05	4E-05
			1,2-Dichloroethane	7.3E-11	- -	1.9E-10	--	3E-10	Urinary	2.8E-06	--	7.2E-06	1E-05
			1,4-Dichlorobenzene	3.6E-12	- -	9.7E-11	--	1E-10	Hepatic	6.8E-07	--	1.8E-05	2E-05
			2-Hexanone	- -	- -	- -	--	- -	Nervous	5.8E-05	--	1.2E-04	2E-04
			Benzene	2.3E-10	- -	2.0E-09	--	2E-09	Hematologic	3.0E-05	--	2.6E-04	3E-04
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	1.4E-04	--	9.1E-04	1E-03
			Ethylbenzene	3.6E-11	- -	9.5E-10	--	1E-09	Hepatic	2.3E-06	--	6.0E-05	6E-05
			m+p-Xylenes	- -	- -	- -	--	- -	Whole Body	3.3E-06	--	9.0E-05	9E-05
			Trichloroethene	2.1E-10	- -	1.5E-09	--	2E-09	Immune, Developmental	--	--	--	--
			Vinyl Chloride	2.2E-09	- -	1.1E-08	--	1E-08	Hepatic	7.2E-05	--	3.5E-04	4E-04
			1,4-Dioxane	4.2E-09	- -	8.4E-10	--	5E-09	Hepatic	5.8E-06	--	1.2E-06	7E-06
			2,6-Dinitrotoluene	9.5E-09	- -	2.5E-08	--	3E-08	Hematologic	1.1E-04	--	2.9E-04	4E-04
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	1.2E-04	--	5.8E-03	6E-03
			Benzo(a)anthracene	1.9E-11	- -	- -	--	2E-11	NA	--	--	--	--
			Benzo(a)pyrene	8.8E-11	- -	- -	--	9E-11	Developmental, Immune, Reproductive	2.1E-05	--	--	2E-05
			Bis(2-Chloroethyl)Ether	9.7E-10	- -	1.1E-09	--	2E-09	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Nervous	6.8E-07	--	1.8E-05	2E-05
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.8E-04	--	--	5E-04
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.7E-04	--	--	2E-04
			Pentachlorophenol	1.4E-10	- -	1.6E-08	--	2E-08	Hepatic	5.0E-06	--	5.7E-04	6E-04
			2,3,7,8-TCDD Equivalents	3.1E-10	- -	- -	--	3E-10	Immune	8.2E-06	--	--	8E-06
			Aldrin	1.4E-11	- -	- -	--	1E-11	Urinary	1.4E-06	--	--	1E-06
			beta-BHC	4.8E-11	- -	1.0E-09	--	1E-09	NA	--	--	--	--
			Dieldrin	2.0E-10	- -	1.1E-08	--	1E-08	Nervous	8.7E-06	--	4.7E-04	5E-04
			Heptachlor	3.6E-12	- -	8.2E-10	--	8E-10	Hepatic	1.1E-07	--	2.6E-05	3E-05
			Heptachlor Epoxide	6.3E-12	- -	2.3E-10	--	2E-10	Hepatic	3.8E-06	--	1.4E-04	1E-04
			Dioxin-Like PCBs	1.3E-10	- -	- -	--	1E-10	Immune	3.6E-06	--	--	4E-06
			Nondioxin-Like PCBs	6.3E-11	- -	- -	--	6E-11	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	4.1E-04	--	2.3E-04	6E-04
			Antimony	- -	- -	- -	--	- -	Whole Body	6.8E-04	--	2.6E-03	3E-03
			Arsenic	2.1E-08	- -	1.2E-08	--	3E-08	CVS, Dermal	3.2E-03	--	1.8E-03	5E-03
			Barium	- -	- -	- -	--	- -	Urinary	1.3E-04	--	1.1E-03	1E-03
			Boron	- -	- -	- -	--	- -	Developmental	1.9E-04	--	1.1E-04	3E-04
			Cadmium	- -	- -	- -	--	- -	Urinary	1.9E-04	--	2.1E-03	2E-03
			Chromium	2.9E-09	- -	6.7E-08	--	7E-08	Hematologic	8.3E-05	--	1.9E-03	2E-03
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.2E-04	--	5.0E-05	3E-04
			Copper	- -	- -	- -	--	- -	GS	2.9E-05	--	1.6E-05	5E-05
			Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	4.3E-05	--	2.4E-05	7E-05
			Iron	- -	- -	- -	--	- -	GS	2.9E-03	--	1.6E-03	5E-03
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	2.3E-02	--	3.3E-01	3E-01
			Mercury	- -	- -	- -	--	- -	Nervous	2.6E-09	--	1.4E-09	4E-09
			Silver	- -	- -	- -	--	- -	Dermal	2.6E-04	--	2.2E-03	2E-03
			Thallium	- -	- -	- -	--	- -	Hair	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Hematologic	5.7E-05	--	1.2E-03	1E-03
			Zinc	- -	- -	- -	--	- -	Hematologic	6.4E-06	--	2.2E-06	9E-06
			Chemical Total	4.2E-08	- -	1.5E-07	--	2E-07		3.3E-02	--	3.5E-01	4E-01
		Exposure Point Total						2E-07					4E-01
	Exposure Medium Total							2E-07					4E-01
	Air - Trench	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	4.9E-09	- -	--	5E-09	Respiratory	--	1.1E-02	--	1E-02
			1,2-Dibromo-3-Chloropropane	- -	2.1E-06	- -	--	2E-06	Reproductive	--	1.2E-02	--	1E-02
			1,2-Dichloroethane	- -	8.6E-08	- -	--	9E-08	Nervous	--	3.3E-03	--	3E-03
			1,4-Dichlorobenzene	- -	2.6E-08	- -	--	3E-08	Hepatic	--	1.4E-04	--	1E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	2.5E-02	--	3E-02
			Benzene	- -	1.6E-07	- -	--	2E-07	Immune	--	1.8E-02	--	2E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	3.3E-08	- -	--	3E-08	Ear	--	1.0E-04	--	1E-04
			m+p-Xylenes	- -	- -	- -	--	- -	CNS	--	1.4E-02	--	1E-02
			Trichloroethene	- -	6.9E-08	- -	--	7E-08	CVS, Immune, Developmental	--	--	--	--
			Vinyl Chloride	- -	7.3E-08	- -	--	7E-08	Hepatic	--	1.2E-02	--	1E-02
			1,4-Dioxane	- -	7.3E-08	- -	--	7E-08	Respiratory	--	1.4E-03	--	1E-03
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	6.3E-09	- -	--	6E-09	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	2.5E-07	- -	--	3E-07	NA	--	--	--	--
			Naphthalene	- -	6.7E-07	- -	--	7E-07	Respiratory, Nervous	--	4.6E-01	--	5E-01

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Outside Landfill Shallow Wells	Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	1.1E-07	- -	--	1E-07	Reproductive, Developmental, Endocrine	--	5.1E-03	--	5E-03
			Aldrin	- -	4.3E-09	- -	--	4E-09	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	2.0E-09	- -	--	2E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	1.2E-09	- -	--	1E-09	NA	--	--	--	--
			Dioxin-Like PCBs	- -	8.7E-08	- -	--	9E-08	Reproductive, Developmental, Endocrine	--	4.0E-03	--	4E-03
			Nondioxin-Like PCBs	- -	3.5E-08	- -	--	3E-08	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	9.0E+00	--	9E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	3.8E-06	- -	--	4E-06		- -	1.0E+01	- -	1E+01
		Exposure Point Total						4E-06					1E+01
	Exposure Medium Total							4E-06					1E+01
Medium Total								4E-06					1E+01
Receptor Total							Receptor Risk Total	4E-06				Receptor HI Total	1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	4E-03
Total Nervous HI	8E-01
Total CVS HI	6E-01
Total Developmental HI	6E-01
Total Ear HI	1E-04
Total Endocrine HI	9E+00
Total GS HI	5E-03
Total Immune HI	6E-01
Total Hepatic HI	1E-02
Total Reproductive HI	2E-02
Total Respiratory HI	5E-01
Total Dermal HI	7E-03
Total Thyroid HI	3E-04
Total Urinary HI	5E-03
Total Whole Body HI	3E-03

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	2.1E-10	- -	3.0E-09	--	3E-09	Immune, Hematologic	2.6E-06	--	3.7E-05	4E-05
			1,2-Dibromo-3-Chloropropane	5.6E-09	- -	1.6E-07	--	2E-07	Reproductive	9.8E-05	--	2.8E-03	3E-03
			1,2-Dichloroethane	3.1E-09	- -	3.5E-08	--	4E-08	Urinary	1.6E-05	--	1.8E-04	2E-04
			1,4-Dichlorobenzene	1.5E-10	- -	1.8E-08	--	2E-08	Hepatic	1.1E-06	--	1.3E-04	1E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	9.6E-05	--	1.0E-03	1E-03
			Benzene	9.8E-09	- -	3.6E-07	--	4E-07	Immune	1.2E-04	--	4.6E-03	5E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	2.3E-03	--	6.6E-02	7E-02
			Ethylbenzene	1.5E-09	- -	1.7E-07	--	2E-07	Hepatic, Urinary	3.8E-06	--	4.4E-04	4E-04
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	1.1E-05	--	1.3E-03	1E-03
			Trichloroethene	8.7E-09	- -	2.8E-07	--	3E-07	CVS, Immune, Developmental	1.1E-03	--	3.4E-02	3E-02
			Vinyl Chloride	9.2E-08	- -	1.9E-06	--	2E-06	Hepatic	1.2E-04	--	2.4E-03	3E-03
			1,4-Dioxane	1.7E-07	- -	1.7E-07	--	3E-07	Hepatic, Urinary	1.6E-04	--	1.6E-04	3E-04
			2,6-Dinitrotoluene	3.9E-07	- -	5.2E-06	--	6E-06	Hepatic, Spleen	2.5E-03	--	3.2E-02	3E-02
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	2.0E-04	--	4.4E-02	4E-02
			Benzo(a)anthracene	8.0E-10	- -	- -	--	8E-10	NA	--	--	--	--
			Benzo(a)pyrene	3.7E-09	- -	- -	--	4E-09	Developmental, Immune, Reproductive	3.4E-05	--	--	3E-05
			Bis(2-Chloroethyl)Ether	4.0E-08	- -	2.3E-07	--	3E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	3.4E-05	--	4.1E-03	4E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	7.9E-03	--	--	8E-03
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.1E-03	--	--	1E-03
			Pentachlorophenol	6.0E-09	- -	3.4E-06	--	3E-06	Hepatic	8.4E-06	--	4.8E-03	5E-03
			2,3,7,8-TCDD Equivalents	1.3E-08	- -	- -	--	1E-08	Reproductive, Developmental, Endocrine	3.9E-04	--	--	4E-04
			Aldrin	5.7E-10	- -	- -	--	6E-10	Hepatic	3.1E-06	--	--	3E-06
			beta-BHC	2.0E-09	- -	2.1E-07	--	2E-07	NA	--	--	--	--
			Dieldrin	8.3E-09	- -	2.3E-06	--	2E-06	Hepatic	2.9E-05	--	7.9E-03	8E-03
			Heptachlor	1.5E-10	- -	1.6E-07	--	2E-07	Hepatic	1.9E-07	--	2.1E-04	2E-04
			Heptachlor Epoxide	2.6E-10	- -	4.8E-08	--	5E-08	Hepatic	6.3E-06	--	1.1E-03	1E-03
			Dioxin-Like PCBs	5.6E-09	- -	- -	--	6E-09	Reproductive, Developmental, Endocrine	1.7E-04	--	--	2E-04
			Nondioxin-Like PCBs	2.6E-09	- -	- -	--	3E-09	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	6.8E-04	--	1.9E-03	3E-03
			Antimony	- -	- -	- -	--	- -	Hematologic	1.1E-03	--	2.1E-02	2E-02
			Arsenic	8.6E-07	- -	2.4E-06	--	3E-06	CVS, Dermal	5.3E-03	--	1.5E-02	2E-02
			Barium	- -	- -	- -	--	- -	Urinary	2.2E-04	--	8.9E-03	9E-03
			Boron	- -	- -	- -	--	- -	Developmental	3.2E-04	--	8.9E-04	1E-03
			Cadmium	- -	- -	- -	--	- -	Urinary	3.2E-04	--	1.8E-02	2E-02
			Chromium	1.2E-07	- -	1.4E-05	--	1E-05	None Specified	2.3E-04	--	2.6E-02	3E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	3.7E-03	--	4.2E-03	8E-03
			Copper	- -	- -	- -	--	- -	GS	4.8E-05	--	1.4E-04	2E-04
			Cyanide	- -	- -	- -	--	- -	Reproductive	2.4E-03	--	5.1E-03	7E-03
			Iron	- -	- -	- -	--	- -	GS	4.8E-03	--	1.4E-02	2E-02
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	3.9E-02	--	2.7E+00	3E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	6.4E-05	--	1.8E-04	2E-04
			Silver	- -	- -	- -	--	- -	Dermal	4.3E-04	--	1.8E-02	2E-02
			Thallium	- -	- -	- -	--	- -	Hair	3.3E-02	--	9.4E-02	1E-01
			Vanadium	- -	- -	- -	--	- -	Dermal	1.9E-04	--	2.1E-02	2E-02
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	1.1E-05	--	1.8E-05	3E-05
			Chemical Total	1.8E-06	- -	3.1E-05	--	3E-05		1.1E-01	--	3.2E+00	3E+00
		Exposure Point Total						3E-05					3E+00
	Exposure Medium Total							3E-05					3E+00

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	1.2E-07	- -	--	1E-07	Respiratory	--	1.1E-01	--	1E-01
			1,2-Dibromo-3-Chloropropane	- -	5.3E-05	- -	--	5E-05	Reproductive	--	1.2E-01	--	1E-01
			1,2-Dichloroethane	- -	2.1E-06	- -	--	2E-06	Nervous	--	3.3E-02	--	3E-02
			1,4-Dichlorobenzene	- -	6.4E-07	- -	--	6E-07	Hepatic	--	2.0E-04	--	2E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	2.5E-02	--	3E-02
			Benzene	- -	4.0E-06	- -	--	4E-06	Immune	--	4.7E-02	--	5E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	8.3E-07	- -	--	8E-07	Developmental	--	9.3E-04	--	9E-04
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	5.5E-02	--	5E-02
			Trichloroethene	- -	1.7E-06	- -	--	2E-06	CVS, Immune, Developmental	--	5.9E-01	--	5.9E-01
			Vinyl Chloride	- -	1.8E-06	- -	--	2E-06	Hepatic	--	1.2E-02	--	1E-02
			1,4-Dioxane	- -	1.8E-06	- -	--	2E-06	Nervous, Respiratory	--	3.4E-02	--	3E-02
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	1.6E-07	- -	--	2E-07	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	6.3E-06	- -	--	6E-06	NA	--	--	--	--
			Naphthalene	- -	1.7E-05	- -	--	2E-05	Nervous, Respiratory	--	4.6E-01	--	5E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.7E-06	- -	--	3E-06	Reproductive, Developmental, Endocrine	--	5.1E-03	--	5E-03
			Aldrin	- -	1.1E-07	- -	--	1E-07	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	5.0E-08	- -	--	5E-08	NA	--	--	--	--
			Heptachlor Epoxide	- -	3.1E-08	- -	--	3E-08	NA	--	--	--	--
			Dioxin-Like PCBs	- -	2.2E-06	- -	--	2E-06	Reproductive, Developmental, Endocrine	--	4.0E-03	--	4E-03
			Nondioxin-Like PCBs	- -	8.7E-07	- -	--	9E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	9.0E+00	--	9E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	9.5E-05	- -	--	9E-05		- -	1.0E+01	- -	1E+01
		Exposure Point Total						9E-05					1E+01
	Exposure Medium Total							9E-05					1E+01
Medium Total								1E-04					1E+01

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Irrigation	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	--	3E-09	--	--	3E-09	Respiratory	--	2.6E-03	--	3E-03
			1,2-Dibromo-3-Chloropropane	--	1E-06	--	--	1E-06	Reproductive	--	3.3E-03	--	3E-03
			1,2-Dichloroethane	--	5E-08	--	--	5E-08	Nervous	--	7.3E-04	--	7E-04
			1,4-Dichlorobenzene	--	2E-08	--	--	2E-08	Hepatic	--	6.0E-06	--	6E-06
			2-Hexanone	--	- -	--	--	- -	Nervous	--	4.7E-04	--	5E-04
			Benzene	--	4E-08	--	--	4E-08	Immune	--	4.7E-04	--	5E-04
			cis-1,2-Dichloroethene	--	- -	--	--	- -	NA	--	--	--	--
			Ethylbenzene	--	2E-08	--	--	2E-08	Developmental	--	2.8E-05	--	3E-05
			m+p-Xylenes	--	- -	--	--	- -	Nervous	--	1.6E-03	--	2E-03
			Trichloroethene	--	6E-08	--	--	6E-08	CVS, Immune, Developmental	--	2.0E-02	--	2E-02
			Vinyl Chloride	--	5E-08	--	--	5E-08	Hepatic	--	3.1E-04	--	3E-04
			1,4-Dioxane	--	3E-09	--	--	3E-09	Nervous, Respiratory	--	6.1E-05	--	6E-05
			2,6-Dinitrotoluene	--	- -	--	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	--	- -	--	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	--	4E-09	--	--	4E-09	NA	--	--	--	--
			Benzo(a)pyrene	--	- -	--	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	--	2E-07	--	--	2E-07	NA	--	--	--	--
			Naphthalene	--	4E-07	--	--	4E-07	Nervous, Respiratory	--	1.0E-02	--	1E-02
			Pentadecafluorooctanoic Acid	--	- -	--	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	--	- -	--	--	- -	NA	--	--	--	--
			Pentachlorophenol	--	- -	--	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	9E-08	--	--	9E-08	Reproductive, Developmental, Endocrine	--	1.6E-04	--	2E-04
			Aldrin	--	4E-09	--	--	4E-09	NA	--	--	--	--
			beta-BHC	--	- -	--	--	- -	NA	--	--	--	--
			Dieldrin	--	- -	--	--	- -	NA	--	--	--	--
			Heptachlor	--	2E-09	--	--	2E-09	NA	--	--	--	--
			Heptachlor Epoxide	--	1E-09	--	--	1E-09	NA	--	--	--	--
			Dioxin-Like PCBs	--	7E-08	--	--	7E-08	Reproductive, Developmental, Endocrine	--	1.3E-04	--	1E-04
			Nondioxin-Like PCBs	--	3E-08	--	--	3E-08	NA	--	--	--	--
			Aluminum	--	- -	--	--	- -	Nervous	--	--	--	--
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Arsenic	--	- -	--	--	- -	CVS, Dermal	--	--	--	--
			Barium	--	- -	--	--	- -	Developmental	--	--	--	--
			Boron	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cadmium	--	- -	--	--	- -	Urinary	--	--	--	--
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cobalt	--	- -	--	--	- -	Respiratory	--	--	--	--
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Cyanide	--	- -	--	--	- -	Endocrine	--	1.5E-01	--	2E-01
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	Nervous	--	--	--	--
			Mercury	--	- -	--	--	- -	NA	--	--	--	--
			Silver	--	- -	--	--	- -	NA	--	--	--	--
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Vanadium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-06	--	--	2E-06		- -	1.9E-01	- -	2E-01
		Exposure Point Total						2E-06					2E-01
	Exposure Medium Total							2E-06					2E-01
Medium Total								2E-06					2E-01

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Shower	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	--	2E-09	--	--	2E-09	Respiratory	--	2.1E-03	--	2E-03
			1,2-Dibromo-3-Chloropropane	--	6E-07	--	--	6E-07	Reproductive	--	1.5E-03	--	1E-03
			1,2-Dichloroethane	--	4E-08	--	--	4E-08	Nervous	--	6.6E-04	--	7E-04
			1,4-Dichlorobenzene	--	1E-08	--	--	1E-08	Hepatic	--	4.4E-06	--	4E-06
			2-Hexanone	--	- -	--	--	- -	Nervous	--	2.7E-04	--	3E-04
			Benzene	--	9E-08	--	--	9E-08	Immune	--	1.0E-03	--	1E-03
			cis-1,2-Dichloroethene	--	- -	--	--	- -	NA	--	--	--	--
			Ethylbenzene	--	2E-08	--	--	2E-08	Developmental	--	2.1E-05	--	2E-05
			m+p-Xylenes	--	- -	--	--	- -	Nervous	--	1.2E-03	--	1E-03
			Trichloroethene	--	4E-08	--	--	4E-08	CVS, Immune, Developmental	--	1.3E-02	--	1E-02
			Vinyl Chloride	--	4E-08	--	--	4E-08	Hepatic	--	2.6E-04	--	3E-04
			1,4-Dioxane	--	1E-08	--	--	1E-08	Nervous, Respiratory	--	2.0E-04	--	2E-04
			2,6-Dinitrotoluene	--	- -	--	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	--	- -	--	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	--	9E-10	--	--	9E-10	NA	--	--	--	--
			Benzo(a)pyrene	--	- -	--	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	--	4E-08	--	--	4E-08	NA	--	--	--	--
			Naphthalene	--	3E-07	--	--	3E-07	Nervous, Respiratory	--	7.8E-03	--	8E-03
			Pentadecafluorooctanoic Acid	--	- -	--	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	--	- -	--	--	- -	NA	--	--	--	--
			Pentachlorophenol	--	- -	--	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	2E-08	--	--	2E-08	Reproductive, Developmental, Endocrine	--	4.0E-05	--	4E-05
			Aldrin	--	8E-10	--	--	8E-10	NA	--	--	--	--
			beta-BHC	--	- -	--	--	- -	NA	--	--	--	--
			Dieldrin	--	- -	--	--	- -	NA	--	--	--	--
			Heptachlor	--	8E-10	--	--	8E-10	NA	--	--	--	--
			Heptachlor Epoxide	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Dioxin-Like PCBs	--	4E-08	--	--	4E-08	Reproductive, Developmental, Endocrine	--	6.7E-05	--	7E-05
			Nondioxin-Like PCBs	--	1E-08	--	--	1E-08	NA	--	--	--	--
			Aluminum	--	- -	--	--	- -	Nervous	--	--	--	--
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Arsenic	--	- -	--	--	- -	CVS, Dermal	--	--	--	--
			Barium	--	- -	--	--	- -	Developmental	--	--	--	--
			Boron	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cadmium	--	- -	--	--	- -	Urinary	--	--	--	--
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cobalt	--	- -	--	--	- -	Respiratory	--	--	--	--
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Cyanide	--	- -	--	--	- -	Endocrine	--	1.9E-01	--	2E-01
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	Nervous	--	--	--	--
			Mercury	--	- -	--	--	- -	NA	--	--	--	--
			Silver	--	- -	--	--	- -	NA	--	--	--	--
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Vanadium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-06	--	--	1E-06		- -	2.2E-01	- -	2E-01
		Exposure Point Total						1E-06					2E-01
	Exposure Medium Total							1E-06					2E-01
Medium Total								1E-06					2E-01
Receptor Total							Receptor Risk Total	1E-04				Receptor HI Total	1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	2E-02
Total Body Weight HI	4E-03
Total Nervous HI	3E+00
Total CVS HI	7E-01
Total Developmental HI	7E-01
Total Endocrine HI	9E+00
Total GS HI	2E-02
Total Hair HI	1E-01
Total Immune HI	7E-01
Total Hepatic HI	6E-02
Total Reproductive HI	1E-01
Total Respiratory HI	7E-01
Total Dermal HI	6E-02
Total Spleen HI	3E-02
Total Thyroid HI	8E-03
Total Urinary HI	1E-01
Total None Specified HI	3E-02

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	2.9E-08	- -	1.9E-09	--	3E-08	Immune, Hematologic	1.5E-03	--	9.6E-05	2E-03
			1,2-Dibromo-3-Chloropropane	4.2E-06	- -	7.1E-07	--	5E-06	Reproductive	5.7E-02	--	9.7E-03	7E-02
			1,2-Dichloroethane	4.3E-07	- -	1.8E-08	--	4E-07	Urinary	9.1E-03	--	3.9E-04	1E-02
			1,4-Dichlorobenzene	2.1E-08	- -	1.3E-08	--	3E-08	Hepatic	6.6E-04	--	4.1E-04	1E-03
			2-Hexanone	- -	- -	- -	--	- -	Nervous	5.6E-02	--	2.0E-03	6E-02
			Benzene	1.4E-06	- -	1.8E-07	--	2E-06	Immune	7.2E-02	--	9.6E-03	8E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	1.3E+00	--	1.5E-01	1E+00
			Ethylbenzene	2.1E-07	- -	1.1E-07	--	3E-07	Hepatic, Urinary	2.2E-03	--	1.2E-03	3E-03
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	6.5E-03	--	3.5E-03	1E-02
			Trichloroethene (Kidney)	1.3E-06	- -	1.9E-07	--	2E-06	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	9.8E-07	- -	1.4E-07	--	1E-06	CVS, Immune, Developmental	6.2E-01	--	9.0E-02	7E-01
			Vinyl Chloride	1.7E-04	- -	1.1E-05	--	2E-04	Hepatic	7.0E-02	--	4.7E-03	7E-02
			1,4-Dioxane	2.4E-05	- -	7.6E-08	--	2E-05	Hepatic, Urinary	9.4E-02	--	3.0E-04	9E-02
			2,6-Dinitrotoluene	5.5E-05	- -	3.5E-06	--	6E-05	Hepatic, Spleen	1.4E+00	--	9.2E-02	2E+00
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	1.2E-01	--	1.4E-01	3E-01
			Benzo(a)anthracene	5.9E-07	- -	- -	--	6E-07	NA	--	--	--	--
			Benzo(a)pyrene	2.7E-06	- -	- -	--	3E-06	Developmental, Immune, Reproductive	2.0E-02	--	--	2E-02
			Bis(2-Chloroethyl)Ether	5.6E-06	- -	1.4E-07	--	6E-06	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	2.0E-02	--	1.1E-02	3E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.6E+00	--	--	5E+00
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	6.5E-01	--	--	6E-01
			Pentachlorophenol	8.4E-07	- -	2.9E-06	--	4E-06	Hepatic	4.9E-03	--	1.7E-02	2E-02
			2,3,7,8-TCDD Equivalents	1.2E-06	- -	- -	--	1E-06	Reproductive, Developmental, Endocrine	1.5E-01	--	--	2E-01
			Aldrin	8.0E-08	- -	- -	--	8E-08	Hepatic	1.8E-03	--	--	2E-03
			beta-BHC	2.8E-07	- -	1.8E-07	--	5E-07	NA	--	--	--	--
			Dieldrin	1.2E-06	- -	1.9E-06	--	3E-06	Hepatic	1.7E-02	--	2.8E-02	4E-02
			Heptachlor	2.1E-08	- -	1.4E-07	--	2E-07	Hepatic	1.1E-04	--	7.5E-04	9E-04
			Heptachlor Epoxide	3.7E-08	- -	4.1E-08	--	8E-08	Hepatic	3.6E-03	--	4.0E-03	8E-03
			Dioxin-Like PCBs	7.8E-07	- -	- -	--	8E-07	Reproductive, Developmental, Endocrine	1.0E-01	--	--	1E-01
			Nondioxin-Like PCBs	3.4E-07	- -	- -	--	3E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	3.9E-01	--	1.7E-03	4E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	6.6E-01	--	1.9E-02	7E-01
			Arsenic	1.2E-04	- -	5.3E-07	--	1E-04	CVS, Dermal	3.1E+00	--	1.4E-02	3E+00
			Barium	- -	- -	- -	--	- -	Urinary	1.3E-01	--	8.1E-03	1E-01
			Boron	- -	- -	- -	--	- -	Developmental	1.8E-01	--	8.1E-04	2E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	1.8E-01	--	1.6E-02	2E-01
			Chromium	9.2E-05	- -	1.6E-05	--	1E-04	None Specified	1.3E-01	--	2.4E-02	2E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.2E+00	--	3.8E-03	2E+00
			Copper	- -	- -	- -	--	- -	GS	2.8E-02	--	1.2E-04	3E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.4E+00	--	6.2E-03	1E+00
			Iron	- -	- -	- -	--	- -	GS	2.8E+00	--	1.2E-02	3E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	2.2E+01	--	2.5E+00	2E+01
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	3.7E-02	--	1.6E-04	4E-02
			Silver	- -	- -	- -	--	- -	Dermal	2.5E-01	--	1.7E-02	3E-01
			Thallium	- -	- -	- -	--	- -	Hair	1.9E+01	--	8.6E-02	2E+01
			Vanadium	- -	- -	- -	--	- -	Dermal	1.1E-01	--	1.9E-02	1E-01
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	6.2E-03	--	1.6E-05	6E-03
			Chemical Total	4.8E-04	- -	3.8E-05	--	5E-04		6.3E+01	--	3.3E+00	7E+01
		Exposure Point Total						5E-04					7E+01
	Exposure Medium Total							5E-04					7E+01
Medium Total								5E-04					7E+01
Receptor Total							Receptor Risk Total	5E-04				Receptor HI Total	7E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	7E-01
Total Body Weight HI	3E-02
Total Nervous HI	3E+01
Total CVS HI	4E+00
Total Developmental HI	6E+00
Total Endocrine HI	3E-01
Total GS HI	3E+00
Total Hair HI	2E+01
Total Immune HI	8E-01
Total Hepatic HI	2E+00
Total Reproductive HI	2E+00
Total Respiratory HI	3E-01
Total Dermal HI	4E+00
Total Spleen HI	2E+00
Total Thyroid HI	2E+00
Total Urinary HI	2E+00

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	5.9E-08	- -	3.8E-09	--	6E-08	Immune, Hematologic	9.0E-04	--	5.8E-05	9.6E-04
			1,2-Dibromo-3-Chloropropane	3.2E-06	- -	5.7E-07	--	4E-06	Reproductive	3.4E-02	--	6.2E-03	4.1E-02
			1,2-Dichloroethane	8.6E-07	- -	3.6E-08	--	9E-07	Urinary	5.5E-03	--	2.3E-04	5.7E-03
			1,4-Dichlorobenzene	4.3E-08	- -	2.6E-08	--	7E-08	Hepatic	3.9E-04	--	2.4E-04	6.4E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	3.4E-02	--	1.3E-03	3.5E-02
			Benzene	2.7E-06	- -	3.5E-07	--	3E-06	Immune	4.3E-02	--	5.5E-03	4.9E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	8.1E-01	--	8.6E-02	8.9E-01
			Ethylbenzene	4.1E-07	- -	2.1E-07	--	6E-07	Hepatic, Urinary	1.3E-03	--	6.6E-04	2.0E-03
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	3.9E-03	--	2.0E-03	5.9E-03
			Trichloroethene (Kidney)	9.9E-07	- -	1.4E-07	--	1E-06	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	2.0E-06	- -	2.8E-07	--	2E-06	CVS, Immune, Developmental	3.7E-01	--	5.3E-02	4.2E-01
			Vinyl Chloride	2.6E-05	- -	1.7E-06	--	3E-05	Hepatic	4.2E-02	--	2.7E-03	4.5E-02
			1,4-Dioxane	4.8E-05	- -	1.7E-07	--	5E-05	Hepatic, Urinary	5.7E-02	--	2.0E-04	5.7E-02
			2,6-Dinitrotoluene	1.1E-04	- -	7.9E-06	--	1E-04	Hepatic, Spleen	8.6E-01	--	6.1E-02	9.2E-01
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	7.0E-02	--	8.7E-02	1.6E-01
			Benzo(a)anthracene	4.5E-07	- -	- -	--	4E-07	NA	--	--	--	--
			Benzo(a)pyrene	2.1E-06	- -	- -	--	2E-06	Developmental, Immune, Reproductive	1.2E-02	--	--	1.2E-02
			Bis(2-Chloroethyl)Ether	1.1E-05	- -	3.0E-07	--	1E-05	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	1.2E-02	--	7.0E-03	1.9E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	2.8E+00	--	--	2.8E+00
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	3.9E-01	--	--	3.9E-01
			Pentachlorophenol	1.7E-06	- -	6.3E-06	--	8E-06	Hepatic	2.9E-03	--	1.1E-02	1.4E-02
			2,3,7,8-TCDD Equivalents	2.4E-06	- -	- -	--	2E-06	Reproductive, Developmental, Endocrine	9.1E-02	--	--	9.1E-02
			Aldrin	1.6E-07	- -	- -	--	2E-07	Hepatic	1.1E-03	--	--	1.1E-03
			beta-BHC	5.5E-07	- -	4.0E-07	--	1E-06	NA	--	--	--	--
			Dieldrin	2.3E-06	- -	4.2E-06	--	7E-06	Hepatic	1.0E-02	--	1.8E-02	2.9E-02
			Heptachlor	4.2E-08	- -	3.1E-07	--	3E-07	Hepatic	6.6E-05	--	4.8E-04	5.4E-04
			Heptachlor Epoxide	7.4E-08	- -	9.0E-08	--	2E-07	Hepatic	2.2E-03	--	2.7E-03	4.8E-03
			Dioxin-Like PCBs	1.6E-06	- -	- -	--	2E-06	Reproductive, Developmental, Endocrine	6.0E-02	--	--	6.0E-02
			Nondioxin-Like PCBs	6.8E-07	- -	- -	--	7E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	2.4E-01	--	1.3E-03	2.4E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	4.0E-01	--	1.5E-02	4.1E-01
			Arsenic	2.4E-04	- -	1.3E-06	--	2E-04	CVS, Dermal	1.9E+00	--	1.0E-02	1.9E+00
			Barium	- -	- -	- -	--	- -	Urinary	7.7E-02	--	6.2E-03	8.3E-02
			Boron	- -	- -	- -	--	- -	Developmental	1.1E-01	--	6.2E-04	1.1E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	1.1E-01	--	1.2E-02	1.2E-01
			Chromium	6.9E-05	- -	1.5E-05	--	8E-05	None Specified	8.0E-02	--	1.8E-02	9.8E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	1.3E+00	--	2.9E-03	1.3E+00
			Copper	- -	- -	- -	--	- -	GS	1.7E-02	--	9.4E-05	1.7E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	8.4E-01	--	3.5E-03	8.4E-01
			Iron	- -	- -	- -	--	- -	GS	1.7E+00	--	9.5E-03	1.7E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	1.3E+01	--	1.9E+00	1.5E+01
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	2.2E-02	--	1.3E-04	2.3E-02
			Silver	- -	- -	- -	--	- -	Dermal	1.5E-01	--	1.3E-02	1.6E-01
			Thallium	- -	- -	- -	--	- -	Hair	1.2E+01	--	6.5E-02	1.2E+01
			Vanadium	- -	- -	- -	--	- -	Dermal	6.7E-02	--	1.4E-02	8.1E-02
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	3.7E-03	--	1.2E-05	3.7E-03
			Chemical Total	5.3E-04	- -	4.0E-05	--	6E-04		3.8E+01	--	2.4E+00	4.0E+01
		Exposure Point Total						6E-04					4.0E+01
	Exposure Medium Total							6E-04					4.0E+01

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	3.4E-08	- -	--	3E-08	Respiratory	--	3.7E-02	--	3.7E-02
			1,2-Dibromo-3-Chloropropane	- -	1.8E-05	- -	--	2E-05	Reproductive	--	2.7E-02	--	2.7E-02
			1,2-Dichloroethane	- -	6.3E-07	- -	--	6E-07	Nervous	--	1.2E-02	--	1.2E-02
			1,4-Dichlorobenzene	- -	2.0E-07	- -	--	2E-07	Hepatic	--	8.0E-05	--	8.0E-05
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	4.9E-03	--	4.9E-03
			Benzene	- -	1.3E-06	- -	--	1E-06	Immune	--	1.9E-02	--	1.9E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	2.7E-07	- -	--	3E-07	Developmental	--	3.8E-04	--	3.8E-04
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	2.2E-02	--	2.2E-02
			Trichloroethene (Kidney)	- -	2.8E-07	- -	--	3E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	4.3E-07	- -	--	4E-07	CVS, Immune, Developmental	--	2.4E-01	--	2.4E-01
			Vinyl Chloride	- -	5.9E-07	- -	--	6E-07	Hepatic	--	4.7E-03	--	4.7E-03
			1,4-Dioxane	- -	1.6E-07	- -	--	2E-07	Nervous, Respiratory	--	3.7E-03	--	3.7E-03
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	2.6E-08	- -	--	3E-08	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	5.9E-07	- -	--	6E-07	NA	--	--	--	--
			Naphthalene	- -	4.1E-06	- -	--	4E-06	Nervous, Respiratory	--	1.4E-01	--	1.4E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.1E-07	- -	--	2E-07	Reproductive, Developmental, Endocrine	--	4.8E-04	--	4.8E-04
			Aldrin	- -	1.2E-08	- -	--	1E-08	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	1.1E-08	- -	--	1E-08	NA	--	--	--	--
			Heptachlor Epoxide	- -	2.7E-09	- -	--	3E-09	NA	--	--	--	--
			Dioxin-Like PCBs	- -	5.3E-07	- -	--	5E-07	Reproductive, Developmental, Endocrine	--	1.2E-03	--	1.2E-03
			Nondioxin-Like PCBs	- -	2.0E-07	- -	--	2E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	3.5E+00	--	3.5E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	2.8E-05	- -	--	3E-05		- -	4.0E+00	- -	4E+00
		Exposure Point Total						3E-05					4E+00
	Exposure Medium Total							3E-05					4E+00
Medium Total								6E-04					4E+01
Receptor Total							Receptor Risk Total	6E-04				Receptor HI Total	4E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	4E-01
Total Body Weight HI	2E-02
Total Nervous HI	2E+01
Total CVS HI	3E+00
Total Developmental HI	4E+00
Total Endocrine HI	4E+00
Total GS HI	2E+00
Total Hair HI	1E+01
Total Immune HI	8E-01
Total Hepatic HI	1E+00
Total Reproductive HI	1E+00
Total Respiratory HI	3E-01
Total Dermal HI	2E+00
Total Spleen HI	9E-01
Total Thyroid HI	1E+00
Total Urinary HI	1E+00
Total None Specified HI	1E-01

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	8.8E-08	- -	5.6E-09	--	9E-08					
			1,2-Dibromo-3-Chloropropane	7.3E-06	- -	1.3E-06	--	9E-06					
			1,2-Dichloroethane	1.3E-06	- -	5.4E-08	--	1E-06					
			1,4-Dichlorobenzene	6.4E-08	- -	4.0E-08	--	1E-07					
			2-Hexanone	- -	- -	- -	--	- -					
			Benzene	4.1E-06	- -	5.3E-07	--	5E-06					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Ethylbenzene	6.2E-07	- -	3.2E-07	--	9E-07					
			m+p-Xylenes	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	2.3E-06	- -	3.3E-07	--	3E-06					
			Trichloroethene (Non-Kidney)	2.9E-06	- -	4.2E-07	--	3E-06					
			Vinyl Chloride	2.0E-04	- -	1.3E-05	--	2E-04					
			1,4-Dioxane	7.3E-05	- -	2.4E-07	--	7E-05					
			2,6-Dinitrotoluene	1.7E-04	- -	1.1E-05	--	2E-04					
			2-Methylnaphthalene	- -	- -	- -	--	- -					
			Benzo(a)anthracene	1.0E-06	- -	- -	--	1E-06					
			Benzo(a)pyrene	4.8E-06	- -	- -	--	5E-06					
			Bis(2-Chloroethyl)Ether	1.7E-05	- -	4.3E-07	--	2E-05					
			Naphthalene	- -	- -	- -	--	- -					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Pentachlorophenol	2.5E-06	- -	9.2E-06	--	1E-05					
			2,3,7,8-TCDD Equivalents	3.5E-06	- -	- -	--	4E-06					
			Aldrin	2.4E-07	- -	- -	--	2E-07					
			beta-BHC	8.3E-07	- -	5.8E-07	--	1E-06					
			Dieldrin	3.5E-06	- -	6.1E-06	--	1E-05					
			Heptachlor	6.4E-08	- -	4.5E-07	--	5E-07					
			Heptachlor Epoxide	1.1E-07	- -	1.3E-07	--	2E-07					
			Dioxin-Like PCBs	2.3E-06	- -	- -	--	2E-06					
			Nondioxin-Like PCBs	1.0E-06	- -	- -	--	1E-06					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	3.6E-04	- -	1.9E-06	--	4E-04					
			Barium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	1.6E-04	- -	3.1E-05	--	2E-04					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	1.0E-03	- -	7.8E-05	--	1E-03					
		Exposure Point Total						1E-03					
	Exposure Medium Total							1E-03					

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	3.4E-08	- -	--	3E-08					
			1,2-Dibromo-3-Chloropropane	- -	1.8E-05	- -	--	2E-05					
			1,2-Dichloroethane	- -	6.3E-07	- -	--	6E-07					
			1,4-Dichlorobenzene	- -	2.0E-07	- -	--	2E-07					
			2-Hexanone	- -	- -	- -	--	- -					
			Benzene	- -	1.3E-06	- -	--	1E-06					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Ethylbenzene	- -	2.7E-07	- -	--	3E-07					
			m+p-Xylenes	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	- -	2.8E-07	- -	--	3E-07					
			Trichloroethene (Non-Kidney)	- -	4.3E-07	- -	--	4E-07					
			Vinyl Chloride	- -	5.9E-07	- -	--	6E-07					
			1,4-Dioxane	- -	1.6E-07	- -	--	2E-07					
			2,6-Dinitrotoluene	- -	- -	- -	--	- -					
			2-Methylnaphthalene	- -	- -	- -	--	- -					
			Benzo(a)anthracene	- -	2.6E-08	- -	--	3E-08					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Bis(2-Chloroethyl)Ether	- -	5.9E-07	- -	--	6E-07					
			Naphthalene	- -	4.1E-06	- -	--	4E-06					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Pentachlorophenol	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	2.1E-07	- -	--	2E-07					
			Aldrin	- -	1.2E-08	- -	--	1E-08					
			beta-BHC	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			Heptachlor	- -	1.1E-08	- -	--	1E-08					
			Heptachlor Epoxide	- -	2.7E-09	- -	--	3E-09					
			Dioxin-Like PCBs	- -	5.3E-07	- -	--	5E-07					
			Nondioxin-Like PCBs	- -	2.0E-07	- -	--	2E-07					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	- -	2.8E-05	- -	--	3E-05					
		Exposure Point Total						3E-05					
	Exposure Medium Total							3E-05					
Medium Total								1E-03					
Receptor Total							Receptor Risk Total	1E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	6.4E-10	- -	1.1E-08	--	1E-08	Urinary	1.6E-06	--	2.8E-05	3E-05
			Benzene	1.3E-09	- -	4.7E-08	--	5E-08	Immune	1.6E-05	--	6.0E-04	6E-04
			Chloroform	1.1E-09	- -	2.1E-08	--	2E-08	Hepatic	1.0E-05	--	1.9E-04	2E-04
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	8.6E-02	--	2.4E+00	3E+00
			Trichloroethene	4.6E-07	- -	1.5E-05	--	2E-05	CVS, Immune, Developmental	5.7E-02	--	1.8E+00	2E+00
			Vinyl Chloride	2.4E-07	- -	4.9E-06	--	5E-06	Hepatic	3.1E-04	--	6.4E-03	7E-03
			1,4-Dioxane	6.7E-08	- -	6.8E-08	--	1E-07	Hepatic, Urinary	6.3E-05	--	6.3E-05	1E-04
			Benzo(a)pyrene	2.4E-09	- -	- -	--	2E-09	Developmental, Immune, Reproductive	2.2E-05	--	--	2E-05
			Bis(2-ethylhexyl)phthalate	3.0E-09	- -	- -	--	3E-09	Hepatic	3.0E-05	--	--	3E-05
			Dibenzo(a,h)anthracene	9.8E-09	- -	- -	--	1E-08	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.2E-09	- -	- -	--	1E-09	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	6.4E-07	--	7.7E-05	8E-05
			2,3,7,8-TCDD Equivalents	1.1E-08	- -	- -	--	1E-08	Reproductive, Developmental, Endocrine	3.4E-04	--	--	3E-04
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	2.1E-04	--	--	2E-04
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.9E-04	--	--	2E-04
			Dieldrin	1.1E-09	- -	3.0E-07	--	3E-07	Hepatic	3.8E-06	--	1.0E-03	1E-03
			delta-BHC	2.5E-09	- -	2.6E-07	--	3E-07	Hepatic	1.4E-07	--	1.5E-05	1E-05
			Aluminum	- -	- -	- -	--	- -	Nervous	2.7E-03	--	7.5E-03	1E-02
			Antimony	- -	- -	- -	--	- -	Hematologic	1.2E-03	--	2.2E-02	2E-02
			Arsenic	2.1E-07	- -	5.9E-07	--	8E-07	CVS, Dermal	1.3E-03	--	3.7E-03	5E-03
			Barium	- -	- -	- -	--	- -	Urinary	8.9E-05	--	3.6E-03	4E-03
			Beryllium	- -	- -	- -	--	- -	GS	5.1E-05	--	2.1E-02	2E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	2.4E-04	--	1.4E-02	1E-02
			Chromium	4.6E-07	- -	5.2E-05	--	5E-05	None Specified	8.7E-04	--	9.8E-02	1E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	7.8E-03	--	8.8E-03	2E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.6E-03	--	3.3E-03	5E-03
			Iron	- -	- -	- -	--	- -	GS	4.5E-03	--	1.3E-02	2E-02
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	1.2E-02	--	8.3E-01	8E-01
			Vanadium	- -	- -	- -	--	- -	Dermal	1.4E-04	--	1.5E-02	2E-02
			Chemical Total	1.5E-06	- -	7.3E-05	--	7E-05		1.8E-01	--	5.3E+00	5E+00
		Exposure Point Total						7E-05					5E+00
	Exposure Medium Total							7E-05					5E+00
	Air - Irrigation	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	1.3E-08	- -	--	1E-08	NA	--	--	--	--
			Benzene	- -	1.3E-08	- -	--	1E-08	Immune	--	1.5E-04	--	2E-04
			Chloroform	- -	5.5E-08	- -	--	6E-08	Hepatic	--	6.9E-05	--	7E-05
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene	- -	3.1E-06	- -	--	3E-06	CVS, Immune, Developmental	--	1.1E+00	--	1E+00
			Vinyl Chloride	- -	1.3E-07	- -	--	1E-07	Hepatic	--	8.0E-04	--	8E-04
			1,4-Dioxane	- -	1.3E-09	- -	--	1E-09	Nervous, Respiratory	--	2.4E-05	--	2E-05
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	7.0E-09	- -	--	7E-09	Nervous, Respiratory	--	1.9E-04	--	2E-04
			2,3,7,8-TCDD Equivalents	- -	7.6E-08	- -	--	8E-08	Reproductive, Developmental, Endocrine	--	1.4E-04	--	1E-04
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.0E-01	--	1E-01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	3.4E-06	- -	--	3E-06		- -	1.2E+00	- -	1E+00
		Exposure Point Total						3E-06					1E+00
	Exposure Medium Total							3E-06					1E+00
Medium Total								8E-05					7E+00

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Showering	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	1.0E-08	- -	--	1E-08	NA	--	--	--	--
			Benzene	- -	1.1E-08	- -	--	1E-08	Immune	--	1.4E-04	--	1E-04
			Chloroform	- -	4.3E-08	- -	--	4E-08	Hepatic	--	5.3E-05	--	5E-05
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene	- -	2.1E-06	- -	--	2E-06	CVS, Immune, Developmental	--	7.1E-01	--	7E-01
			Vinyl Chloride	- -	1.1E-07	- -	--	1E-07	Hepatic	--	6.8E-04	--	7E-04
			1,4-Dioxane	- -	4.3E-09	- -	--	4E-09	Nervous, Respiratory	--	7.9E-05	--	8E-05
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	5.3E-09	- -	--	5E-09	Nervous, Respiratory	--	1.5E-04	--	1E-04
			2,3,7,8-TCDD Equivalents	- -	1.9E-08	- -	--	2E-08	Reproductive, Developmental, Endocrine	--	3.5E-05	--	3E-05
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.3E-01	--	1E-01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	2.3E-06	- -	--	2E-06		- -	8.4E-01	- -	8E-01
		Exposure Point Total						2E-06					8E-01
	Exposure Medium Total							2E-06					8E-01
Medium Total								2E-06					8E-01
Receptor Total							Receptor Risk Total	8E-05				Receptor HI Total	7

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	2E-02
Total Body Weight HI	8E-05
Total Nervous HI	9E-01
Total CVS HI	4E+00
Total Developmental HI	4E+00
Total Endocrine HI	2E-01
Total GS HI	4E-02
Total Immune HI	4E+00
Total Hepatic HI	1E-02
Total Reproductive HI	5E-03
Total Respiratory HI	4E-04
Total Dermal HI	2E-02
Total Thyroid HI	2E-02
Total Urinary HI	3E+00
Total None Specified HI	1E-01

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	9.0E-08	- -	6.2E-09	--	1E-07	Urinary	9.2E-04	--	6.3E-05	1E-03
			Benzene	1.8E-07	- -	2.4E-08	--	2E-07	Immune	9.5E-03	--	1.3E-03	1E-02
			Chloroform	1.6E-07	- -	1.3E-08	--	2E-07	Hepatic	6.0E-03	--	4.7E-04	6E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	5.0E+01	--	5.5E+00	6E+01
			Trichloroethene (Kidney)	7.0E-05	- -	1.0E-05	--	8E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	5.2E-05	- -	7.6E-06	--	6E-05	CVS, Immune, Developmental	3.3E+01	--	4.8E+00	4E+01
			Vinyl Chloride	4.5E-04	- -	3.0E-05	--	5E-04	Hepatic	1.8E-01	--	1.2E-02	2E-01
			1,4-Dioxane	9.4E-06	- -	3.0E-08	--	9E-06	Hepatic, Urinary	3.7E-02	--	1.2E-04	4E-02
			Benzo(a)pyrene	1.8E-06	- -	- -	--	2E-06	Developmental, Immune, Reproductive	1.3E-02	--	--	1E-02
			Bis(2-ethylhexyl)phthalate	4.2E-07	- -	- -	--	4E-07	Hepatic	1.7E-02	--	--	2E-02
			Dibenzo(a,h)anthracene	7.3E-06	- -	- -	--	7E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.9E-07	- -	- -	--	9E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	3.7E-04	--	2.1E-04	6E-04
			2,3,7,8-TCDD Equivalents	1.6E-06	- -	- -	--	2E-06	Reproductive, Developmental, Endocrine	2.0E-01	--	--	2E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.2E-01	--	--	1E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.1E-01	--	--	1E-01
			Dieldrin	1.5E-07	- -	2.5E-07	--	4E-07	Hepatic	2.2E-03	--	3.6E-03	6E-03
			delta-BHC	3.5E-07	- -	2.2E-07	--	6E-07	Hepatic	8.1E-05	--	5.1E-05	1E-04
			Aluminum	- -	- -	- -	--	- -	Nervous	1.6E+00	--	6.9E-03	2E+00
			Antimony	- -	- -	- -	--	- -	Hematologic	6.9E-01	--	2.0E-02	7E-01
			Arsenic	2.9E-05	- -	1.3E-07	--	3E-05	CVS, Dermal	7.6E-01	--	3.4E-03	8E-01
			Barium	- -	- -	- -	--	- -	Urinary	5.2E-02	--	3.2E-03	5E-02
			Beryllium	- -	- -	- -	--	- -	GS	3.0E-02	--	1.9E-02	5E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	1.4E-01	--	1.2E-02	2E-01
			Chromium	3.5E-04	- -	6.1E-05	--	4E-04	None Specified	5.1E-01	--	8.9E-02	6E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	4.5E+00	--	8.0E-03	5E+00
			Cyanide	- -	- -	- -	--	- -	Reproductive	9.2E-01	--	4.1E-03	9E-01
			Iron	- -	- -	- -	--	- -	GS	2.6E+00	--	1.2E-02	3E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	6.9E+00	--	7.6E-01	8E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	8.2E-02	--	1.4E-02	1E-01
			Chemical Total	9.7E-04	- -	1.1E-04	--	1E-03		1.0E+02	--	1.1E+01	1E+02
		Exposure Point Total						1E-03					1E+02
	Exposure Medium Total							1E-03					1E+02
Medium Total								1E-03					1E+02
Receptor Total							Receptor Risk Total	1E-03				Receptor HI Total	1E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	7E-01
Total Nervous HI	9E+00
Total CVS HI	4E+01
Total Developmental HI	4E+01
Total GS HI	3E+00
Total Immune HI	4E+01
Total Hepatic HI	3E-01
Total Reproductive HI	1E+00
Total Dermal HI	9E-01
Total Thyroid HI	5E+00
Total Urinary HI	6E+01
Total None Specified HI	6E-01
Total Endocrine HI	2E-01

TABLE 9.13.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	1.8E-07	- -	1.2E-08	--	2E-07	Urinary	5.5E-04	--	3.6E-05	6E-04
			Benzene	3.6E-07	- -	4.6E-08	--	4E-07	Immune	5.7E-03	--	7.3E-04	6E-03
			Chloroform	3.2E-07	- -	2.5E-08	--	3E-07	Hepatic	3.6E-03	--	2.8E-04	4E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	3.0E+01	--	3.2E+00	3E+01
			Trichloroethene (Kidney)	5.3E-05	- -	7.4E-06	--	6E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.0E-04	- -	1.5E-05	--	1E-04	CVS, Immune, Developmental	2.0E+01	--	2.8E+00	2E+01
			Vinyl Chloride	6.8E-05	- -	4.4E-06	--	7E-05	Hepatic	1.1E-01	--	7.1E-03	1E-01
			1,4-Dioxane	1.9E-05	- -	6.5E-08	--	2E-05	Hepatic, Urinary	2.2E-02	--	7.6E-05	2E-02
			Benzo(a)pyrene	1.3E-06	- -	- -	--	1E-06	Developmental, Immune, Reproductive	7.7E-03	--	--	8E-03
			Bis(2-ethylhexyl)phthalate	8.4E-07	- -	- -	--	8E-07	Hepatic	1.0E-02	--	--	1E-02
			Dibenzo(a,h)anthracene	5.5E-06	- -	- -	--	5E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	6.7E-07	- -	- -	--	7E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	2.2E-04	--	1.3E-04	4E-04
			2,3,7,8-TCDD Equivalents	3.1E-06	- -	- -	--	3E-06	Reproductive, Developmental, Endocrine	1.2E-01	--	--	1E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	7.5E-02	--	--	7E-02
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	6.6E-02	--	--	7E-02
			Dieldrin	3.1E-07	- -	5.5E-07	--	9E-07	Hepatic	1.3E-03	--	2.4E-03	4E-03
			delta-BHC	7.0E-07	- -	4.9E-07	--	1E-06	Hepatic	4.9E-05	--	3.4E-05	8E-05
			Aluminum	- -	- -	- -	--	- -	Nervous	9.4E-01	--	5.2E-03	9E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	4.1E-01	--	1.5E-02	4E-01
			Arsenic	5.9E-05	- -	3.3E-07	--	6E-05	CVS, Dermal	4.6E-01	--	2.6E-03	5E-01
			Barium	- -	- -	- -	--	- -	Urinary	3.1E-02	--	2.5E-03	3E-02
			Beryllium	- -	- -	- -	--	- -	GS	1.8E-02	--	1.4E-02	3E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	8.4E-02	--	9.4E-03	9E-02
			Chromium	2.6E-04	- -	5.8E-05	--	3E-04	None Specified	3.0E-01	--	6.8E-02	4E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.7E+00	--	6.1E-03	3E+00
			Cyanide	- -	- -	- -	--	- -	Reproductive	5.5E-01	--	2.3E-03	6E-01
			Iron	- -	- -	- -	--	- -	GS	1.6E+00	--	8.8E-03	2E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	4.1E+00	--	5.8E-01	5E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	4.9E-02	--	1.1E-02	6E-02
			Chemical Total	5.8E-04	- -	8.6E-05	--	7E-04		6.1E+01	--	6.7E+00	7E+01
		Exposure Point Total						7E-04					7E+01
	Exposure Medium Total							7E-04					7E+01
	Air-Shower	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	1.5E-07	- -	--	1E-07	NA	--	--	--	--
			Benzene	- -	1.7E-07	- -	--	2E-07	Immune	--	2.5E-03	--	2E-03
			Chloroform	- -	6.2E-07	- -	--	6E-07	Hepatic	--	9.7E-04	--	1E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene (Kidney)	- -	1.5E-05	- -	--	1E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	2.3E-05	- -	--	2E-05	CVS, Immune, Developmental	--	1.3E+01	--	1E+01
			Vinyl Chloride	- -	1.6E-06	- -	--	2E-06	Hepatic	--	1.2E-02	--	1E-02
			1,4-Dioxane	- -	6.2E-08	- -	--	6E-08	Nervous, Respiratory	--	1.4E-03	--	1E-03
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	7.7E-08	- -	--	8E-08	Nervous, Respiratory	--	2.7E-03	--	3E-03
			2,3,7,8-TCDD Equivalents	- -	2.8E-07	- -	--	3E-07	Reproductive, Developmental, Endocrine	--	6.3E-04	--	6E-04
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	2.3E+00	--	2E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	4.1E-05	- -	--	4E-05		- -	1.5E+01	- -	2E+01
		Exposure Point Total						4E-05					2E+01
	Exposure Medium Total							4E-05					2E+01
Medium Total								7E-04					8E+01
Receptor Total							Receptor Risk Total	7E-04				Receptor HI Total	8E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.13.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Hematologic HI	4E-01
Total Body Weight HI	4E-04
Total Nervous HI	6E+00
Total CVS HI	4E+01
Total Developmental HI	4E+01
Total Endocrine HI	2E+00
Total GS HI	2E+00
Total Immune HI	4E+01
Total Hepatic HI	2E-01
Total Reproductive HI	7E-01
Total Respiratory HI	4E-03
Total Dermal HI	5E-01
Total Thyroid HI	3E+00
Total Urinary HI	3E+01
Total None Specified HI	4E-01

TABLE 9.14.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	2.7E-07	- -	1.8E-08	--	3E-07					
			Benzene	5.4E-07	- -	6.9E-08	--	6E-07					
			Chloroform	4.8E-07	- -	3.7E-08	--	5E-07					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	1.2E-04	- -	1.8E-05	--	1E-04					
			Trichloroethene (Non-Kidney)	1.6E-04	- -	2.2E-05	--	2E-04					
			Vinyl Chloride	5.1E-04	- -	3.4E-05	--	5E-04					
			1,4-Dioxane	2.8E-05	- -	9.5E-08	--	3E-05					
			Benzo(a)pyrene	3.1E-06	- -	- -	--	3E-06					
			Bis(2-ethylhexyl)phthalate	1.3E-06	- -	- -	--	1E-06					
			Dibenzo(a,h)anthracene	1.3E-05	- -	- -	--	1E-05					
			Indeno(1,2,3-cd)pyrene	1.6E-06	- -	- -	--	2E-06					
			Naphthalene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	4.7E-06	- -	- -	--	5E-06					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Dieldrin	4.6E-07	- -	8.0E-07	--	1E-06					
			delta-BHC	1.1E-06	- -	7.1E-07	--	2E-06					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	8.8E-05	- -	4.6E-07	--	9E-05					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	6.1E-04	- -	1.2E-04	--	7E-04					
			Cobalt	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Chemical Total	1.5E-03	- -	2.0E-04	--	2E-03					
		Exposure Point Total						2E-03					
	Exposure Medium Total							2E-03					
	Air-Shower	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	1.5E-07	- -	--	1E-07					
			Benzene	- -	1.7E-07	- -	--	2E-07					
			Chloroform	- -	6.2E-07	- -	--	6E-07					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	- -	1.5E-05	- -	--	1E-05					
			Trichloroethene (Non-Kidney)	- -	2.3E-05	- -	--	2E-05					
			Vinyl Chloride	- -	1.6E-06	- -	--	2E-06					
			1,4-Dioxane	- -	6.2E-08	- -	--	6E-08					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -					
			Naphthalene	- -	7.7E-08	- -	--	8E-08					
			2,3,7,8-TCDD Equivalents	- -	2.8E-07	- -	--	3E-07					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			delta-BHC	- -	- -	- -	--	- -					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Cobalt	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Chemical Total	- -	4.1E-05	- -	--	4E-05					
		Exposure Point Total						4E-05					
	Exposure Medium Total							4E-05					
Medium Total								2E-03					
Receptor Total							Receptor Risk Total	2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	3.1E-12	- -	6.2E-11	--	6E-11	Hepatic	5.7E-07	--	1.1E-05	1E-05
			1,4-Dichlorobenzene	7.5E-12	- -	1.2E-10	--	1E-10	Hepatic	1.4E-06	--	2.2E-05	2E-05
			Benzene	6.5E-11	- -	3.0E-10	--	4E-10	Hematologic	8.2E-06	--	3.8E-05	5E-05
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic, Urinary	2.2E-05	--	2.0E-04	2E-04
			Trichloroethene	7.8E-11	- -	3.2E-10	--	4E-10	Immune, Developmental	2.4E-04	--	9.7E-04	1E-03
			1,4-Dioxane	6.7E-09	- -	7.3E-10	--	7E-09	Hepatic	9.4E-06	--	1.0E-06	1E-05
			Benzo(a)anthracene	4.1E-11	- -	- -	--	4E-11	NA	--	--	--	--
			Benzo(a)pyrene	6.1E-10	- -	- -	--	6E-10	Developmental, Immune, Reproductive	1.4E-04	--	--	1E-04
			Benzo(b)fluoranthene	1.0E-10	- -	- -	--	1E-10	NA	--	--	--	--
			Benzo(k)fluoranthene	3.9E-12	- -	- -	--	4E-12	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.3E-10	- -	- -	--	1E-10	Reproductive	6.3E-06	--	--	6E-06
			Dibenzo(a,h)anthracene	4.5E-11	- -	- -	--	4E-11	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	--	- -	Whole Body	9.5E-05	--	3.5E-03	4E-03
			Indeno(1,2,3-cd)pyrene	3.5E-11	- -	- -	--	4E-11	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Nervous	9.4E-08	--	1.4E-06	2E-06
			Pentachlorophenol	5.6E-11	- -	4.5E-09	--	5E-09	Hepatic	2.0E-06	--	1.6E-04	2E-04
			Phenanthrene	- -	- -	- -	--	- -	Urinary	1.4E-06	--	8.2E-05	8E-05
			2,3,7,8-TCDD Equivalents	2.4E-07	- -	- -	--	2E-07	Immune	6.4E-03	--	--	6E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	7.4E-05	--	--	7E-05
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	3.3E-04	--	--	3E-04
			4,4'-DDD	1.8E-12	- -	3.5E-10	--	4E-10	NA	--	--	--	--
			4,4'-DDE	1.4E-11	- -	- -	--	1E-11	NA	--	--	--	--
			Aldrin	5.9E-10	- -	- -	--	6E-10	Urinary	6.0E-05	--	--	6E-05
			beta-BHC	5.5E-11	- -	8.5E-10	--	9E-10	NA	--	--	--	--
			delta-BHC	1.6E-10	- -	2.3E-09	--	3E-09	Liver	2.2E-07	--	3.3E-06	3E-06
			Dieldrin	2.6E-10	- -	9.9E-09	--	1E-08	Nervous	1.1E-05	--	4.3E-04	4E-04
			Heptachlor	1.6E-11	- -	2.6E-09	--	3E-09	Hepatic	5.0E-07	--	8.1E-05	8E-05
			Heptachlor Epoxide	6.0E-12	- -	1.6E-10	--	2E-10	Hepatic	3.6E-06	--	9.3E-05	1E-04
			gamma-BHC (Lindane)	3.6E-11	- -	5.4E-10	--	6E-10	Immune	7.5E-06	--	1.2E-04	1E-04
			Dioxin-Like PCBs	2.4E-08	- -	- -	--	2E-08	Immune	6.4E-04	--	--	6E-04
			Nondioxin-Like PCBs	3.9E-08	- -	- -	--	4E-08	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	5.9E-04	--	1.7E-04	8E-04
			Antimony	- -	- -	- -	--	- -	Whole Body	3.6E-03	--	6.7E-03	1E-02
			Arsenic	2.8E-08	- -	7.8E-09	--	4E-08	CVS, Dermal	4.3E-03	--	1.2E-03	6E-03
			Barium	- -	- -	- -	--	- -	Urinary	3.1E-04	--	1.3E-03	2E-03
			Beryllium	- -	- -	- -	--	- -	None Specified	8.2E-05	--	3.3E-03	3E-03
			Boron	- -	- -	- -	--	- -	Developmental	6.0E-04	--	1.7E-04	8E-04
			Cadmium	- -	- -	- -	--	- -	Urinary	2.3E-03	--	1.3E-02	1E-02
			Chromium	5.5E-08	- -	6.3E-07	--	7E-07	Hematologic	1.6E-03	--	1.8E-02	2E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.2E-04	--	2.4E-05	2E-04
			Copper	- -	- -	- -	--	- -	GS	3.6E-04	--	1.0E-04	5E-04
			Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	2.8E-04	--	7.8E-05	4E-04
			Iron	- -	- -	- -	--	- -	GS	3.9E-03	--	1.1E-03	5E-03
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	9.9E-03	--	7.0E-02	8E-02
			Mercury	- -	- -	- -	--	- -	Nervous	2.8E-07	--	7.9E-08	4E-07
			Nickel	- -	- -	- -	--	- -	Body Weight	3.4E-04	--	4.8E-04	8E-04
			Silver	- -	- -	- -	--	- -	Dermal	2.7E-04	--	1.1E-03	1E-03
			Thallium	- -	- -	- -	--	- -	Hair	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Hematologic	4.7E-04	--	5.1E-03	6E-03
			Zinc	- -	- -	- -	--	- -	Hematologic	2.8E-04	--	4.7E-05	3E-04
			Chemical Total	3.9E-07	- -	6.6E-07	--	1E-06		3.7E-02	--	1.3E-01	2E-01
		Exposure Point Total						1E-06					2E-01
	Exposure Medium Total							1E-06					2E-01
	Air - Trench	Inside Landfill	1,3-Dichlorobenzene	- -	1.1E-08	- -	--	1E-08	Hepatic	--	5.7E-05	--	6E-05
			1,4-Dichlorobenzene	- -	2.6E-08	- -	--	3E-08	Hepatic	--	1.4E-04	--	1E-04
			Benzene	- -	2.2E-08	- -	--	2E-08	Immune	--	2.5E-03	--	2E-03
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic, Urinary	--	6.1E-03	--	6E-03
			Trichloroethene	- -	1.3E-08	- -	--	1E-08	CVS, Immune, Developmental	--	1.1E-01	--	1E-01
			1,4-Dioxane	- -	5.9E-08	- -	--	6E-08	Respiratory	--	1.1E-03	--	1E-03
			Benzo(a)anthracene	- -	6.8E-09	- -	--	7E-09	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Inside Landfill	Dibenzofuran	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	4.6E-08	- -	--	5E-08	Respiratory, Nervous	--	3.2E-02	--	3E-02
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	4.3E-05	- -	--	4E-05	Reproductive, Developmental, Endocrine	--	2.0E+00	--	2E+00
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDE	- -	2.2E-09	- -	--	2E-09	NA	--	--	--	--
			Aldrin	- -	9.3E-08	- -	--	9E-08	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	4.5E-09	- -	--	4E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	5.9E-10	- -	--	6E-10	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	7.8E-06	- -	--	8E-06	Reproductive, Developmental, Endocrine	--	3.6E-01	--	4E-01
			Nondioxin-Like PCBs	- -	1.1E-05	- -	--	1E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	2.9E+01	--	3E+01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	6.2E-05	- -	--	6E-05		- -	3.1E+01	- -	3E+01
		Exposure Point Total						6E-05					3E+01
	Exposure Medium Total							6E-05					3E+01
Medium Total								6E-05					3E+01
Receptor Total							Receptor Risk Total	6E-05				Receptor HI Total	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	2E-02
Total Body Weight HI	8E-04
Total Nervous HI	1E-01
Total CVS HI	1E-01
Total Developmental HI	2E+00
Total Endocrine HI	3E+01
Total GS HI	5E-03
Total Immune HI	1E-01
Total Hepatic HI	7E-03
Total Reproductive HI	2E+00
Total Respiratory HI	3E-02
Total Dermal HI	7E-03
Total Thyroid HI	6E-04
Total Urinary HI	2E-02
Total Whole Body HI	1E-02
Total None Specified HI	3E-03

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	2.9E-11	- -	2.6E-09	- -	3E-09	Hepatic	8.3E-07	--	7.4E-05	8E-05
			1,4-Dichlorobenzene	7.2E-11	- -	5.1E-09	- -	5E-09	Hepatic	2.0E-06	--	1.4E-04	1E-04
			Benzene	6.2E-10	- -	1.2E-08	- -	1E-08	Immune	3.0E-05	--	5.9E-04	6E-04
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic	1.1E-04	--	4.6E-03	5E-03
			Trichloroethene	7.5E-10	- -	1.4E-08	- -	1E-08	CVS, Immune, Developmental	3.5E-04	--	6.2E-03	7E-03
			1,4-Dioxane	6.5E-08	- -	3.5E-08	- -	1E-07	Hepatic, Urinary	2.3E-04	--	1.2E-04	4E-04
			Benzo(a)anthracene	3.9E-10	- -	- -	- -	4E-10	NA	--	--	--	--
			Benzo(a)pyrene	5.9E-09	- -	- -	- -	6E-09	Developmental, Immune, Reproductive	2.1E-04	--	--	2E-04
			Benzo(b)fluoranthene	9.9E-10	- -	- -	- -	1E-09	NA	--	--	--	--
			Benzo(k)fluoranthene	3.7E-11	- -	- -	- -	4E-11	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.2E-09	- -	- -	- -	1E-09	Hepatic	4.6E-05	--	--	5E-05
			Dibenzo(a,h)anthracene	4.3E-10	- -	- -	- -	4E-10	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	Whole Body	5.6E-04	--	9.6E-02	1E-01
			Indeno(1,2,3-cd)pyrene	3.4E-10	- -	- -	- -	3E-10	NA	--	--	--	--
			Naphthalene	- -	- -	- -	- -	- -	Body Weight	4.1E-06	--	2.9E-04	3E-04
			Pentachlorophenol	5.4E-10	- -	2.2E-07	- -	2E-07	Hepatic	2.9E-06	--	1.2E-03	1E-03
			Phenanthrene	- -	- -	- -	- -	- -	Urinary	2.1E-05	--	5.9E-03	6E-03
			2,3,7,8-TCDD Equivalents	2.3E-06	- -	- -	- -	2E-06	Reproductive, Developmental, Endocrine	2.7E-01	--	--	3E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	Developmental	1.1E-03	--	--	1E-03
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	Developmental	2.0E-03	--	--	2E-03
			4,4'-DDD	1.7E-11	- -	1.7E-08	- -	2E-08	NA	--	--	--	--
			4,4'-DDE	1.3E-10	- -	- -	- -	1E-10	NA	--	--	--	--
			Aldrin	5.7E-09	- -	- -	- -	6E-09	Hepatic	1.2E-04	--	--	1E-04
			beta-BHC	5.3E-10	- -	4.1E-08	- -	4E-08	NA	--	--	--	--
			delta-BHC	1.5E-09	- -	1.1E-07	- -	1E-07	Hepatic	3.2E-07	--	2.4E-05	2E-05
			Dieldrin	2.5E-09	- -	4.8E-07	- -	5E-07	Hepatic	3.3E-05	--	6.3E-03	6E-03
			Heptachlor	1.6E-10	- -	1.2E-07	- -	1E-07	Hepatic	7.4E-07	--	5.7E-04	6E-04
			Heptachlor Epoxide	5.8E-11	- -	7.5E-09	- -	8E-09	Hepatic	5.2E-06	--	6.7E-04	7E-04
			gamma-BHC (Lindane)	3.4E-10	- -	2.6E-08	- -	3E-08	Hepatic, Urinary	1.1E-05	--	8.4E-04	9E-04
			Dioxin-Like PCBs	2.3E-07	- -	- -	- -	2E-07	Reproductive, Developmental, Endocrine	2.7E-02	--	--	3E-02
			Nondioxin-Like PCBs	3.7E-07	- -	- -	- -	4E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	8.6E-04	--	1.2E-03	2E-03
			Antimony	- -	- -	- -	- -	- -	Hematologic	5.2E-03	--	4.9E-02	5E-02
			Arsenic	2.7E-07	- -	3.8E-07	- -	6E-07	CVS, Dermal	6.3E-03	--	8.9E-03	2E-02
			Barium	- -	- -	- -	- -	- -	Urinary	4.6E-04	--	9.2E-03	1E-02
			Beryllium	- -	- -	- -	- -	- -	GS	3.0E-04	--	6.0E-02	6E-02
			Boron	- -	- -	- -	- -	- -	Developmental	8.8E-04	--	1.2E-03	2E-03
			Cadmium	- -	- -	- -	- -	- -	Urinary	3.3E-03	--	9.3E-02	1E-01
			Chromium	5.3E-07	- -	3.0E-05	- -	3E-05	None Specified	3.8E-03	--	2.1E-01	2E-01
			Cobalt	- -	- -	- -	- -	- -	Thyroid	3.2E-03	--	1.8E-03	5E-03
			Copper	- -	- -	- -	- -	- -	GS	5.3E-04	--	7.4E-04	1E-03
			Cyanide	- -	- -	- -	- -	- -	Reproductive	1.4E-02	--	1.4E-02	3E-02
			Iron	- -	- -	- -	- -	- -	GS	5.7E-03	--	8.0E-03	1E-02
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	1.5E-02	--	5.1E-01	5E-01
			Mercury	- -	- -	- -	- -	- -	Developmental, Nervous	6.2E-03	--	8.7E-03	1E-02
			Nickel	- -	- -	- -	- -	- -	Body Weight	5.0E-04	--	3.5E-03	4E-03
			Silver	- -	- -	- -	- -	- -	Dermal	3.9E-04	--	8.3E-03	9E-03
			Thallium	- -	- -	- -	- -	- -	Hair	2.2E-02	--	3.1E-02	5E-02
			Vanadium	- -	- -	- -	- -	- -	Dermal	1.4E-03	--	7.4E-02	8E-02
			Zinc	- -	- -	- -	- -	- -	Immune, Hematologic	4.1E-04	--	3.4E-04	8E-04
			Chemical Total	3.8E-06	- -	3.2E-05	- -	4E-05		3.9E-01	--	1.2E+00	2E+00
		Exposure Point Total						4E-05					2E+00
	Exposure Medium Total							4E-05					2E+00

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Inside Landfill	1,3-Dichlorobenzene	- -	7.1E-08	- -	- -	7E-08	Hepatic	--	8.5E-05	--	9E-05
			1,4-Dichlorobenzene	- -	1.7E-07	- -	- -	2E-07	Hepatic	--	2.1E-04	--	2E-04
			Benzene	- -	1.4E-07	- -	- -	1E-07	Immune	--	6.5E-03	--	7E-03
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic, Urinary	--	6.1E-02	--	6E-02
			Trichloroethene	- -	8.4E-08	- -	- -	8E-08	CVS, Immune, Developmental	--	1.1E-01	--	1E-01
			1,4-Dioxane	- -	3.9E-07	- -	- -	4E-07	Nervous, Respiratory	--	2.7E-02	--	3E-02
			Benzo(a)anthracene	- -	4.5E-08	- -	- -	4E-08	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	- -	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Naphthalene	- -	3.0E-07	- -	- -	3E-07	Nervous, Respiratory	--	3.2E-02	--	3E-02
			Pentachlorophenol	- -	- -	- -	- -	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.8E-04	- -	- -	3E-04	Reproductive, Developmental, Endocrine	--	2.0E+00	--	2E+00
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDE	- -	1.5E-08	- -	- -	1E-08	NA	--	--	--	--
			Aldrin	- -	6.1E-07	- -	- -	6E-07	NA	--	--	--	--
			beta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	- -	- -	NA	--	--	--	--
			Heptachlor	- -	2.9E-08	- -	- -	3E-08	NA	--	--	--	--
			Heptachlor Epoxide	- -	3.9E-09	- -	- -	4E-09	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	5.1E-05	- -	- -	5E-05	Reproductive, Developmental, Endocrine	--	3.6E-01	--	4E-01
			Nondioxin-Like PCBs	- -	7.2E-05	- -	- -	7E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	- -	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	- -	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	- -	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	- -	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	- -	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	2.9E+01	--	3E+01
			Iron	- -	- -	- -	- -	- -	NA	--	--	--	--
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	- -	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	- -	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	- -	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	- -	- -	NA	--	--	--	--
			Chemical Total	- -	4.1E-04	- -	- -	4E-04		- -	3.1E+01	- -	3E+01
		Exposure Point Total						4E-04					3E+01
	Exposure Medium Total							4E-04					3E+01
Medium Total								4E-04					3E+01

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Irrigation	Inside Landfill	1,3-Dichlorobenzene	- -	1.9E-09	- -	- -	2E-09	Hepatic	--	2.2E-06	--	2E-06
			1,4-Dichlorobenzene	- -	4.5E-09	- -	- -	5E-09	Hepatic	--	5.4E-06	--	5E-06
			Benzene	- -	3.1E-09	- -	- -	3E-09	Immune	--	1.4E-04	--	1E-04
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic, Urinary	--	1.5E-03	--	1E-03
			Trichloroethene	- -	2.5E-09	- -	- -	3E-09	CVS, Immune, Developmental	--	3.2E-03	--	3E-03
			1,4-Dioxane	- -	6.1E-10	- -	- -	6E-10	Nervous, Respiratory	--	4.3E-05	--	4E-05
			Benzo(a)anthracene	- -	1.1E-09	- -	- -	1E-09	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	- -	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Naphthalene	- -	5.9E-09	- -	- -	6E-09	Nervous, Respiratory	--	6.1E-04	--	6E-04
			Pentachlorophenol	- -	- -	- -	- -	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	7.9E-06	- -	- -	8E-06	Reproductive, Developmental, Endocrine	--	5.5E-02	--	5E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDE	- -	4.1E-10	- -	- -	4E-10	NA	--	--	--	--
			Aldrin	- -	1.8E-08	- -	- -	2E-08	NA	--	--	--	--
			beta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	- -	- -	NA	--	--	--	--
			Heptachlor	- -	9.2E-10	- -	- -	9E-10	NA	--	--	--	--
			Heptachlor Epoxide	- -	1.2E-10	- -	- -	1E-10	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	1.5E-06	- -	- -	1E-06	Reproductive, Developmental, Endocrine	--	1.0E-02	--	1E-02
			Nondioxin-Like PCBs	- -	2.1E-06	- -	- -	2E-06	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	- -	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	- -	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	- -	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	- -	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	- -	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	4.3E-01	--	4E-01
			Iron	- -	- -	- -	- -	- -	NA	--	--	--	--
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	- -	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	- -	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	- -	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	- -	- -	NA	--	--	--	--
			Chemical Total	- -	1.1E-05	- -	- -	1E-05		- -	5.0E-01	- -	5E-01
		Exposure Point Total						1E-05					5E-01
	Exposure Medium Total							1E-05					5E-01
Medium Total								1E-05					5E-01

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Showering	Inside Landfill	1,3-Dichlorobenzene	- -	2.7E-09	- -	- -	3E-09	Hepatic	--	3.3E-06	--	3E-06
			1,4-Dichlorobenzene	- -	6.6E-09	- -	- -	7E-09	Hepatic	--	7.9E-06	--	8E-06
			Benzene	- -	5.6E-09	- -	- -	6E-09	Immune	--	2.5E-04	--	3E-04
			Chlorobenzene	- -	- -	- -	- -	- -	Hepatic, Urinary	--	2.4E-03	--	2E-03
			Trichloroethene	- -	3.4E-09	- -	- -	3E-09	CVS, Immune, Developmental	--	4.4E-03	--	4E-03
			1,4-Dioxane	- -	4.1E-09	- -	- -	4E-09	Nervous, Respiratory	--	2.9E-04	--	3E-04
			Benzo(a)anthracene	- -	4.5E-10	- -	- -	4E-10	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	- -	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	- -	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			Naphthalene	- -	9.0E-09	- -	- -	9E-09	Nervous, Respiratory	--	9.4E-04	--	9E-04
			Pentachlorophenol	- -	- -	- -	- -	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	- -	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	3.9E-06	- -	- -	4E-06	Reproductive, Developmental, Endocrine	--	2.7E-02	--	3E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	- -	- -	NA	--	--	--	--
			4,4'-DDE	- -	1.9E-10	- -	- -	2E-10	NA	--	--	--	--
			Aldrin	- -	8.0E-09	- -	- -	8E-09	NA	--	--	--	--
			beta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	- -	- -	NA	--	--	--	--
			Heptachlor	- -	7.8E-10	- -	- -	8E-10	NA	--	--	--	--
			Heptachlor Epoxide	- -	4.1E-11	- -	- -	4E-11	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	- -	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	1.5E-06	- -	- -	2E-06	Reproductive, Developmental, Endocrine	--	1.1E-02	--	1E-02
			Nondioxin-Like PCBs	- -	2.1E-06	- -	- -	2E-06	NA	--	--	--	--
			Aluminum	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	- -	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	- -	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	- -	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	- -	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	- -	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	1.1E+00	--	1E+00
			Iron	- -	- -	- -	- -	- -	NA	--	--	--	--
			Lead	- -	- -	- -	- -	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	- -	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	- -	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	- -	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	- -	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	- -	- -	NA	--	--	--	--
			Chemical Total	- -	7.6E-06	- -	- -	8E-06		- -	1.1E+00	- -	1E+00
		Exposure Point Total						8E-06					1E+00
	Exposure Medium Total							8E-06					1E+00
Medium Total								8E-06					1E+00
Receptor Total							Receptor Risk Total	5E-04				Receptor HI Total	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Hematologic HI	5E-02
Total Body Weight HI	4E-03
Total Nervous HI	6E-01
Total CVS HI	1E-01
Total Developmental HI	3E+00
Total Endocrine HI	3E+01
Total GS HI	8E-02
Total Hair HI	5E-02
Total Immune HI	1E-01
Total Hepatic HI	8E-02
Total Reproductive HI	3E+00
Total Respiratory HI	6E-02
Total Dermal HI	1E-01
Total Thyroid HI	5E-03
Total Urinary HI	2E-01
Total Whole Body HI	1E-01
Total None Specified HI	2E-01

TABLE 9.3.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	3.4E-09	- -	3.8E-09	--	7E-09	Hepatic	2.1E-04	--	2.3E-04	4E-04
			1,4-Dichlorobenzene	8.4E-09	- -	7.2E-09	--	2E-08	Hepatic	5.2E-04	--	4.4E-04	1E-03
			Benzene	7.3E-08	- -	1.3E-08	--	9E-08	Immune	7.7E-03	--	1.4E-03	9E-03
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic	2.9E-02	--	1.2E-02	4E-02
			Trichloroethene (Kidney)	1.4E-07	- -	2.7E-08	--	2E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	7.0E-08	- -	1.4E-08	--	8E-08	CVS, Immune, Developmental	8.8E-02	--	1.7E-02	1E-01
			1,4-Dioxane	7.6E-06	- -	3.2E-08	--	8E-06	Hepatic, Urinary	5.9E-02	--	2.5E-04	6E-02
			Benzo(a)anthracene	3.5E-07	- -	- -	--	4E-07	NA	--	--	--	--
			Benzo(a)pyrene	5.2E-06	- -	- -	--	5E-06	Developmental, Immune, Reproductive	5.3E-02	--	--	5E-02
			Benzo(b)fluoranthene	8.8E-07	- -	- -	--	9E-07	NA	--	--	--	--
			Benzo(k)fluoranthene	3.3E-08	- -	- -	--	3E-08	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.4E-07	- -	- -	--	1E-07	Hepatic	1.2E-02	--	--	1E-02
			Dibenzo(a,h)anthracene	3.9E-07	- -	- -	--	4E-07	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	--	- -	Whole Body	1.4E-01	--	3.0E-01	4E-01
			Indeno(1,2,3-cd)pyrene	3.0E-07	- -	- -	--	3E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	1.1E-03	--	8.2E-04	2E-03
			Pentachlorophenol	6.3E-08	- -	2.9E-07	--	4E-07	Hepatic	7.3E-04	--	3.4E-03	4E-03
			Phenanthrene	- -	- -	- -	--	- -	Urinary	5.3E-03	--	1.8E-02	2E-02
			2,3,7,8-TCDD Equivalents	2.7E-04	- -	- -	--	3E-04	Reproductive, Developmental, Endocrine	6.9E+01	--	--	7E+01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	2.8E-01	--	--	3E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	5.0E-01	--	--	5E-01
			4,4'-DDD	2.0E-09	- -	2.3E-08	--	2E-08	NA	--	--	--	--
			4,4'-DDE	1.5E-08	- -	- -	--	2E-08	NA	--	--	--	--
			Aldrin	6.6E-07	- -	- -	--	7E-07	Hepatic	3.0E-02	--	--	3E-02
			beta-BHC	6.2E-08	- -	5.5E-08	--	1E-07	NA	--	--	--	--
			delta-BHC	1.8E-07	- -	1.5E-07	--	3E-07	Hepatic	8.2E-05	--	7.0E-05	2E-04
			Dieldrin	2.9E-07	- -	6.4E-07	--	9E-07	Hepatic	8.5E-03	--	1.9E-02	3E-02
			Heptachlor	1.8E-08	- -	1.7E-07	--	2E-07	Hepatic	1.9E-04	--	1.7E-03	2E-03
			Heptachlor Epoxide	6.8E-09	- -	1.0E-08	--	2E-08	Hepatic	1.3E-03	--	2.0E-03	3E-03
			gamma-BHC (Lindane)	4.0E-08	- -	3.5E-08	--	8E-08	Hepatic, Urinary	2.8E-03	--	0.002	5E-03
			Dioxin-Like PCBs	2.7E-05	- -	- -	--	3E-05	Reproductive, Developmental, Endocrine	6.9E+00	--	--	7E+00
			Nondioxin-Like PCBs	4.4E-05	- -	- -	--	4E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	2.2E-01	--	1.0E-03	2E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	1.3E+00	--	4.2E-02	1E+00
			Arsenic	3.1E-05	- -	1.5E-07	--	3E-05	CVS, Dermal	1.6E+00	--	7.5E-03	2E+00
			Barium	- -	- -	- -	--	- -	Urinary	1.2E-01	--	7.8E-03	1E-01
			Beryllium	- -	- -	- -	--	- -	GS	7.7E-02	--	5.1E-02	1E-01
			Boron	- -	- -	- -	--	- -	Developmental	2.3E-01	--	1.1E-03	2E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	8.4E-01	--	7.9E-02	9E-01
			Chromium	4.8E-04	- -	8.9E-05	--	6E-04	None Specified	9.7E-01	--	1.8E-01	1E+00
			Cobalt	- -	- -	- -	--	- -	Thyroid	8.1E-01	--	1.5E-03	8E-01
			Copper	- -	- -	- -	--	- -	GS	1.3E-01	--	6.3E-04	1E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	3.5E+00	--	1.6E-02	3E+00
			Iron	- -	- -	- -	--	- -	GS	1.5E+00	--	6.8E-03	1E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	3.7E+00	--	4.3E-01	4E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	1.6E+00	--	7.4E-03	2E+00
			Nickel	- -	- -	- -	--	- -	Body Weight	1.3E-01	--	3.0E-03	1E-01
			Silver	- -	- -	- -	--	- -	Dermal	1.0E-01	--	7.1E-03	1E-01
			Thallium	- -	- -	- -	--	- -	Hair	5.6E+00	--	2.6E-02	6E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	3.5E-01	--	6.3E-02	4E-01
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	1.0E-01	--	2.9E-04	1E-01
			Chemical Total	8.6E-04	- -	9.1E-05	--	1E-03		1.0E+02	--	1.3E+00	1E+02
		Exposure Point Total						1E-03					1E+02
	Exposure Medium Total							1E-03					1E+02
Medium Total								1E-03					1E+02
Receptor Total							Receptor Risk Total	1E-03				Receptor HI Total	1E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Hematologic HI	1E+00
Total Body Weight HI	1E-01
Total Nervous HI	6E+00
Total CVS HI	2E+00
Total Developmental HI	8E+01
Total Endocrine HI	8E+01
Total GS HI	2E+00
Total Hair HI	6E+00
Total Immune HI	3E-01
Total Hepatic HI	2E-01
Total Reproductive HI	8E+01
Total Dermal HI	2E+00
Total Thyroid HI	8E-01
Total Urinary HI	1E+00
Total Whole Body HI	4E-01
Total None Specified HI	1E+00

TABLE 9.4.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	5.1E-09	- -	5.1E-09	--	1E-08	Hepatic	1.1E-04	--	1.0E-04	2E-04
			1,4-Dichlorobenzene	1.3E-08	- -	9.7E-09	--	2E-08	Hepatic	2.6E-04	--	2.0E-04	5E-04
			Benzene	1.1E-07	- -	1.7E-08	--	1E-07	Immune	3.8E-03	--	5.9E-04	4E-03
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic	1.5E-02	--	5.5E-03	2E-02
			Trichloroethene (Kidney)	3.8E-08	- -	6.7E-09	--	4E-08	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.1E-07	- -	1.8E-08	--	1E-07	CVS, Immune, Developmental	4.4E-02	--	7.7E-03	5E-02
			1,4-Dioxane	1.1E-05	- -	4.9E-08	--	1E-05	Hepatic, Urinary	2.9E-02	--	1.3E-04	3E-02
			Benzo(a)anthracene	9.9E-08	- -	- -	--	1E-07	NA	--	--	--	--
			Benzo(a)pyrene	1.5E-06	- -	- -	--	1E-06	Developmental, Immune, Reproductive	2.7E-02	--	--	3E-02
			Benzo(b)fluoranthene	2.5E-07	- -	- -	--	3E-07	NA	--	--	--	--
			Benzo(k)fluoranthene	9.5E-09	- -	- -	--	9E-09	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	2.1E-07	- -	- -	--	2E-07	Hepatic	5.9E-03	--	--	6E-03
			Dibenzo(a,h)anthracene	1.1E-07	- -	- -	--	1E-07	NA	--	--	--	--
			Dibenzofuran	- -	- -	- -	--	- -	Whole Body	7.1E-02	--	1.4E-01	2E-01
			Indeno(1,2,3-cd)pyrene	8.6E-08	- -	- -	--	9E-08	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	5.3E-04	--	3.8E-04	9E-04
			Pentachlorophenol	9.4E-08	- -	4.4E-07	--	5E-07	Hepatic	3.7E-04	--	1.7E-03	2E-03
			Phenanthrene	- -	- -	- -	--	- -	Urinary	2.6E-03	--	8.7E-03	1E-02
			2,3,7,8-TCDD Equivalents	4.0E-04	- -	- -	--	4E-04	Reproductive, Developmental, Endocrine	3.4E+01	--	--	3E+01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.4E-01	--	--	1E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	2.5E-01	--	--	3E-01
			4,4'-DDD	3.0E-09	- -	3.4E-08	--	4E-08	NA	--	--	--	--
			4,4'-DDE	2.3E-08	- -	- -	--	2E-08	NA	--	--	--	--
			Aldrin	9.9E-07	- -	- -	--	1E-06	Hepatic	1.5E-02	--	--	2E-02
			beta-BHC	9.3E-08	- -	8.3E-08	--	2E-07	NA	--	--	--	--
			delta-BHC	2.6E-07	- -	2.3E-07	--	5E-07	Hepatic	4.1E-05	--	3.5E-05	8E-05
			Dieldrin	4.4E-07	- -	9.7E-07	--	1E-06	Hepatic	4.2E-03	--	9.4E-03	1E-02
			Heptachlor	2.7E-08	- -	2.4E-07	--	3E-07	Hepatic	9.4E-05	--	8.4E-04	9E-04
			Heptachlor Epoxide	1.0E-08	- -	1.5E-08	--	3E-08	Hepatic	6.7E-04	--	1.0E-03	2E-03
			gamma-BHC (Lindane)	6.0E-08	- -	5.3E-08	--	1E-07	Hepatic, Urinary	1.4E-03	--	1.3E-03	3E-03
			Dioxin-Like PCBs	4.0E-05	- -	- -	--	4E-05	Reproductive, Developmental, Endocrine	3.4E+00	--	--	3E+00
			Nondioxin-Like PCBs	6.5E-05	- -	- -	--	7E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	1.1E-01	--	4.5E-04	1E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	6.7E-01	--	1.8E-02	7E-01
			Arsenic	4.7E-05	- -	1.9E-07	--	5E-05	CVS, Dermal	8.1E-01	--	3.3E-03	8E-01
			Barium	- -	- -	- -	--	- -	Urinary	5.9E-02	--	3.4E-03	6E-02
			Beryllium	- -	- -	- -	--	- -	GS	3.8E-02	--	2.2E-02	6E-02
			Boron	- -	- -	- -	--	- -	Developmental	1.1E-01	--	4.6E-04	1E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	4.2E-01	--	3.4E-02	5E-01
			Chromium	1.3E-04	- -	2.2E-05	--	2E-04	None Specified	4.8E-01	--	7.9E-02	6E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	4.0E-01	--	6.6E-04	4E-01
			Copper	- -	- -	- -	--	- -	GS	6.7E-02	--	2.8E-04	7E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.7E+00	--	5.3E-03	2E+00
			Iron	- -	- -	- -	--	- -	GS	7.3E-01	--	3.0E-03	7E-01
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	1.9E+00	--	1.9E-01	2E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	7.9E-01	--	3.2E-03	8E-01
			Nickel	- -	- -	- -	--	- -	Body Weight	6.3E-02	--	1.3E-03	6E-02
			Silver	- -	- -	- -	--	- -	Dermal	5.1E-02	--	3.1E-03	5E-02
			Thallium	- -	- -	- -	--	- -	Hair	2.8E+00	--	1.1E-02	3E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	1.7E-01	--	2.7E-02	2E-01
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	5.2E-02	--	1.3E-04	5E-02
			Chemical Total	7.0E-04	- -	2.4E-05	--	7E-04		5.0E+01	--	5.9E-01	5E+01
		Exposure Point Total						7E-04					5E+01
	Exposure Medium Total							7E-04					5E+01
	Air-Shower	Inside Landfill	1,3-Dichlorobenzene	- -	3.9E-09	- -	--	4E-09	Hepatic	--	3.5E-06	--	3E-06
			1,4-Dichlorobenzene	- -	9.6E-09	- -	--	1E-08	Hepatic	--	8.5E-06	--	8E-06
			Benzene	- -	8.1E-09	- -	--	8E-09	Immune	--	2.7E-04	--	3E-04
			Chlorobenzene	- -	- -	- -	--	- -	Hepatic, Urinary	--	2.5E-03	--	3E-03
			Trichloroethene (Kidney)	- -	1.7E-09	- -	--	2E-09	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	3.7E-09	- -	--	4E-09	CVS, Immune, Developmental	--	4.7E-03	--	5E-03
			1,4-Dioxane	- -	6.0E-09	- -	--	6E-09	Nervous, Respiratory	--	3.1E-04	--	3E-04
			Benzo(a)anthracene	- -	9.5E-10	- -	--	9E-10	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(k)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--

TABLE 9.4.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Inside Landfill	Dibenzofuran	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	1.3E-08	- -	--	1E-08	Nervous, Respiratory	--	1.0E-03	--	1E-03
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			Phenanthrene	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	5.7E-06	- -	--	6E-06	Reproductive, Developmental, Endocrine	--	2.9E-02	--	3E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDD	- -	- -	- -	--	- -	NA	--	--	--	--
			4,4'-DDE	- -	2.8E-10	- -	--	3E-10	NA	--	--	--	--
			Aldrin	- -	1.2E-08	- -	--	1E-08	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	1.1E-09	- -	--	1E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	6.0E-11	- -	--	6E-11	NA	--	--	--	--
			gamma-BHC (Lindane)	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	2.2E-06	- -	--	2E-06	Reproductive, Developmental, Endocrine	--	1.1E-02	--	1E-02
			Nondioxin-Like PCBs	- -	3.1E-06	- -	--	3E-06	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.2E+00	--	1E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Nickel	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	1.1E-05	- -	--	1E-05		- -	1.2E+00	- -	1E+00
		Exposure Point Total						1E-05					1E+00
	Exposure Medium Total							1E-05					1E+00
Medium Total								7E-04					5E+01
Receptor Total							Receptor Risk Total	7E-04				Receptor HI Total	5E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	7E-01
Total Body Weight HI	7E-02
Total Nervous HI	3E+00
Total CVS HI	9E-01
Total Developmental HI	4E+01
Total Endocrine HI	4E+01
Total GS HI	9E-01
Total Hair HI	3E+00
Total Immune HI	1E-01
Total Hepatic HI	9E-02
Total Reproductive HI	4E+01
Total Respiratory HI	1E-03
Total Dermal HI	1E+00
Total Thyroid HI	4E-01
Total Urinary HI	6E-01
Total Whole Body HI	2E-01
Total None Specified HI	6E-01

TABLE 9.5.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,3-Dichlorobenzene	8.6E-09	- -	8.8E-09	--	2E-08					
			1,4-Dichlorobenzene	2.1E-08	- -	1.7E-08	--	4E-08					
			Benzene	1.8E-07	- -	3.0E-08	--	2E-07					
			Chlorobenzene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	1.7E-07	- -	3.3E-08	--	2E-07					
			Trichloroethene (Non-Kidney)	1.8E-07	- -	3.2E-08	--	2E-07					
			1,4-Dioxane	1.9E-05	- -	8.1E-08	--	2E-05					
			Benzo(a)anthracene	4.5E-07	- -	- -	--	4E-07					
			Benzo(a)pyrene	6.7E-06	- -	- -	--	7E-06					
			Benzo(b)fluoranthene	1.1E-06	- -	- -	--	1E-06					
			Benzo(k)fluoranthene	4.3E-08	- -	- -	--	4E-08					
			Bis(2-ethylhexyl)phthalate	3.5E-07	- -	- -	--	4E-07					
			Dibenzo(a,h)anthracene	4.9E-07	- -	- -	--	5E-07					
			Dibenzofuran	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	3.9E-07	- -	- -	--	4E-07					
			Naphthalene	- -	- -	- -	--	- -					
			Pentachlorophenol	1.6E-07	- -	7.3E-07	--	9E-07					
			Phenanthrene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	6.7E-04	- -	- -	--	7E-04					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			4,4'-DDD	4.9E-09	- -	5.7E-08	--	6E-08					
			4,4'-DDE	3.9E-08	- -	- -	--	4E-08					
			Aldrin	1.6E-06	- -	- -	--	2E-06					
			beta-BHC	1.6E-07	- -	1.4E-07	--	3E-07					
			delta-BHC	4.4E-07	- -	3.8E-07	--	8E-07					
			Dieldrin	7.3E-07	- -	1.6E-06	--	2E-06					
			Heptachlor	4.5E-08	- -	4.1E-07	--	5E-07					
			Heptachlor Epoxide	1.7E-08	- -	2.5E-08	--	4E-08					
			gamma-BHC (Lindane)	1.0E-07	- -	8.8E-08	--	2E-07					
			Dioxin-Like PCBs	6.7E-05	- -	- -	--	7E-05					
			Nondioxin-Like PCBs	1.1E-04	- -	- -	--	1E-04					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	7.8E-05	- -	3.4E-07	--	8E-05					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	6.1E-04	- -	1.1E-04	--	7E-04					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Nickel	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	1.6E-03	- -	1.2E-04	--	2E-03					
		Exposure Point Total						2E-03					
	Exposure Medium Total							2E-03					
	Air-Shower	Inside Landfill	1,3-Dichlorobenzene	- -	3.9E-09	- -	--	4E-09					
			1,4-Dichlorobenzene	- -	9.6E-09	- -	--	1E-08					
			Benzene	- -	8.1E-09	- -	--	8E-09					
			Chlorobenzene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	- -	1.7E-09	- -	--	2E-09					
			Trichloroethene (Non-Kidney)	- -	3.7E-09	- -	--	4E-09					
			1,4-Dioxane	- -	6.0E-09	- -	--	6E-09					
			Benzo(a)anthracene	- -	9.5E-10	- -	--	9E-10					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Benzo(b)fluoranthene	- -	- -	- -	--	- -					
			Benzo(k)fluoranthene	- -	- -	- -	--	- -					
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					

TABLE 9.5.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Inside Landfill	Dibenzofuran	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -					
			Naphthalene	- -	1.3E-08	- -	--	1E-08					
			Pentachlorophenol	- -	- -	- -	--	- -					
			Phenanthrene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	5.7E-06	- -	--	6E-06					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			4,4'-DDD	- -	- -	- -	--	- -					
			4,4'-DDE	- -	2.8E-10	- -	--	3E-10					
			Aldrin	- -	1.2E-08	- -	--	1E-08					
			beta-BHC	- -	- -	- -	--	- -					
			delta-BHC	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			Heptachlor	- -	1.1E-09	- -	--	1E-09					
			Heptachlor Epoxide	- -	6.0E-11	- -	--	6E-11					
			gamma-BHC (Lindane)	- -	- -	- -	--	- -					
			Dioxin-Like PCBs	- -	2.2E-06	- -	--	2E-06					
			Nondioxin-Like PCBs	- -	3.1E-06	- -	--	3E-06					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Nickel	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	- -	1.1E-05	- -	--	1E-05					
		Exposure Point Total						1E-05					
	Exposure Medium Total							1E-05					
Medium Total								2E-03					
Receptor Total							Receptor Risk Total	2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	5.0E-12	- -	9.1E-12	--	1E-11	Hepatic	1.5E-06	--	2.8E-06	4E-06
			1,2-Dibromo-3-Chloropropane	1.4E-10	- -	5.4E-10	--	7E-10	Reproductive	5.9E-06	--	2.3E-05	3E-05
			1,2-Dichloroethane	7.3E-11	- -	1.0E-10	--	2E-10	Urinary	2.8E-06	--	3.9E-06	7E-06
			1,4-Dichlorobenzene	3.6E-12	- -	5.8E-11	--	6E-11	Hepatic	6.8E-07	--	1.1E-05	1E-05
			2-Hexanone	- -	- -	- -	--	- -	Nervous	5.8E-05	--	6.8E-05	1E-04
			Benzene	2.3E-10	- -	1.1E-09	--	1E-09	Hematologic	3.0E-05	--	1.4E-04	2E-04
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	1.4E-04	--	5.0E-04	6E-04
			Ethylbenzene	3.6E-11	- -	5.3E-10	--	6E-10	Hepatic	2.3E-06	--	3.4E-05	4E-05
			m+p-Xylenes	- -	- -	- -	--	- -	Whole Body	3.3E-06	--	5.1E-05	5E-05
			Trichloroethene	2.1E-10	- -	8.6E-10	--	1E-09	Immune, Developmental	--	--	--	--
			Vinyl Chloride	2.2E-09	- -	5.8E-09	--	8E-09	Hepatic	7.2E-05	--	1.9E-04	3E-04
			1,4-Dioxane	4.2E-09	- -	4.5E-10	--	5E-09	Hepatic	5.8E-06	--	6.3E-07	6E-06
			2,6-Dinitrotoluene	9.5E-09	- -	1.5E-08	--	2E-08	Hematologic	1.1E-04	--	1.8E-04	3E-04
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	1.2E-04	--	3.6E-03	4E-03
			Benzo(a)anthracene	1.9E-11	- -	- -	--	2E-11	NA	--	--	--	--
			Benzo(a)pyrene	8.8E-11	- -	- -	--	9E-11	Developmental, Immune, Reproductive	2.1E-05	--	--	2E-05
			Bis(2-Chloroethyl)Ether	9.7E-10	- -	6.5E-10	--	2E-09	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Nervous	6.8E-07	--	1.0E-05	1E-05
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.8E-04	--	--	5E-04
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.7E-04	--	--	2E-04
			Pentachlorophenol	1.4E-10	- -	1.2E-08	--	1E-08	Hepatic	5.0E-06	--	4.1E-04	4E-04
			2,3,7,8-TCDD Equivalents	3.1E-10	- -	- -	--	3E-10	Immune	8.2E-06	--	--	8E-06
			Aldrin	1.4E-11	- -	- -	--	1E-11	Urinary	1.4E-06	--	--	1E-06
			beta-BHC	4.8E-11	- -	7.3E-10	--	8E-10	NA	--	--	--	--
			Dieldrin	2.0E-10	- -	7.7E-09	--	8E-09	Nervous	8.7E-06	--	3.4E-04	3E-04
			Heptachlor	3.6E-12	- -	5.8E-10	--	6E-10	Hepatic	1.1E-07	--	1.8E-05	2E-05
			Heptachlor Epoxide	6.3E-12	- -	1.7E-10	--	2E-10	Hepatic	3.8E-06	--	9.8E-05	1E-04
			Dioxin-Like PCBs	1.3E-10	- -	- -	--	1E-10	Immune	3.6E-06	--	--	4E-06
			Nondioxin-Like PCBs	6.3E-11	- -	- -	--	6E-11	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	4.1E-04	--	1.1E-04	5E-04
			Antimony	- -	- -	- -	--	- -	Whole Body	6.8E-04	--	1.3E-03	2E-03
			Arsenic	2.1E-08	- -	5.8E-09	--	3E-08	CVS, Dermal	3.2E-03	--	9.0E-04	4E-03
			Barium	- -	- -	- -	--	- -	Urinary	1.3E-04	--	5.3E-04	7E-04
			Boron	- -	- -	- -	--	- -	Developmental	1.9E-04	--	5.3E-05	2E-04
			Cadmium	- -	- -	- -	--	- -	Urinary	1.9E-04	--	1.1E-03	1E-03
			Chromium	2.9E-09	- -	3.3E-08	--	4E-08	Hematologic	8.3E-05	--	9.3E-04	1E-03
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.2E-04	--	2.5E-05	2E-04
			Copper	- -	- -	- -	--	- -	GS	2.9E-05	--	8.1E-06	4E-05
			Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	4.3E-05	--	1.2E-05	6E-05
			Iron	- -	- -	- -	--	- -	GS	2.9E-03	--	8.2E-04	4E-03
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	2.3E-02	--	1.6E-01	2E-01
			Mercury	- -	- -	- -	--	- -	Nervous	2.6E-09	--	7.2E-10	3E-09
			Silver	- -	- -	- -	--	- -	Dermal	2.6E-04	--	1.1E-03	1E-03
			Thallium	- -	- -	- -	--	- -	Hair	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Hematologic	5.7E-05	--	6.2E-04	7E-04
			Zinc	- -	- -	- -	--	- -	Hematologic	6.4E-06	--	1.1E-06	7E-06
			Chemical Total	4.2E-08	- -	8.5E-08	--	1E-07		3.3E-02	--	1.8E-01	2E-01
		Exposure Point Total						1E-07					2E-01
Exposure Medium Total								1E-07					2E-01
	Air - Trench	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	2.4E-09	- -	--	2E-09	Respiratory	--	5.3E-03	--	5E-03
			1,2-Dibromo-3-Chloropropane	- -	1.1E-06	- -	--	1E-06	Reproductive	--	6.1E-03	--	6E-03
			1,2-Dichloroethane	- -	4.3E-08	- -	--	4E-08	Nervous	--	1.6E-03	--	2E-03
			1,4-Dichlorobenzene	- -	1.3E-08	- -	--	1E-08	Hepatic	--	6.8E-05	--	7E-05
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	1.3E-02	--	1E-02
			Benzene	- -	7.9E-08	- -	--	8E-08	Immune	--	8.9E-03	--	9E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	1.7E-08	- -	--	2E-08	Ear	--	5.2E-05	--	5E-05
			m+p-Xylenes	- -	- -	- -	--	- -	CNS	--	6.8E-03	--	7E-03
			Trichloroethene	- -	3.4E-08	- -	--	3E-08	CVS, Immune, Developmental	--	--	--	--
			Vinyl Chloride	- -	3.6E-08	- -	--	4E-08	Hepatic	--	5.8E-03	--	6E-03
			1,4-Dioxane	- -	3.6E-08	- -	--	4E-08	Respiratory	--	7.1E-04	--	7E-04
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	3.2E-09	- -	--	3E-09	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	1.3E-07	- -	--	1E-07	NA	--	--	--	--
			Naphthalene	- -	3.3E-07	- -	--	3E-07	Respiratory, Nervous	--	2.3E-01	--	2E-01

TABLE 9.6.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Outside Landfill Shallow Wells	Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	5.5E-08	- -	--	5E-08	Reproductive, Developmental, Endocrine	--	2.5E-03	--	3E-03
			Aldrin	- -	2.2E-09	- -	--	2E-09	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	1.0E-09	- -	--	1E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	6.2E-10	- -	--	6E-10	NA	--	--	--	--
			Dioxin-Like PCBs	- -	4.4E-08	- -	--	4E-08	Reproductive, Developmental, Endocrine	--	2.0E-03	--	2E-03
			Nondioxin-Like PCBs	- -	1.7E-08	- -	--	2E-08	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	4.5E+00	--	4E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	1.9E-06	- -	--	2E-06		- -	5.1E+00	- -	5E+00
		Exposure Point Total						2E-06					5E+00
	Exposure Medium Total							2E-06					5E+00
Medium Total								2E-06					5E+00
Receptor Total							Receptor Risk Total	2E-06				Receptor HI Total	5E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	2E-03
Total Nervous HI	4E-01
Total CVS HI	3E-01
Total Developmental HI	3E-01
Total Ear HI	5E-05
Total Endocrine HI	4E+00
Total GS HI	4E-03
Total Immune HI	3E-01
Total Hepatic HI	7E-03
Total Reproductive HI	1E-02
Total Respiratory HI	2E-01
Total Dermal HI	5E-03
Total Thyroid HI	3E-04
Total Urinary HI	3E-03
Total Whole Body HI	2E-03

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	4.8E-11	- -	4.0E-10	--	4E-10	Immune, Hematologic	2.3E-06	--	1.9E-05	2E-05
			1,2-Dibromo-3-Chloropropane	1.3E-09	- -	2.5E-08	--	3E-08	Reproductive	8.6E-05	--	1.7E-03	2E-03
			1,2-Dichloroethane	7.1E-10	- -	4.4E-09	--	5E-09	Urinary	1.4E-05	--	8.5E-05	1E-04
			1,4-Dichlorobenzene	3.5E-11	- -	2.5E-09	--	3E-09	Hepatic	9.9E-07	--	7.0E-05	7E-05
			2-Hexanone	- -	- -	- -	--	- -	Nervous	8.4E-05	--	4.8E-04	6E-04
			Benzene	2.3E-09	- -	4.4E-08	--	5E-08	Immune	1.1E-04	--	2.1E-03	2E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	2.0E-03	--	3.1E-02	3E-02
			Ethylbenzene	3.4E-10	- -	2.2E-08	--	2E-08	Hepatic, Urinary	3.3E-06	--	2.2E-04	2E-04
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	9.8E-06	--	6.5E-04	7E-04
			Trichloroethene	2.0E-09	- -	3.6E-08	--	4E-08	CVS, Immune, Developmental	9.3E-04	--	1.7E-02	2E-02
			Vinyl Chloride	2.1E-08	- -	2.3E-07	--	3E-07	Hepatic	1.1E-04	--	1.1E-03	1E-03
			1,4-Dioxane	4.0E-08	- -	2.2E-08	--	6E-08	Hepatic, Urinary	1.4E-04	--	7.7E-05	2E-04
			2,6-Dinitrotoluene	9.1E-08	- -	7.3E-07	--	8E-07	Hepatic, Spleen	2.2E-03	--	1.7E-02	2E-02
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	1.7E-04	--	2.4E-02	2E-02
			Benzo(a)anthracene	1.8E-10	- -	- -	--	2E-10	NA	--	--	--	--
			Benzo(a)pyrene	8.5E-10	- -	- -	--	8E-10	Developmental, Immune, Reproductive	3.0E-05	--	--	3E-05
			Bis(2-Chloroethyl)Ether	9.3E-09	- -	3.1E-08	--	4E-08	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	3.0E-05	--	2.1E-03	2E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	6.9E-03	--	--	7E-03
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	9.8E-04	--	--	1E-03
			Pentachlorophenol	1.4E-09	- -	5.6E-07	--	6E-07	Hepatic	7.4E-06	--	3.0E-03	3E-03
			2,3,7,8-TCDD Equivalents	2.9E-09	- -	- -	--	3E-09	Reproductive, Developmental, Endocrine	3.4E-04	--	--	3E-04
			Aldrin	1.3E-10	- -	- -	--	1E-10	Hepatic	2.8E-06	--	--	3E-06
			beta-BHC	4.6E-10	- -	3.5E-08	--	4E-08	NA	--	--	--	--
			Dieldrin	1.9E-09	- -	3.7E-07	--	4E-07	Hepatic	2.6E-05	--	4.9E-03	5E-03
			Heptachlor	3.5E-11	- -	2.7E-08	--	3E-08	Hepatic	1.7E-07	--	1.3E-04	1E-04
			Heptachlor Epoxide	6.1E-11	- -	7.9E-09	--	8E-09	Hepatic	5.5E-06	--	7.1E-04	7E-04
			Dioxin-Like PCBs	1.3E-09	- -	- -	--	1E-09	Reproductive, Developmental, Endocrine	1.5E-04	--	--	2E-04
			Nondioxin-Like PCBs	6.0E-10	- -	- -	--	6E-10	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	5.9E-04	--	8.4E-04	1E-03
			Antimony	- -	- -	- -	--	- -	Hematologic	9.9E-04	--	9.3E-03	1E-02
			Arsenic	2.0E-07	- -	2.8E-07	--	5E-07	CVS, Dermal	4.7E-03	--	6.6E-03	1E-02
			Barium	- -	- -	- -	--	- -	Urinary	1.9E-04	--	3.9E-03	4E-03
			Boron	- -	- -	- -	--	- -	Developmental	2.8E-04	--	3.9E-04	7E-04
			Cadmium	- -	- -	- -	--	- -	Urinary	2.8E-04	--	7.8E-03	8E-03
			Chromium	2.8E-08	- -	1.6E-06	--	2E-06	None Specified	2.0E-04	--	1.1E-02	1E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	3.3E-03	--	1.8E-03	5E-03
			Copper	- -	- -	- -	--	- -	GS	4.2E-05	--	5.9E-05	1E-04
			Cyanide	- -	- -	- -	--	- -	Reproductive	2.1E-03	--	2.2E-03	4E-03
			Iron	- -	- -	- -	--	- -	GS	4.2E-03	--	6.0E-03	1E-02
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	3.4E-02	--	1.2E+00	1E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	5.6E-05	--	7.9E-05	1E-04
			Silver	- -	- -	- -	--	- -	Dermal	3.8E-04	--	8.0E-03	8E-03
			Thallium	- -	- -	- -	--	- -	Hair	2.9E-02	--	4.1E-02	7E-02
			Vanadium	- -	- -	- -	--	- -	Dermal	1.7E-04	--	9.0E-03	9E-03
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	9.3E-06	--	7.9E-06	2E-05
			Chemical Total	4.1E-07	- -	4.0E-06	--	4E-06		9.5E-02	--	1.4E+00	2E+00
		Exposure Point Total						4E-06					2E+00
	Exposure Medium Total							4E-06					2E+00

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Trench	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	1.6E-08	- -	--	2E-08	Respiratory	--	5.3E-02	--	5E-02
			1,2-Dibromo-3-Chloropropane	- -	6.9E-06	- -	--	7E-06	Reproductive	--	6.1E-02	--	6E-02
			1,2-Dichloroethane	- -	2.8E-07	- -	--	3E-07	Nervous	--	1.6E-02	--	2E-02
			1,4-Dichlorobenzene	- -	8.4E-08	- -	--	8E-08	Hepatic	--	1.0E-04	--	1E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	1.3E-02	--	1E-02
			Benzene	- -	5.2E-07	- -	--	5E-07	Immune	--	2.4E-02	--	2E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	1.1E-07	- -	--	1E-07	Developmental	--	4.6E-04	--	5E-04
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	2.7E-02	--	3E-02
			Trichloroethene	- -	2.3E-07	- -	--	2E-07	CVS, Immune, Developmental	--	2.9E-01	--	3E-01
			Vinyl Chloride	- -	2.4E-07	- -	--	2E-07	Hepatic	--	5.8E-03	--	6E-03
			1,4-Dioxane	- -	2.4E-07	- -	--	2E-07	Nervous, Respiratory	--	1.7E-02	--	2E-02
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	2.1E-08	- -	--	2E-08	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	8.3E-07	- -	--	8E-07	NA	--	--	--	--
			Naphthalene	- -	2.2E-06	- -	--	2E-06	Nervous, Respiratory	--	2.3E-01	--	2E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	3.6E-07	- -	--	4E-07	Reproductive, Developmental, Endocrine	--	2.5E-03	--	3E-03
			Aldrin	- -	1.4E-08	- -	--	1E-08	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	6.6E-09	- -	--	7E-09	NA	--	--	--	--
			Heptachlor Epoxide	- -	4.1E-09	- -	--	4E-09	NA	--	--	--	--
			Dioxin-Like PCBs	- -	2.9E-07	- -	--	3E-07	Reproductive, Developmental, Endocrine	--	2.0E-03	--	2E-03
			Nondioxin-Like PCBs	- -	1.2E-07	- -	--	1E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	4.5E+00	--	4E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	1.3E-05	- -	--	1E-05		- -	5	- -	5E+00
		Exposure Point Total						1E-05					5E+00
	Exposure Medium Total							1E-05					5E+00
Medium Total								2E-05					7E+00

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Irrigation	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	3.5E-10	- -	--	3E-10	Respiratory	--	1.1E-03	--	1E-03
			1,2-Dibromo-3-Chloropropane	- -	1.7E-07	- -	--	2E-07	Reproductive	--	1.5E-03	--	1E-03
			1,2-Dichloroethane	- -	5.5E-09	- -	--	6E-09	Nervous	--	3.2E-04	--	3E-04
			1,4-Dichlorobenzene	- -	2.2E-09	- -	--	2E-09	Hepatic	--	2.6E-06	--	3E-06
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	2.1E-04	--	2E-04
			Benzene	- -	4.6E-09	- -	--	5E-09	Immune	--	2.1E-04	--	2E-04
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	2.8E-09	- -	--	3E-09	Developmental	--	1.2E-05	--	1E-05
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	7.0E-04	--	7E-04
			Trichloroethene	- -	6.8E-09	- -	--	7E-09	CVS, Immune, Developmental	--	8.7E-03	--	9E-03
			Vinyl Chloride	- -	5.6E-09	- -	--	6E-09	Hepatic	--	1.3E-04	--	1E-04
			1,4-Dioxane	- -	3.8E-10	- -	--	4E-10	Nervous, Respiratory	--	2.7E-05	--	3E-05
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	5.2E-10	- -	--	5E-10	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	1.8E-08	- -	--	2E-08	NA	--	--	--	--
			Naphthalene	- -	4.3E-08	- -	--	4E-08	Nervous, Respiratory	--	4.5E-03	--	4E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	1.0E-08	- -	--	1E-08	Reproductive, Developmental, Endocrine	--	7.0E-05	--	7E-05
			Aldrin	- -	4.2E-10	- -	--	4E-10	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	2.1E-10	- -	--	2E-10	NA	--	--	--	--
			Heptachlor Epoxide	- -	1.3E-10	- -	--	1E-10	NA	--	--	--	--
			Dioxin-Like PCBs	- -	8.3E-09	- -	--	8E-09	Reproductive, Developmental, Endocrine	--	5.8E-05	--	6E-05
			Nondioxin-Like PCBs	- -	3.3E-09	- -	--	3E-09	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	6.6E-02	--	7E-02
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	2.8E-07	- -	--	3E-07		- -	8.4E-02	- -	8E-02
		Exposure Point Total						3E-07					8E-02
	Exposure Medium Total							3E-07					8E-02
Medium Total								3E-07					8E-02

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Shower	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	5.4E-10	- -	--	5E-10	Respiratory	--	1.8E-03	--	2E-03
			1,2-Dibromo-3-Chloropropane	- -	1.5E-07	- -	--	1E-07	Reproductive	--	1.3E-03	--	1E-03
			1,2-Dichloroethane	- -	1.0E-08	- -	--	1E-08	Nervous	--	5.8E-04	--	6E-04
			1,4-Dichlorobenzene	- -	3.2E-09	- -	--	3E-09	Hepatic	--	3.9E-06	--	4E-06
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	2.4E-04	--	2E-04
			Benzene	- -	2.0E-08	- -	--	2E-08	Immune	--	9.2E-04	--	9E-04
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	4.3E-09	- -	--	4E-09	Developmental	--	1.8E-05	--	2E-05
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	1.1E-03	--	1E-03
			Trichloroethene	- -	9.1E-09	- -	--	9E-09	CVS, Immune, Developmental	--	1.2E-02	--	1E-02
			Vinyl Chloride	- -	9.5E-09	- -	--	9E-09	Hepatic	--	2.3E-04	--	2E-04
			1,4-Dioxane	- -	2.5E-09	- -	--	3E-09	Nervous, Respiratory	--	1.8E-04	--	2E-04
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	2.1E-10	- -	--	2E-10	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	9.4E-09	- -	--	9E-09	NA	--	--	--	--
			Naphthalene	- -	6.6E-08	- -	--	7E-08	Nervous, Respiratory	--	6.8E-03	--	7E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	5.0E-09	- -	--	5E-09	Reproductive, Developmental, Endocrine	--	3.5E-05	--	3E-05
			Aldrin	- -	1.9E-10	- -	--	2E-10	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	1.8E-10	- -	--	2E-10	NA	--	--	--	--
			Heptachlor Epoxide	- -	4.3E-11	- -	--	4E-11	NA	--	--	--	--
			Dioxin-Like PCBs	- -	8.5E-09	- -	--	8E-09	Reproductive, Developmental, Endocrine	--	5.9E-05	--	6E-05
			Nondioxin-Like PCBs	- -	3.4E-09	- -	--	3E-09	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.7E-01	--	2E-01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	3.0E-07	- -	--	3E-07		- -	1.9E-01	- -	2E-01
		Exposure Point Total						3E-07					2E-01
	Exposure Medium Total							3E-07					2E-01
Medium Total								3E-07					2E-01
Receptor Total							Receptor Risk Total	2E-05				Receptor HI Total	7E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	1E-02
Total Body Weight HI	2E-03
Total Nervous HI	2E+00
Total CVS HI	3E-01
Total Developmental HI	3E-01
Total Endocrine HI	5E+00
Total GS HI	1E-02
Total Hair HI	7E-02
Total Immune HI	4E-01
Total Hepatic HI	4E-02
Total Reproductive HI	8E-02
Total Respiratory HI	3E-01
Total Dermal HI	3E-02
Total Spleen HI	2E-02
Total Thyroid HI	5E-03
Total Urinary HI	5E-02
Total None Specified HI	1E-02

TABLE 9.8.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	5.6E-09	- -	4.9E-10	--	6E-09	Immune, Hematologic	5.8E-04	--	5.0E-05	6E-04
			1,2-Dibromo-3-Chloropropane	1.2E-06	- -	2.7E-07	--	1E-06	Reproductive	2.2E-02	--	5.1E-03	3E-02
			1,2-Dichloroethane	8.3E-08	- -	4.8E-09	--	9E-08	Urinary	3.5E-03	--	2.0E-04	4E-03
			1,4-Dichlorobenzene	4.1E-09	- -	3.5E-09	--	8E-09	Hepatic	2.5E-04	--	2.2E-04	5E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	2.2E-02	--	1.1E-03	2E-02
			Benzene	2.6E-07	- -	4.7E-08	--	3E-07	Immune	2.8E-02	--	5.0E-03	3E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	5.2E-01	--	7.8E-02	6E-01
			Ethylbenzene	4.0E-08	- -	2.8E-08	--	7E-08	Hepatic, Urinary	8.5E-04	--	6.0E-04	1E-03
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	2.5E-03	--	1.8E-03	4E-03
			Trichloroethene (Kidney)	3.6E-07	- -	7.2E-08	--	4E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.9E-07	- -	3.7E-08	--	2E-07	CVS, Immune, Developmental	2.4E-01	--	4.7E-02	3E-01
			Vinyl Chloride	9.3E-05	- -	8.5E-06	--	1E-04	Hepatic	2.7E-02	--	2.5E-03	3E-02
			1,4-Dioxane	4.7E-06	- -	2.0E-08	--	5E-06	Hepatic, Urinary	3.6E-02	--	1.5E-04	4E-02
			2,6-Dinitrotoluene	1.1E-05	- -	9.3E-07	--	1E-05	Hepatic, Spleen	5.5E-01	--	4.8E-02	6E-01
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	4.5E-02	--	7.5E-02	1E-01
			Benzo(a)anthracene	1.6E-07	- -	- -	--	2E-07	NA	--	--	--	--
			Benzo(a)pyrene	7.6E-07	- -	- -	--	8E-07	Developmental, Immune, Reproductive	7.7E-03	--	--	8E-03
			Bis(2-Chloroethyl)Ether	1.1E-06	- -	3.5E-08	--	1E-06	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	7.7E-03	--	6.0E-03	1E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.8E+00	--	--	2E+00
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	2.5E-01	--	--	3E-01
			Pentachlorophenol	1.6E-07	- -	7.5E-07	--	9E-07	Hepatic	1.9E-03	--	8.7E-03	1E-02
			2,3,7,8-TCDD Equivalents	2.3E-07	- -	- -	--	2E-07	Reproductive, Developmental, Endocrine	5.8E-02	--	--	6E-02
			Aldrin	1.5E-08	- -	- -	--	2E-08	Hepatic	7.1E-04	--	--	7E-04
			beta-BHC	5.3E-08	- -	4.7E-08	--	1E-07	NA	--	--	--	--
			Dieldrin	2.2E-07	- -	5.0E-07	--	7E-07	Hepatic	6.5E-03	--	1.4E-02	2E-02
			Heptachlor	4.1E-09	- -	3.8E-08	--	4E-08	Hepatic	4.2E-05	--	3.9E-04	4E-04
			Heptachlor Epoxide	7.1E-09	- -	1.1E-08	--	2E-08	Hepatic	1.4E-03	--	2.1E-03	4E-03
			Dioxin-Like PCBs	1.5E-07	- -	- -	--	2E-07	Reproductive, Developmental, Endocrine	3.8E-02	--	--	4E-02
			Nondioxin-Like PCBs	6.6E-08	- -	- -	--	7E-08	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	1.5E-01	--	7.1E-04	2E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	2.5E-01	--	7.9E-03	3E-01
			Arsenic	2.3E-05	- -	1.1E-07	--	2E-05	CVS, Dermal	1.2E+00	--	5.6E-03	1E+00
			Barium	- -	- -	- -	--	- -	Urinary	5.0E-02	--	3.3E-03	5E-02
			Boron	- -	- -	- -	--	- -	Developmental	7.1E-02	--	3.3E-04	7E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	7.1E-02	--	6.6E-03	8E-02
			Chromium	2.5E-05	- -	4.7E-06	--	3E-05	None Specified	5.1E-02	--	9.6E-03	6E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	8.3E-01	--	1.6E-03	8E-01
			Copper	- -	- -	- -	--	- -	GS	1.1E-02	--	5.0E-05	1E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	5.4E-01	--	2.5E-03	5E-01
			Iron	- -	- -	- -	--	- -	GS	1.1E+00	--	5.1E-03	1E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	8.7E+00	--	1.0E+00	1E+01
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	1.4E-02	--	6.7E-05	1E-02
			Silver	- -	- -	- -	--	- -	Dermal	9.7E-02	--	6.8E-03	1E-01
			Thallium	- -	- -	- -	--	- -	Hair	7.5E+00	--	3.5E-02	8E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	4.3E-02	--	7.7E-03	5E-02
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	2.4E-03	--	6.7E-06	2E-03
			Chemical Total	1.6E-04	- -	1.6E-05	--	2E-04		2.4E+01	--	1.4E+00	3E+01
		Exposure Point Total						2E-04					3E+01
	Exposure Medium Total							2E-04					3E+01
Medium Total								2E-04					3E+01
Receptor Total							Receptor Risk Total	2E-04				Receptor HI Total	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	3E-01
Total Body Weight HI	1E-02
Total Nervous HI	1E+01
Total CVS HI	1E+00
Total Developmental HI	3E+00
Total Endocrine HI	1E-01
Total GS HI	1E+00
Total Hair HI	8E+00
Total Immune HI	3E-01
Total Hepatic HI	7E-01
Total Reproductive HI	7E-01
Total Respiratory HI	1E-01
Total Dermal HI	1E+00
Total Spleen HI	6E-01
Total Thyroid HI	8E-01
Total Urinary HI	8E-01

TABLE 9.9.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	8.5E-09	- -	6.7E-10	--	9E-09	Immune, Hematologic	2.9E-04	--	2.3E-05	3E-04
			1,2-Dibromo-3-Chloropropane	3.3E-07	- -	7.3E-08	--	4E-07	Reproductive	1.1E-02	--	2.5E-03	1E-02
			1,2-Dichloroethane	1.2E-07	- -	6.4E-09	--	1E-07	Urinary	1.8E-03	--	9.1E-05	2E-03
			1,4-Dichlorobenzene	6.1E-09	- -	4.7E-09	--	1E-08	Hepatic	1.3E-04	--	9.7E-05	2E-04
			2-Hexanone	- -	- -	- -	--	- -	Nervous	1.1E-02	--	5.1E-04	1E-02
			Benzene	3.9E-07	- -	6.1E-08	--	5E-07	Immune	1.4E-02	--	2.1E-03	2E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	2.6E-01	--	3.4E-02	3E-01
			Ethylbenzene	6.0E-08	- -	3.7E-08	--	1E-07	Hepatic, Urinary	4.2E-04	--	2.6E-04	7E-04
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	1.3E-03	--	7.9E-04	2E-03
			Trichloroethene (Kidney)	1.0E-07	- -	1.8E-08	--	1E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	2.8E-07	- -	5.0E-08	--	3E-07	CVS, Immune, Developmental	1.2E-01	--	2.1E-02	1E-01
			Vinyl Chloride	3.7E-06	- -	2.9E-07	--	4E-06	Hepatic	1.3E-02	--	1.0E-03	1E-02
			1,4-Dioxane	7.0E-06	- -	3.0E-08	--	7E-06	Hepatic, Urinary	1.8E-02	--	7.8E-05	2E-02
			2,6-Dinitrotoluene	1.6E-05	- -	1.4E-06	--	2E-05	Hepatic, Spleen	2.8E-01	--	2.4E-02	3E-01
			2-Methylnaphthalene	- -	- -	- -	--	- -	Respiratory	2.2E-02	--	3.5E-02	6E-02
			Benzo(a)anthracene	4.6E-08	- -	- -	--	5E-08	NA	--	--	--	--
			Benzo(a)pyrene	2.1E-07	- -	- -	--	2E-07	Developmental, Immune, Reproductive	3.8E-03	--	--	4E-03
			Bis(2-Chloroethyl)Ether	1.6E-06	- -	5.3E-08	--	2E-06	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	3.8E-03	--	2.8E-03	7E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	8.9E-01	--	--	9E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.3E-01	--	--	1E-01
			Pentachlorophenol	2.4E-07	- -	1.1E-06	--	1E-06	Hepatic	9.4E-04	--	4.4E-03	5E-03
			2,3,7,8-TCDD Equivalents	3.4E-07	- -	- -	--	3E-07	Reproductive, Developmental, Endocrine	2.9E-02	--	--	3E-02
			Aldrin	2.3E-08	- -	- -	--	2E-08	Hepatic	3.5E-04	--	--	4E-04
			beta-BHC	8.0E-08	- -	7.1E-08	--	2E-07	NA	--	--	--	--
			Dieldrin	3.4E-07	- -	7.5E-07	--	1E-06	Hepatic	3.3E-03	--	7.3E-03	1E-02
			Heptachlor	6.1E-09	- -	5.5E-08	--	6E-08	Hepatic	2.1E-05	--	1.9E-04	2E-04
			Heptachlor Epoxide	1.1E-08	- -	1.6E-08	--	3E-08	Hepatic	7.0E-04	--	1.1E-03	2E-03
			Dioxin-Like PCBs	2.3E-07	- -	- -	--	2E-07	Reproductive, Developmental, Endocrine	1.9E-02	--	--	2E-02
			Nondioxin-Like PCBs	9.8E-08	- -	- -	--	1E-07	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	7.6E-02	--	3.1E-04	8E-02
			Antimony	- -	- -	- -	--	- -	Hematologic	1.3E-01	--	3.5E-03	1E-01
			Arsenic	3.5E-05	- -	1.4E-07	--	3E-05	CVS, Dermal	6.0E-01	--	2.5E-03	6E-01
			Barium	- -	- -	- -	--	- -	Urinary	2.5E-02	--	1.4E-03	3E-02
			Boron	- -	- -	- -	--	- -	Developmental	3.5E-02	--	1.5E-04	4E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	3.5E-02	--	2.9E-03	4E-02
			Chromium	7.2E-06	- -	1.2E-06	--	8E-06	None Specified	2.6E-02	--	4.2E-03	3E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	4.2E-01	--	6.8E-04	4E-01
			Copper	- -	- -	- -	--	- -	GS	5.4E-03	--	2.2E-05	5E-03
			Cyanide	- -	- -	- -	--	- -	Reproductive	2.7E-01	--	8.3E-04	3E-01
			Iron	- -	- -	- -	--	- -	GS	5.4E-01	--	2.2E-03	5E-01
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	4.3E+00	--	4.4E-01	5E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	7.2E-03	--	3.0E-05	7E-03
			Silver	- -	- -	- -	--	- -	Dermal	4.9E-02	--	3.0E-03	5E-02
			Thallium	- -	- -	- -	--	- -	Hair	3.8E+00	--	1.5E-02	4E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	2.1E-02	--	3.4E-03	2E-02
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	1.2E-03	--	2.9E-06	1E-03
			Chemical Total	7.3E-05	- -	5.4E-06	--	8E-05		1.2E+01	--	6.2E-01	1E+01
		Exposure Point Total						8E-05					1E+01
	Exposure Medium Total							8E-05					1E+01

TABLE 9.9.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	7.9E-10	- -	--	8E-10	Respiratory	--	1.9E-03	--	2E-03
			1,2-Dibromo-3-Chloropropane	- -	3.1E-07	- -	--	3E-07	Reproductive	--	1.4E-03	--	1E-03
			1,2-Dichloroethane	- -	1.5E-08	- -	--	1E-08	Nervous	--	6.2E-04	--	6E-04
			1,4-Dichlorobenzene	- -	4.7E-09	- -	--	5E-09	Hepatic	--	4.1E-06	--	4E-06
			2-Hexanone	- -	- -	- -	--	- -	Nervous	--	2.5E-04	--	3E-04
			Benzene	- -	2.9E-08	- -	--	3E-08	Immune	--	9.8E-04	--	1E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Ethylbenzene	- -	6.3E-09	- -	--	6E-09	Developmental	--	2.0E-05	--	2E-05
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	1.2E-03	--	1E-03
			Trichloroethene (Kidney)	- -	4.7E-09	- -	--	5E-09	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	1.0E-08	- -	--	1E-08	CVS, Immune, Developmental	--	1.3E-02	--	1E-02
			Vinyl Chloride	- -	1.4E-08	- -	--	1E-08	Hepatic	--	2.4E-04	--	2E-04
			1,4-Dioxane	- -	3.7E-09	- -	--	4E-09	Nervous, Respiratory	--	1.9E-04	--	2E-04
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			2-Methylnaphthalene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)anthracene	- -	4.4E-10	- -	--	4E-10	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	1.4E-08	- -	--	1E-08	NA	--	--	--	--
			Naphthalene	- -	9.6E-08	- -	--	1E-07	Nervous, Respiratory	--	7.3E-03	--	7E-03
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	4.8E-09	- -	--	5E-09	Reproductive, Developmental, Endocrine	--	2.5E-05	--	2E-05
			Aldrin	- -	2.7E-10	- -	--	3E-10	NA	--	--	--	--
			beta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	2.6E-10	- -	--	3E-10	NA	--	--	--	--
			Heptachlor Epoxide	- -	6.3E-11	- -	--	6E-11	NA	--	--	--	--
			Dioxin-Like PCBs	- -	1.2E-08	- -	--	1E-08	Reproductive, Developmental, Endocrine	--	6.3E-05	--	6E-05
			Nondioxin-Like PCBs	- -	4.6E-09	- -	--	5E-09	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.8E-01	--	2E-01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	5.3E-07	- -	--	5E-07		- -	2.1E-01	- -	2E-01
		Exposure Point Total						5E-07					2E-01
	Exposure Medium Total							5E-07					2E-01
Medium Total								8E-05					1E+01
Receptor Total							Receptor Risk Total	8E-05				Receptor HI Total	1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	1E-01
Total Body Weight HI	7E-03
Total Nervous HI	5E+00
Total CVS HI	8E-01
Total Developmental HI	1E+00
Total Endocrine HI	2E-01
Total GS HI	6E-01
Total Hair HI	4E+00
Total Immune HI	2E-01
Total Hepatic HI	4E-01
Total Reproductive HI	3E-01
Total Respiratory HI	7E-02
Total Dermal HI	7E-01
Total Spleen HI	3E-01
Total Thyroid HI	4E-01
Total Urinary HI	4E-01
Total None Specified HI	3E-02

TABLE 9.10.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	1.4E-08	- -	1.2E-09	--	2E-08					
			1,2-Dibromo-3-Chloropropane	1.5E-06	- -	3.4E-07	--	2E-06					
			1,2-Dichloroethane	2.1E-07	- -	1.1E-08	--	2E-07					
			1,4-Dichlorobenzene	1.0E-08	- -	8.2E-09	--	2E-08					
			2-Hexanone	- -	- -	- -	--	- -					
			Benzene	6.6E-07	- -	1.1E-07	--	8E-07					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Ethylbenzene	1.0E-07	- -	6.6E-08	--	2E-07					
			m+p-Xylenes	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	4.7E-07	- -	9.0E-08	--	6E-07					
			Trichloroethene (Non-Kidney)	4.7E-07	- -	8.7E-08	--	6E-07					
			Vinyl Chloride	9.7E-05	- -	8.8E-06	--	1E-04					
			1,4-Dioxane	1.2E-05	- -	5.0E-08	--	1E-05					
			2,6-Dinitrotoluene	2.7E-05	- -	2.3E-06	--	3E-05					
			2-Methylnaphthalene	- -	- -	- -	--	- -					
			Benzo(a)anthracene	2.1E-07	- -	- -	--	2E-07					
			Benzo(a)pyrene	9.7E-07	- -	- -	--	1E-06					
			Bis(2-Chloroethyl)Ether	2.7E-06	- -	8.9E-08	--	3E-06					
			Naphthalene	- -	- -	- -	--	- -					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Pentachlorophenol	4.0E-07	- -	1.9E-06	--	2E-06					
			2,3,7,8-TCDD Equivalents	5.7E-07	- -	- -	--	6E-07					
			Aldrin	3.9E-08	- -	- -	--	4E-08					
			beta-BHC	1.3E-07	- -	1.2E-07	--	3E-07					
			Dieldrin	5.6E-07	- -	1.2E-06	--	2E-06					
			Heptachlor	1.0E-08	- -	9.2E-08	--	1E-07					
			Heptachlor Epoxide	1.8E-08	- -	2.7E-08	--	4E-08					
			Dioxin-Like PCBs	3.8E-07	- -	- -	--	4E-07					
			Nondioxin-Like PCBs	1.6E-07	- -	- -	--	2E-07					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	5.8E-05	- -	2.5E-07	--	6E-05					
			Barium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	3.3E-05	- -	5.9E-06	--	4E-05					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	2.4E-04	- -	2.2E-05	--	3E-04					
		Exposure Point Total						3E-04					
	Exposure Medium Total							3E-04					

TABLE 9.10.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,1,2-Trichloroethane	- -	7.9E-10	- -	--	8E-10					
			1,2-Dibromo-3-Chloropropane	- -	3.1E-07	- -	--	3E-07					
			1,2-Dichloroethane	- -	1.5E-08	- -	--	1E-08					
			1,4-Dichlorobenzene	- -	4.7E-09	- -	--	5E-09					
			2-Hexanone	- -	- -	- -	--	- -					
			Benzene	- -	2.9E-08	- -	--	3E-08					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Ethylbenzene	- -	6.3E-09	- -	--	6E-09					
			m+p-Xylenes	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	- -	4.7E-09	- -	--	5E-09					
			Trichloroethene (Non-Kidney)	- -	1.0E-08	- -	--	1E-08					
			Vinyl Chloride	- -	1.4E-08	- -	--	1E-08					
			1,4-Dioxane	- -	3.7E-09	- -	--	4E-09					
			2,6-Dinitrotoluene	- -	- -	- -	--	- -					
			2-Methylnaphthalene	- -	- -	- -	--	- -					
			Benzo(a)anthracene	- -	4.4E-10	- -	--	4E-10					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Bis(2-Chloroethyl)Ether	- -	1.4E-08	- -	--	1E-08					
			Naphthalene	- -	9.6E-08	- -	--	1E-07					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Pentachlorophenol	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	4.8E-09	- -	--	5E-09					
			Aldrin	- -	2.7E-10	- -	--	3E-10					
			beta-BHC	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			Heptachlor	- -	2.6E-10	- -	--	3E-10					
			Heptachlor Epoxide	- -	6.3E-11	- -	--	6E-11					
			Dioxin-Like PCBs	- -	1.2E-08	- -	--	1E-08					
			Nondioxin-Like PCBs	- -	4.6E-09	- -	--	5E-09					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Boron	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Cobalt	- -	- -	- -	--	- -					
			Copper	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Mercury	- -	- -	- -	--	- -					
			Silver	- -	- -	- -	--	- -					
			Thallium	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Zinc	- -	- -	- -	--	- -					
			Chemical Total	- -	5.3E-07	- -	--	5E-07					
		Exposure Point Total						5E-07					
	Exposure Medium Total							5E-07					
Medium Total								3E-04					
Receptor Total							Receptor Risk Total	3E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.11.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	1.5E-10	- -	1.4E-09	--	2E-09	Urinary	1.4E-06	--	1.3E-05	1E-05
			Benzene	3.0E-10	- -	5.8E-09	--	6E-09	Immune	1.4E-05	--	2.8E-04	3E-04
			Chloroform	2.6E-10	- -	2.7E-09	--	3E-09	Hepatic	9.0E-06	--	9.3E-05	1E-04
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	7.5E-02	--	1.2E+00	1E+00
			Trichloroethene	1.1E-07	- -	1.9E-06	--	2E-06	CVS, Immune, Developmental	5.0E-02	--	8.9E-01	9E-01
			Vinyl Chloride	5.6E-08	- -	6.0E-07	--	7E-07	Hepatic	2.8E-04	--	3.0E-03	3E-03
			1,4-Dioxane	1.6E-08	- -	8.4E-09	--	2E-08	Hepatic, Urinary	5.5E-05	--	3.0E-05	8E-05
			Benzo(a)pyrene	5.4E-10	- -	- -	--	5E-10	Developmental, Immune, Reproductive	1.9E-05	--	--	2E-05
			Bis(2-ethylhexyl)phthalate	6.9E-10	- -	- -	--	7E-10	Hepatic	2.6E-05	--	--	3E-05
			Dibenzo(a,h)anthracene	2.3E-09	- -	- -	--	2E-09	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.8E-10	- -	- -	--	3E-10	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	5.6E-07	--	3.9E-05	4E-05
			2,3,7,8-TCDD Equivalents	2.6E-09	- -	- -	--	3E-09	Reproductive, Developmental, Endocrine	3.0E-04	--	--	3E-04
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.9E-04	--	--	2E-04
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.7E-04	--	--	2E-04
			Dieldrin	2.5E-10	- -	4.9E-08	--	5E-08	Hepatic	3.4E-06	--	6.5E-04	6E-04
			delta-BHC	5.8E-10	- -	4.3E-08	--	4E-08	Hepatic	1.2E-07	--	9.1E-06	9E-06
			Aluminum	- -	- -	- -	--	- -	Nervous	2.3E-03	--	3.3E-03	6E-03
			Antimony	- -	- -	- -	--	- -	Hematologic	1.0E-03	--	9.7E-03	1E-02
			Arsenic	4.9E-08	- -	6.9E-08	--	1E-07	CVS, Dermal	1.1E-03	--	1.6E-03	3E-03
			Barium	- -	- -	- -	--	- -	Urinary	7.8E-05	--	1.6E-03	2E-03
			Beryllium	- -	- -	- -	--	- -	GS	4.5E-05	--	9.1E-03	9E-03
			Cadmium	- -	- -	- -	--	- -	Urinary	2.1E-04	--	5.9E-03	6E-03
			Chromium	1.1E-07	- -	6.1E-06	--	6E-06	None Specified	7.6E-04	--	4.3E-02	4E-02
			Cobalt	- -	- -	- -	--	- -	Thyroid	6.8E-03	--	3.8E-03	1E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.4E-03	--	1.5E-03	3E-03
			Iron	- -	- -	- -	--	- -	GS	3.9E-03	--	5.5E-03	9E-03
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	1.0E-02	--	3.7E-01	4E-01
			Vanadium	- -	- -	- -	--	- -	Dermal	1.2E-04	--	6.7E-03	7E-03
			Chemical Total	3.4E-07	- -	8.8E-06	--	9E-06		1.5E-01	--	2.5E+00	3E+00
		Exposure Point Total						9E-06					3E+00
	Exposure Medium Total							9E-06					3E+00
	Air - Irrigation	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	1.5E-09	- -	--	1E-09	NA	--	--	--	--
			Benzene	- -	1.5E-09	- -	--	1E-09	Immune	--	6.6E-05	--	7E-05
			Chloroform	- -	6.4E-09	- -	--	6E-09	Hepatic	--	3.0E-05	--	3E-05
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene	- -	3.6E-07	- -	--	4E-07	CVS, Immune, Developmental	--	4.7E-01	--	5E-01
			Vinyl Chloride	- -	1.5E-08	- -	--	1E-08	Hepatic	--	3.5E-04	--	4E-04
			1,4-Dioxane	- -	1.5E-10	- -	--	1E-10	Nervous, Respiratory	--	1.0E-05	--	1E-05
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	8.1E-10	- -	--	8E-10	Nervous, Respiratory	--	8.4E-05	--	8E-05
			2,3,7,8-TCDD Equivalents	- -	8.8E-09	- -	--	9E-09	Reproductive, Developmental, Endocrine	--	6.1E-05	--	6E-05
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	4.4E-02	--	4E-02
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	3.9E-07	- -	--	4E-07		- -	5.1E-01	- -	5E-01
		Exposure Point Total						4E-07					5E-01
	Exposure Medium Total							4E-07					5E-01
Medium Total								1E-05					3E+00

TABLE 9.11.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Showering	Outside Landfill Deep Wells	1,1-Dichloroethane	--	2E-09	--	--	2E-09	NA	--	--	--	--
			Benzene	--	3E-09	--	--	3E-09	Immune	--	1.2E-04	--	1E-04
			Chloroform	--	1E-08	--	--	1E-08	Hepatic	--	4.7E-05	--	5E-05
			cis-1,2-Dichloroethene	--	- -	--	--	- -	NA	--	--	--	--
			Trichloroethene	--	5E-07	--	--	5E-07	CVS, Immune, Developmental	--	6.3E-01	--	6E-01
			Vinyl Chloride	--	2E-08	--	--	2E-08	Hepatic	--	6.0E-04	--	6E-04
			1,4-Dioxane	--	1E-09	--	--	1E-09	Nervous, Respiratory	--	7.0E-05	--	7E-05
			Benzo(a)pyrene	--	- -	--	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-ethylhexyl)phthalate	--	- -	--	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	--	- -	--	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	- -	--	--	- -	NA	--	--	--	--
			Naphthalene	--	1E-09	--	--	1E-09	Nervous, Respiratory	--	1.3E-04	--	1E-04
			2,3,7,8-TCDD Equivalents	--	4E-09	--	--	4E-09	Reproductive, Developmental, Endocrine	--	3.1E-05	--	3E-05
			Pentadecafluorooctanoic Acid	--	- -	--	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	--	- -	--	--	- -	NA	--	--	--	--
			Dieldrin	--	- -	--	--	- -	NA	--	--	--	--
			delta-BHC	--	- -	--	--	- -	NA	--	--	--	--
			Aluminum	--	- -	--	--	- -	Nervous	--	--	--	--
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Arsenic	--	- -	--	--	- -	CVS, Dermal	--	--	--	--
			Barium	--	- -	--	--	- -	Developmental	--	--	--	--
			Beryllium	--	- -	--	--	- -	Immune, Respiratory	--	--	--	--
			Cadmium	--	- -	--	--	- -	Urinary	--	--	--	--
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cobalt	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cyanide	--	- -	--	--	- -	Endocrine	--	1.1E-01	--	1E-01
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	Nervous	--	--	--	--
			Vanadium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Chemical Total	--	5E-07	--	--	5E-07		- -	7.4E-01	- -	7E-01
		Exposure Point Total						5E-07					7E-01
	Exposure Medium Total							5E-07					7E-01
Medium Total								5E-07					7E-01
Receptor Total							Receptor Risk Total	1E-05				Receptor HI Total	4E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	1E-02
Total Body Weight HI	4E-05
Total Nervous HI	4E-01
Total CVS HI	2E+00
Total Developmental HI	2E+00
Total Endocrine HI	2E-01
Total GS HI	2E-02
Total Immune HI	2E+00
Total Hepatic HI	5E-03
Total Reproductive HI	3E-03
Total Respiratory HI	3E-04
Total Dermal HI	1E-02
Total Thyroid HI	1E-02
Total Urinary HI	1E+00
Total None Specified HI	4E-02

TABLE 9.12.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	1.7E-08	- -	1.6E-09	--	2E-08	Urinary	3.6E-04	--	3.3E-05	4E-04
			Benzene	3.4E-08	- -	6.2E-09	--	4E-08	Immune	3.7E-03	--	6.6E-04	4E-03
			Chloroform	3.1E-08	- -	3.3E-09	--	3E-08	Hepatic	2.3E-03	--	2.5E-04	3E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	1.9E+01	--	2.9E+00	2E+01
			Trichloroethene (Kidney)	1.9E-05	- -	3.8E-06	--	2E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.0E-05	- -	2.0E-06	--	1E-05	CVS, Immune, Developmental	1.3E+01	--	2.5E+00	2E+01
			Vinyl Chloride	2.4E-04	- -	2.2E-05	--	3E-04	Hepatic	7.1E-02	--	6.4E-03	8E-02
			1,4-Dioxane	1.8E-06	- -	7.7E-09	--	2E-06	Hepatic, Urinary	1.4E-02	--	6.0E-05	1E-02
			Benzo(a)pyrene	4.9E-07	- -	- -	--	5E-07	Developmental, Immune, Reproductive	4.9E-03	--	--	5E-03
			Bis(2-ethylhexyl)phthalate	8.1E-08	- -	- -	--	8E-08	Hepatic	6.7E-03	--	--	7E-03
			Dibenzo(a,h)anthracene	2.0E-06	- -	- -	--	2E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.5E-07	- -	- -	--	2E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	1.4E-04	--	1.1E-04	3E-04
			2,3,7,8-TCDD Equivalents	3.0E-07	- -	- -	--	3E-07	Reproductive, Developmental, Endocrine	7.7E-02	--	--	8E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.8E-02	--	--	5E-02
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	4.2E-02	--	--	4E-02
			Dieldrin	3.0E-08	- -	6.5E-08	--	9E-08	Hepatic	8.6E-04	--	1.9E-03	3E-03
			delta-BHC	6.8E-08	- -	5.8E-08	--	1E-07	Hepatic	3.1E-05	--	2.7E-05	6E-05
			Aluminum	- -	- -	- -	--	- -	Nervous	6.0E-01	--	2.8E-03	6E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	2.6E-01	--	8.2E-03	3E-01
			Arsenic	5.7E-06	- -	2.6E-08	--	6E-06	CVS, Dermal	2.9E-01	--	1.4E-03	3E-01
			Barium	- -	- -	- -	--	- -	Urinary	2.0E-02	--	1.3E-03	2E-02
			Beryllium	- -	- -	- -	--	- -	GS	1.2E-02	--	7.7E-03	2E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	5.4E-02	--	5.0E-03	6E-02
			Chromium	9.6E-05	- -	1.8E-05	--	1E-04	None Specified	1.9E-01	--	3.6E-02	2E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	1.7E+00	--	3.3E-03	2E+00
			Cyanide	- -	- -	- -	--	- -	Reproductive	3.6E-01	--	1.7E-03	4E-01
			Iron	- -	- -	- -	--	- -	GS	1.0E+00	--	4.7E-03	1E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	2.7E+00	--	3.1E-01	3E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	3.2E-02	--	5.7E-03	4E-02
			Chemical Total	3.8E-04	- -	4.6E-05	--	4E-04		3.9E+01	--	5.8E+00	5E+01
		Exposure Point Total						4E-04					5E+01
	Exposure Medium Total							4E-04					5E+01
Medium Total								4E-04					5E+01
Receptor Total							Receptor Risk Total	4E-04				Receptor HI Total	5E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	3E-01
Total Nervous HI	4E+00
Total CVS HI	2E+01
Total Developmental HI	2E+01
Total GS HI	1E+00
Total Immune HI	2E+01
Total Hepatic HI	1E-01
Total Reproductive HI	4E-01
Total Dermal HI	3E-01
Total Thyroid HI	2E+00
Total Urinary HI	2E+01
Total None Specified HI	2E-01
Total Endocrine HI	8E-02

TABLE 9.13.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	2.6E-08	- -	2.1E-09	--	3E-08	Urinary	1.8E-04	--	1.4E-05	2E-04
			Benzene	5.2E-08	- -	8.0E-09	--	6E-08	Immune	1.8E-03	--	2.8E-04	2E-03
			Chloroform	4.6E-08	- -	4.4E-09	--	5E-08	Hepatic	1.2E-03	--	1.1E-04	1E-03
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	9.6E+00	--	1.3E+00	1E+01
			Trichloroethene (Kidney)	5.5E-06	- -	9.6E-07	--	6E-06	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.5E-05	- -	2.6E-06	--	2E-05	CVS, Immune, Developmental	6.3E+00	--	1.1E+00	7E+00
			Vinyl Chloride	9.8E-06	- -	7.5E-07	--	1E-05	Hepatic	3.5E-02	--	2.7E-03	4E-02
			1,4-Dioxane	2.7E-06	- -	1.2E-08	--	3E-06	Hepatic, Urinary	7.1E-03	--	3.0E-05	7E-03
			Benzo(a)pyrene	1.4E-07	- -	- -	--	1E-07	Developmental, Immune, Reproductive	2.5E-03	--	--	2E-03
			Bis(2-ethylhexyl)phthalate	1.2E-07	- -	- -	--	1E-07	Hepatic	3.4E-03	--	--	3E-03
			Dibenzo(a,h)anthracene	5.7E-07	- -	- -	--	6E-07	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	7.0E-08	- -	- -	--	7E-08	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	7.2E-05	--	5.2E-05	1E-04
			2,3,7,8-TCDD Equivalents	4.5E-07	- -	- -	--	5E-07	Reproductive, Developmental, Endocrine	3.8E-02	--	--	4E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	2.4E-02	--	--	2E-02
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	2.1E-02	--	--	2E-02
			Dieldrin	4.4E-08	- -	9.9E-08	--	1E-07	Hepatic	4.3E-04	--	9.6E-04	1E-03
			delta-BHC	1.0E-07	- -	8.8E-08	--	2E-07	Hepatic	1.6E-05	--	1.4E-05	3E-05
			Aluminum	- -	- -	- -	--	- -	Nervous	3.0E-01	--	1.2E-03	3E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	1.3E-01	--	3.6E-03	1E-01
			Arsenic	8.5E-06	- -	3.5E-08	--	9E-06	CVS, Dermal	1.5E-01	--	6.0E-04	1E-01
			Barium	- -	- -	- -	--	- -	Urinary	1.0E-02	--	5.8E-04	1E-02
			Beryllium	- -	- -	- -	--	- -	GS	5.8E-03	--	3.4E-03	9E-03
			Cadmium	- -	- -	- -	--	- -	Urinary	2.7E-02	--	2.2E-03	3E-02
			Chromium	2.7E-05	- -	4.4E-06	--	3E-05	None Specified	9.7E-02	--	1.6E-02	1E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	8.7E-01	--	1.4E-03	9E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.8E-01	--	5.5E-04	2E-01
			Iron	- -	- -	- -	--	- -	GS	5.0E-01	--	2.1E-03	5E-01
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	1.3E+00	--	1.4E-01	1E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	1.6E-02	--	2.5E-03	2E-02
			Chemical Total	7.0E-05	- -	9.0E-06	--	8E-05		2.0E+01	--	2.5E+00	2E+01
		Exposure Point Total						8E-05					2E+01
	Exposure Medium Total							8E-05					2E+01
	Air-Shower	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	3.5E-09	- -	--	3E-09	NA	--	--	--	--
			Benzene	- -	3.9E-09	- -	--	4E-09	Immune	--	1.3E-04	--	1E-04
			Chloroform	- -	1.4E-08	- -	--	1E-08	Hepatic	--	5.0E-05	--	5E-05
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene (Kidney)	- -	2.5E-07	- -	--	2E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	5.3E-07	- -	--	5E-07	CVS, Immune, Developmental	--	6.7E-01	--	7E-01
			Vinyl Chloride	- -	3.6E-08	- -	--	4E-08	Hepatic	--	6.4E-04	--	6E-04
			1,4-Dioxane	- -	1.4E-09	- -	--	1E-09	Nervous, Respiratory	--	7.4E-05	--	7E-05
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -	NA	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -	NA	--	--	--	--
			Naphthalene	- -	1.8E-09	- -	--	2E-09	Nervous, Respiratory	--	1.4E-04	--	1E-04
			2,3,7,8-TCDD Equivalents	- -	6.4E-09	- -	--	6E-09	Reproductive, Developmental, Endocrine	--	3.3E-05	--	3E-05
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.2E-01	--	1E-01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	8.5E-07	- -	--	8E-07		- -	7.9E-01	- -	8E-01
		Exposure Point Total						8E-07					8E-01
	Exposure Medium Total							8E-07					8E-01
Medium Total								8E-05					2E+01
Receptor Total							Receptor Risk Total	8E-05				Receptor HI Total	2E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.13.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Hematologic HI	1E-01
Total Body Weight HI	1E-04
Total Nervous HI	2E+00
Total CVS HI	8E+00
Total Developmental HI	8E+00
Total Endocrine HI	2E-01
Total GS HI	5E-01
Total Immune HI	8E+00
Total Hepatic HI	5E-02
Total Reproductive HI	2E-01
Total Respiratory HI	2E-04
Total Dermal HI	2E-01
Total Thyroid HI	9E-01
Total Urinary HI	1E+01
Total None Specified HI	1E-01

TABLE 9.14.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	1,1-Dichloroethane	4.3E-08	- -	3.7E-09	--	5E-08					
			Benzene	8.6E-08	- -	1.4E-08	--	1E-07					
			Chloroform	7.7E-08	- -	7.7E-09	--	8E-08					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	2.5E-05	- -	4.8E-06	--	3E-05					
			Trichloroethene (Non-Kidney)	2.5E-05	- -	4.6E-06	--	3E-05					
			Vinyl Chloride	2.5E-04	- -	2.3E-05	--	3E-04					
			1,4-Dioxane	4.5E-06	- -	1.9E-08	--	5E-06					
			Benzo(a)pyrene	6.2E-07	- -	- -	--	6E-07					
			Bis(2-ethylhexyl)phthalate	2.0E-07	- -	- -	--	2E-07					
			Dibenzo(a,h)anthracene	2.6E-06	- -	- -	--	3E-06					
			Indeno(1,2,3-cd)pyrene	3.2E-07	- -	- -	--	3E-07					
			Naphthalene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	7.5E-07	- -	- -	--	8E-07					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Dieldrin	7.4E-08	- -	1.6E-07	--	2E-07					
			delta-BHC	1.7E-07	- -	1.5E-07	--	3E-07					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	1.4E-05	- -	6.1E-08	--	1E-05					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	1.2E-04	- -	2.2E-05	--	1E-04					
			Cobalt	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Chemical Total	4.5E-04	- -	5.5E-05	--	5E-04					
		Exposure Point Total						5E-04					
	Exposure Medium Total							5E-04					
	Air-Shower	Outside Landfill Deep Wells	1,1-Dichloroethane	- -	3.5E-09	- -	--	3E-09					
			Benzene	- -	3.9E-09	- -	--	4E-09					
			Chloroform	- -	1.4E-08	- -	--	1E-08					
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -					
			Trichloroethene (Kidney)	- -	2.5E-07	- -	--	2E-07					
			Trichloroethene (Non-Kidney)	- -	5.3E-07	- -	--	5E-07					
			Vinyl Chloride	- -	3.6E-08	- -	--	4E-08					
			1,4-Dioxane	- -	1.4E-09	- -	--	1E-09					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -					
			Naphthalene	- -	1.8E-09	- -	--	2E-09					
			2,3,7,8-TCDD Equivalents	- -	6.4E-09	- -	--	6E-09					
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -					
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			delta-BHC	- -	- -	- -	--	- -					
			Aluminum	- -	- -	- -	--	- -					
			Antimony	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Beryllium	- -	- -	- -	--	- -					
			Cadmium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Cobalt	- -	- -	- -	--	- -					
			Cyanide	- -	- -	- -	--	- -					
			Iron	- -	- -	- -	--	- -					
			Lead	- -	- -	- -	--	- -					
			Manganese	- -	- -	- -	--	- -					
			Vanadium	- -	- -	- -	--	- -					
			Chemical Total	- -	8.5E-07	- -	--	8E-07					
		Exposure Point Total						8E-07					
	Exposure Medium Total							8E-07					
Medium Total								5E-04					
Receptor Total							Receptor Risk Total	5E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 10

Risks Summary

LIST OF TABLES

RAGS PART D TABLE 10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

Reasonable Maximum Exposures

10.1.RME Construction Workers - Groundwater Inside Landfill
10.2.RME Industrial Workers - Groundwater Inside Landfill
10.3.RME Child Residents - Groundwater Inside Landfill
10.4.RME Adult Residents - Groundwater Inside Landfill
10.5.RME Lifetime Residents - Groundwater Inside Landfill
10.6.RME Construction Workers - Groundwater Outside Landfill - Shallow Wells
10.7.RME Industrial Workers - Groundwater Outside Landfill - Shallow Wells
10.8.RME Child Residents - Groundwater Outside Landfill - Shallow Wells
10.9.RME Adult Residents - Groundwater Outside Landfill - Shallow Wells
10.10.RME Lifetime Residents - Groundwater Outside Landfill - Shallow Wells
10.11.RME Industrial Workers - Groundwater Outside Landfill - Deep Wells
10.12.RME Child Residents - Groundwater Outside Landfill - Deep Wells
10.13.RME Adult Residents - Groundwater Outside Landfill - Deep Wells
10.14.RME Lifetime Residents - Groundwater Outside Landfill - Deep Wells

Central Tendency Exposures

10.1.CTE Construction Workers - Groundwater Inside Landfill
10.2.CTE Industrial Workers - Groundwater Inside Landfill
10.3.CTE Child Residents - Groundwater Inside Landfill
10.4.CTE Adult Residents - Groundwater Inside Landfill
10.5.CTE Lifetime Residents - Groundwater Inside Landfill
10.6.CTE Construction Workers - Groundwater Outside Landfill - Shallow Wells
10.7.CTE Industrial Workers - Groundwater Outside Landfill - Shallow Wells
10.8.CTE Child Residents - Groundwater Outside Landfill - Shallow Wells
10.9.CTE Adult Residents - Groundwater Outside Landfill - Shallow Wells
10.10.CTE Lifetime Residents - Groundwater Outside Landfill - Shallow Wells
10.11.CTE Industrial Workers - Groundwater Outside Landfill - Deep Wells
10.12.CTE Child Residents - Groundwater Outside Landfill - Deep Wells
10.13.CTE Adult Residents - Groundwater Outside Landfill - Deep Wells
10.14.CTE Lifetime Residents - Groundwater Outside Landfill - Deep Wells

TABLE 10.1.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	2,3,7,8-TCDD Equivalents	2.4E-07	- -	- -	--	2E-07	Immune	6.4E-03	--	--	6E-03
			Dioxin-Like PCBs	2.4E-08	- -	- -	--	2E-08	Immune	6.4E-04	--	--	6E-04
			Nondioxin-Like PCBs	3.9E-08	- -	- -	--	4E-08	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	2.8E-04	--	1.6E-04	4E-04
			Chemical Total	3.0E-07	- -	- -	--	3E-07		7.3E-03	--	1.6E-04	7E-03
		Exposure Point Total						3E-07					7E-03
	Exposure Medium Total							3E-07					7E-03
	Air - Trench	Inside Landfill	2,3,7,8-TCDD Equivalents	- -	8.6E-05	- -	--	9E-05	Reproductive, Developmental, Endocrine	--	3.9E+00	--	4E+00
			Dioxin-Like PCBs	- -	1.6E-05	- -	--	2E-05	Reproductive, Developmental, Endocrine	--	7.2E-01	--	7E-01
			Nondioxin-Like PCBs	- -	2.2E-05	- -	--	2E-05	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	5.8E+01	--	6E+01
			Chemical Total	- -	1.2E-04	- -	--	1E-04		- -	6.2E+01	- -	6E+01
		Exposure Point Total						1E-04					6E+01
	Exposure Medium Total							1E-04					6E+01
Medium Total								1E-04					6E+01
Receptor Total							Receptor Risk Total	1E-04				Receptor HI Total	6E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	4E-04
Total Developmental HI	5E+00
Total Endocrine HI	6E+01
Total Immune HI	7E-03
Total Reproductive HI	5E+00
Total Thyroid HI	4E-04
Total Whole Body HI	4E-04

TABLE 10.2.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,4-Dioxane	2.8E-07	- -	2.8E-07	- -	6E-07	Hepatic, Urinary	2.6E-04	--	2.6E-04	5E-04
			Naphthalene	- -	- -	- -	- -	- -	Body Weight	4.7E-06	--	5.7E-04	6E-04
			2,3,7,8-TCDD Equivalents	9.9E-06	- -	- -	- -	1E-05	Reproductive, Developmental, Endocrine	3.1E-01	--	--	3E-01
			Aldrin	2.4E-08	- -	- -	- -	2E-08	Hepatic	1.3E-04	--	--	1E-04
			Dieldrin	1.1E-08	- -	2.9E-06	- -	3E-06	Hepatic	3.8E-05	--	1.0E-02	1E-02
			Dioxin-Like PCBs	9.9E-07	- -	- -	- -	1E-06	Reproductive, Developmental, Endocrine	3.1E-02	--	--	3E-02
			Nondioxin-Like PCBs	1.6E-06	- -	- -	- -	2E-06	NA	--	--	--	--
			Arsenic	1.2E-06	- -	3.3E-06	- -	4E-06	CVS, Dermal	7.2E-03	--	2.0E-02	3E-02
			Chromium	2.3E-06	- -	2.6E-04	- -	3E-04	None Specified	4.3E-03	--	4.9E-01	5E-01
			Cyanide	- -	- -	- -	- -	- -	Reproductive	1.5E-02	--	3.3E-02	5E-02
			Chemical Total	1.6E-05	- -	2.7E-04	- -	3E-04		3.6E-01	--	5.5E-01	9E-01
		Exposure Point Total						3E-04					9E-01
	Exposure Medium Total							3E-04					9E-01
	Air-Trench	Inside Landfill	1,4-Dioxane	- -	2.9E-06	- -	- -	3E-06	Nervous, Respiratory	--	5.5E-02	--	5E-02
			Naphthalene	- -	2.3E-06	- -	- -	2E-06	Nervous, Respiratory	--	6.3E-02	--	6E-02
			2,3,7,8-TCDD Equivalents	- -	2.1E-03	- -	- -	2E-03	Reproductive, Developmental, Endocrine	--	3.9E+00	--	4E+00
			Aldrin	- -	4.6E-06	- -	- -	5E-06	NA	--	--	--	--
			Dioxin-Like PCBs	- -	3.9E-04	- -	- -	4E-04	Reproductive, Developmental, Endocrine	--	7.2E-01	--	7E-01
			Nondioxin-Like PCBs	- -	5.4E-04	- -	- -	5E-04	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	5.8E+01	--	6E+01
			Chemical Total	- -	3.1E-03	- -	- -	3E-03		- -	6.3E+01	- -	6E+01
		Exposure Point Total						3E-03					6E+01
	Exposure Medium Total							3E-03					6E+01
Medium Total								3E-03					6E+01
Groundwater	Air -Irrigation	Inside Landfill	1,4-Dioxane	- -	5.3E-09	- -	- -	5E-09	Nervous, Respiratory	--	9.9E-05	--	1E-04
			Naphthalene	- -	5.1E-08	- -	- -	5E-08	Nervous, Respiratory	--	1.4E-03	--	1E-03
			2,3,7,8-TCDD Equivalents	- -	6.8E-05	- -	- -	7E-05	Reproductive, Developmental, Endocrine	--	1.3E-01	--	1E-01
			Aldrin	- -	1.6E-07	- -	- -	2E-07	NA	--	--	--	--
			Dioxin-Like PCBs	- -	1.3E-05	- -	- -	1E-05	Reproductive, Developmental, Endocrine	--	2.4E-02	--	2E-02
			Nondioxin-Like PCBs	- -	1.8E-05	- -	- -	2E-05	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	9.7E-01	--	1E+00
			Chemical Total	- -	9.9E-05	- -	- -	1E-04		- -	1.1E+00	- -	1E+00
		Exposure Point Total						1E-04					1E+00
	Exposure Medium Total							1E-04					1E+00
Medium Total								1E-04					1E+00
Groundwater	Air - Showering	Inside Landfill	1,4-Dioxane	- -	1.8E-08	- -	- -	2E-08	Nervous, Respiratory	--	3.3E-04	--	3E-04
			Naphthalene	- -	3.9E-08	- -	- -	4E-08	Nervous, Respiratory	--	1.1E-03	--	1E-03
			2,3,7,8-TCDD Equivalents	- -	1.7E-05	- -	- -	2E-05	Reproductive, Developmental, Endocrine	--	3.1E-02	--	3E-02
			Aldrin	- -	3.5E-08	- -	- -	3E-08	NA	--	--	--	--
			Dioxin-Like PCBs	- -	6.5E-06	- -	- -	7E-06	Reproductive, Developmental, Endocrine	--	1.2E-02	--	1E-02
			Nondioxin-Like PCBs	- -	9.1E-06	- -	- -	9E-06	NA	--	--	--	--
			Arsenic	- -	- -	- -	- -	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	1.2E+00	--	1E+00
			Chemical Total	- -	3.3E-05	- -	- -	3E-05		- -	1.3E+00	- -	1E+00
		Exposure Point Total						3E-05					1E+00
	Exposure Medium Total							3E-05					1E+00
Medium Total								3E-05					1E+00
Receptor Total							Receptor Risk Total	4E-03				Receptor HI Total	7E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.2.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Body Weight HI	6E-04
Total Nervous HI	1E-01
Total CVS HI	3E-02
Total Developmental HI	5E+00
Total Endocrine HI	7E+01
Total Hepatic HI	1E-02
Total Reproductive HI	5E+00
Total Respiratory HI	1E-01
Total Dermal HI	3E-02
Total Urinary HI	5E-04
Total None Specified HI	5E-01

TABLE 10.2.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Body Weight HI	6E-04
Total Nervous HI	1E-01
Total CVS HI	3E-02
Total Developmental HI	5E+00
Total Endocrine HI	7E+01
Total Hepatic HI	1E-02
Total Reproductive HI	5E+00
Total Respiratory HI	1E-01
Total Dermal HI	3E-02
Total Urinary HI	5E-04
Total None Specified HI	5E-01

TABLE 10.3.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	Trichloroethene (Kidney)	4.9E-07	- -	7.1E-08	--	6E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	3.6E-07	- -	5.3E-08	--	4E-07	CVS, Immune, Developmental	2.3E-01	--	3.3E-02	3E-01
			1,4-Dioxane	3.9E-05	- -	1.2E-07	--	4E-05	Hepatic, Urinary	1.5E-01	--	4.8E-04	2E-01
			Benzo(a)pyrene	1.9E-05	- -	- -	--	2E-05	Developmental, Immune, Reproductive	1.4E-01	--	--	1E-01
			Benzo(b)fluoranthene	3.2E-06	- -	- -	--	3E-06	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	1.4E-03	- -	- -	--	1E-03	Reproductive, Developmental, Endocrine	1.8E+02	--	--	2E+02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	7.2E-01	--	--	7E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.3E+00	--	--	1E+00
			Aldrin	3.4E-06	- -	- -	--	3E-06	Hepatic	7.8E-02	--	--	8E-02
			Dieldrin	1.5E-06	- -	2.5E-06	--	4E-06	Hepatic	2.2E-02	--	3.6E-02	6E-02
			Dioxin-Like PCBs	1.4E-04	- -	- -	--	1E-04	Reproductive, Developmental, Endocrine	1.8E+01	--	--	2E+01
			Nondioxin-Like PCBs	2.3E-04	- -	- -	--	2E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	5.7E-01	--	2.5E-03	6E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	3.5E+00	--	1.0E-01	4E+00
			Arsenic	1.6E-04	- -	7.1E-07	--	2E-04	CVS, Dermal	4.2E+00	--	1.8E-02	4E+00
			Barium	- -	- -	- -	--	- -	Urinary	3.0E-01	--	1.9E-02	3E-01
			Beryllium	- -	- -	- -	--	- -	GS	2.0E-01	--	1.3E-01	3E-01
			Boron	- -	- -	- -	--	- -	Developmental	5.9E-01	--	2.6E-03	6E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	2.2E+00	--	1.9E-01	2E+00
			Chromium	1.7E-03	- -	3.0E-04	--	2E-03	None Specified	2.5E+00	--	4.4E-01	3E+00
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.1E+00	--	3.7E-03	2E+00
			Copper	- -	- -	- -	--	- -	GS	3.5E-01	--	1.5E-03	4E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	9.0E+00	--	4.0E-02	9E+00
			Iron	- -	- -	- -	--	- -	GS	3.8E+00	--	1.7E-02	4E+00
			Manganese	- -	- -	- -	--	- -	Nervous	9.6E+00	--	1	1E+01
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	4.1E+00	--	1.8E-02	4E+00
			Silver	- -	- -	- -	--	- -	Dermal	2.6E-01	--	1.7E-02	3E-01
			Thallium	- -	- -	- -	--	- -	Hair	1.4E+01	--	6.4E-02	1E+01
			Vanadium	- -	- -	- -	--	- -	Dermal	9.0E-01	--	1.5E-01	1E+00
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	2.7E-01	--	7.1E-04	3E-01
			Chemical Total	3.7E-03	- -	3.1E-04	--	4E-03		2.6E+02	--	2.4E+00	3E+02
		Exposure Point Total						4E-03					3E+02
	Exposure Medium Total							4E-03					3E+02
Medium Total								4E-03					3E+02
Receptor Total							Receptor Risk Total	4E-03				Receptor HI Total	3E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	4E+00
Total Nervous HI	2E+01
Total CVS HI	4E+00
Total Developmental HI	2E+02
Total Endocrine HI	2E+02
Total GS HI	4E+00
Total Hair HI	1E+01
Total Reproductive HI	2E+02
Total Dermal HI	6E+00
Total Thyroid HI	2E+00
Total Urinary HI	3E+00
Total None Specified HI	3E+00

TABLE 10.4.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	Trichloroethene (Kidney)	3.7E-07	1.0E-07	5.2E-08	--	5E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	7.3E-07	1.6E-07	1.0E-07	--	1E-06	CVS, Immune, Developmental	1.4E-01	--	2.0E-02	2E-01
			1,4-Dioxane	7.9E-05	2.6E-07	2.7E-07	--	8E-05	Hepatic, Urinary	9.2E-02	--	3.2E-04	9E-02
			Benzo(a)pyrene	1.4E-05	- -	- -	--	1E-05	Developmental, Immune, Reproductive	8.3E-02	--	--	8E-02
			Benzo(b)fluoranthene	2.4E-06	- -	- -	--	2E-06	NA	--	--	--	--
			Pentachlorophenol	6.5E-07	- -	2.5E-06	--	3E-06	Hepatic	1.1E-03	--	4.3E-03	5E-03
			2,3,7,8-TCDD Equivalents	2.8E-03	2.5E-04	- -	--	3E-03	Reproductive, Developmental, Endocrine	1.1E+02	--	--	1E+02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.3E-01	--	--	4E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	7.8E-01	--	--	8E-01
			Aldrin	6.8E-06	5.0E-07	- -	--	7E-06	Hepatic	4.7E-02	--	--	5E-02
			delta-BHC	1.8E-06	- -	1.3E-06	--	3E-06	Hepatic	1.3E-04	--	8.9E-05	2E-04
			Dieldrin	3.0E-06	- -	5.4E-06	--	8E-06	Hepatic	1.3E-02	--	2.4E-02	4E-02
			Heptachlor	1.9E-07	4.9E-08	1.4E-06	--	2E-06	Hepatic	2.9E-04	--	2.1E-03	2E-03
			Dioxin-Like PCBs	2.8E-04	9.5E-05	- -	--	4E-04	Reproductive, Developmental, Endocrine	1.1E+01	--	--	1E+01
			Nondioxin-Like PCBs	4.5E-04	1.3E-04	- -	--	6E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	3.5E-01	--	1.9E-03	3E-01
			Antimony	- -	- -	- -	--	- -	Hematologic	2.1E+00	--	7.7E-02	2E+00
			Arsenic	3.2E-04	- -	1.8E-06	--	3E-04	CVS, Dermal	2.5E+00	--	1.4E-02	3E+00
			Barium	- -	- -	- -	--	- -	Urinary	1.8E-01	--	1.5E-02	2E-01
			Beryllium	- -	- -	- -	--	- -	GS	1.2E-01	--	9.6E-02	2E-01
			Boron	- -	- -	- -	--	- -	Developmental	3.5E-01	--	2.0E-03	4E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	1.3E+00	--	1.5E-01	1E+00
			Chromium	1.3E-03	- -	2.9E-04	--	2E-03	None Specified	1.5E+00	--	3.4E-01	2E+00
			Copper	- -	- -	- -	--	- -	GS	2.1E-01	--	1.2E-03	2E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	5.4E+00	--	2.3E-02	5E+00
			Iron	- -	- -	- -	--	- -	GS	2.3E+00	--	1.3E-02	2E+00
			Manganese	- -	- -	- -	--	- -	Nervous	5.8E+00	--	8.1E-01	7E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	2.5E+00	--	1.4E-02	2E+00
			Silver	- -	- -	- -	--	- -	Dermal	1.6E-01	--	1.3E-02	2E-01
			Thallium	- -	- -	- -	--	- -	Hair	8.7E+00	--	4.9E-02	9E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	5.4E-01	--	1.2E-01	7E-01
			Zinc	- -	- -	- -	--	- -	Immune, Hematologic	1.6E-01	--	5.4E-04	2E-01
			Chemical Total	5.2E-03	- -	3.0E-04	--	6E-03		1.5E+02	--	1.8E+00	2E+02
		Exposure Point Total						6E-03					2E+02
	Exposure Medium Total							6E-03					2E+02
			Trichloroethene (Kidney)	- -	1.0E-07	- -	--	1E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	1.6E-07	- -	--	2E-07	CVS, Immune, Developmental	--	9.0E-02	--	9E-02
			1,4-Dioxane	- -	2.6E-07	- -	--	3E-07	Nervous, Respiratory	--	6.0E-03	--	6E-03
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Benzo(b)fluoranthene	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.5E-04	- -	--	2E-04	Reproductive, Developmental, Endocrine	--	5.7E-01	--	6E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Aldrin	- -	5.0E-07	- -	--	5E-07	NA	--	--	--	--
			delta-BHC	- -	- -	- -	--	- -	NA	--	--	--	--
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Heptachlor	- -	4.9E-08	- -	--	5E-08	NA	--	--	--	--
			Dioxin-Like PCBs	- -	9.5E-05	- -	--	9E-05	Reproductive, Developmental, Endocrine	--	2.2E-01	--	2E-01
			Nondioxin-Like PCBs	- -	1.3E-04	- -	--	1E-04	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Beryllium	- -	- -	- -	--	- -	Immune, Respiratory	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cadmium	- -	- -	- -	--	- -	Urinary	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Copper	- -	- -	- -	--	- -	NA	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	2.2E+01	--	2E+01
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Zinc	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	4.7E-04	- -	--	5E-04		- -	2.3E+01	- -	2E+01
		Exposure Point Total						5E-04					2E+01
	Exposure Medium Total							5E-04					2E+01
Medium Total								6E-03					2E+02
Receptor Total							Receptor Risk Total	6E-03				Receptor HI Total	2E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Hematologic HI	2E+00
Total Nervous HI	9E+00
Total CVS HI	3E+00
Total Developmental HI	1E+02
Total Endocrine HI	1E+02
Total GS HI	3E+00
Total Hair HI	9E+00
Total Reproductive HI	1E+02
Total Dermal HI	3E+00
Total Urinary HI	2E+00
Total None Specified HI	2E+00

TABLE 10.5.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	Trichloroethene (Kidney)	8.5E-07	- -	1.2E-07	--	1E-06					
			Trichloroethene (Non-Kidney)	1.1E-06	- -	1.6E-07	--	1E-06					
			1,4-Dioxane	1.2E-04	- -	4.0E-07	--	1E-04					
			Benzo(a)anthracene	2.2E-06	- -	- -	--	2E-06					
			Benzo(a)pyrene	3.3E-05	- -	- -	--	3E-05					
			Benzo(b)fluoranthene	5.6E-06	- -	- -	--	6E-06					
			Bis(2-ethylhexyl)phthalate	2.2E-06	- -	- -	--	2E-06					
			Dibenzo(a,h)anthracene	2.4E-06	- -	- -	--	2E-06					
			Indeno(1,2,3-cd)pyrene	1.9E-06	- -	- -	--	2E-06					
			Pentachlorophenol	9.8E-07	- -	3.6E-06	--	5E-06					
			2,3,7,8-TCDD Equivalents	4.2E-03	- -	- -	--	4E-03					
			Aldrin	1.0E-05	- -	- -	--	1E-05					
			beta-BHC	9.7E-07	- -	6.7E-07	--	2E-06					
			delta-BHC	2.7E-06	- -	1.9E-06	--	5E-06					
			Dieldrin	4.5E-06	- -	7.9E-06	--	1E-05					
			Heptachlor	2.8E-07	- -	2.0E-06	--	2E-06					
			Dioxin-Like PCBs	4.2E-04	- -	- -	--	4E-04					
			Nondioxin-Like PCBs	6.8E-04	- -	- -	--	7E-04					
			Arsenic	4.9E-04	- -	2.5E-06	--	5E-04					
			Chromium	3.0E-03	- -	5.9E-04	--	4E-03					
			Chemical Total	9.0E-03	- -	6.1E-04	--	1E-02					
		Exposure Point Total						1E-02					
	Exposure Medium Total							1E-02					
	Air-Shower	Inside Landfill	Trichloroethene (Kidney)	- -	1.0E-07	- -	--	1E-07					
			Trichloroethene (Non-Kidney)	- -	1.6E-07	- -	--	2E-07					
			1,4-Dioxane	- -	2.6E-07	- -	--	3E-07					
			Benzo(a)anthracene	- -	5.7E-08	- -	--	6E-08					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Benzo(b)fluoranthene	- -	- -	- -	--	- -					
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -					
			Pentachlorophenol	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	2.5E-04	- -	--	2E-04					
			Aldrin	- -	5.0E-07	- -	--	5E-07					
			beta-BHC	- -	- -	- -	--	- -					
			delta-BHC	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			Heptachlor	- -	4.9E-08	- -	--	5E-08					
			Dioxin-Like PCBs	- -	9.5E-05	- -	--	9E-05					
			Nondioxin-Like PCBs	- -	1.3E-04	- -	--	1E-04					
			Arsenic	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Chemical Total	- -	4.7E-04	- -	--	5E-04					
		Exposure Point Total						5E-04					
	Exposure Medium Total							5E-04					
Medium Total								1E-02					
Receptor Total							Receptor Risk Total	1E-02					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.6.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill	Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	4.3E-05	--	2.4E-05	7E-05
		Shallow Wells	Chemical Total	- -	- -	- -	--	- -		4.3E-05	--	2.4E-05	7E-05
		Exposure Point Total						- -					7E-05
	Exposure Medium Total							- -					7E-05
	Air - Trench	Outside Landfill	Cyanide	- -	- -	- -	--	- -	Endocrine	--	9.0E+00	--	9E+00
		Shallow Wells	Chemical Total	- -	- -	- -	--	- -		- -	9.0E+00	- -	9E+00
		Exposure Point Total						- -					9E+00
	Exposure Medium Total							- -					9E+00
Medium Total								- -					9E+00
Receptor Total							Receptor Risk Total	- -				Receptor HI Total	9E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	7E-05
Total Endocrine HI	9E+00
Total Thyroid HI	7E-05
Total Whole Body HI	7E-05

TABLE 10.7.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	5.6E-09	- -	1.6E-07	--	2E-07	Reproductive	9.8E-05	--	2.8E-03	3E-03
			1,2-Dichloroethane	3.1E-09	- -	3.5E-08	--	4E-08	Urinary	1.6E-05	--	1.8E-04	2E-04
			Benzene	9.8E-09	- -	3.6E-07	--	4E-07	Immune	1.2E-04	--	4.6E-03	5E-03
			Trichloroethene	8.7E-09	- -	2.8E-07	--	3E-07	CVS, Immune, Developmental	1.1E-03	--	3.4E-02	3E-02
			Vinyl Chloride	9.2E-08	- -	1.9E-06	--	2E-06	Hepatic	1.2E-04	--	2.4E-03	3E-03
			1,4-Dioxane	1.7E-07	- -	1.7E-07	--	3E-07	Hepatic, Urinary	1.6E-04	--	1.6E-04	3E-04
			2,6-Dinitrotoluene	3.9E-07	- -	5.2E-06	--	6E-06	Hepatic, Spleen	2.5E-03	--	3.2E-02	3E-02
			Bis(2-Chloroethyl)Ether	4.0E-08	- -	2.3E-07	--	3E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	3.4E-05	--	4.1E-03	4E-03
			Pentachlorophenol	6.0E-09	- -	3.4E-06	--	3E-06	Hepatic	8.4E-06	--	4.8E-03	5E-03
			2,3,7,8-TCDD Equivalents	1.3E-08	- -	- -	--	1E-08	Reproductive, Developmental, Endocrine	3.9E-04	--	--	4E-04
			Dieldrin	8.3E-09	- -	2.3E-06	--	2E-06	Hepatic	2.9E-05	--	7.9E-03	8E-03
			Dioxin-Like PCBs	5.6E-09	- -	- -	--	6E-09	Reproductive, Developmental, Endocrine	1.7E-04	--	--	2E-04
			Arsenic	8.6E-07	- -	2.4E-06	--	3E-06	CVS, Dermal	5.3E-03	--	1.5E-02	2E-02
			Chromium	1.2E-07	- -	1.4E-05	--	1E-05	None Specified	2.3E-04	--	2.6E-02	3E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	2.4E-03	--	5.1E-03	7E-03
			Manganese	- -	- -	- -	--	- -	Nervous	3.9E-02	--	2.7E+00	3E+00
			Chemical Total	1.7E-06	- -	3.0E-05	--	3E-05		5.1E-02	--	2.9E+00	3E+00
		Exposure Point Total						3E-05					3E+00
	Exposure Medium Total							3E-05					3E+00
Groundwater	Air - Trench	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	- -	5.3E-05	- -	--	5E-05	Reproductive	--	1.2E-01	--	1E-01
			1,2-Dichloroethane	- -	2.1E-06	- -	--	2E-06	Nervous	--	3.3E-02	--	3E-02
			Benzene	- -	4.0E-06	- -	--	4E-06	Immune	--	4.7E-02	--	5E-02
			Trichloroethene	- -	1.7E-06	- -	--	2E-06	CVS, Immune, Developmental	--	5.9E-01	--	5.9E-01
			Vinyl Chloride	- -	1.8E-06	- -	--	2E-06	Hepatic	--	1.2E-02	--	1E-02
			1,4-Dioxane	- -	1.8E-06	- -	--	2E-06	Nervous, Respiratory	--	3.4E-02	--	3E-02
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	6.3E-06	- -	--	6E-06	NA	--	--	--	--
			Naphthalene	- -	1.7E-05	- -	--	2E-05	Nervous, Respiratory	--	4.6E-01	--	5E-01
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.7E-06	- -	--	3E-06	Reproductive, Developmental, Endocrine	--	5.1E-03	--	5E-03
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	2.2E-06	- -	--	2E-06	Reproductive, Developmental, Endocrine	--	4.0E-03	--	4E-03
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	9.0E+00	--	9E+00
			Chemical Total	- -	9.2E-05	- -	--	9E-05		- -	1.0E+01	- -	1E+01
		Exposure Point Total						9E-05					1E+01
	Exposure Medium Total							9E-05					1E+01
Medium Total								1E-04					1E+01
Groundwater	Air - Irrigation	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	--	1E-06	--	--	1E-06	Reproductive	--	3.3E-03	--	3E-03
			1,2-Dichloroethane	--	5E-08	--	--	5E-08	Nervous	--	7.3E-04	--	7E-04
			Benzene	--	4E-08	--	--	4E-08	Immune	--	4.7E-04	--	5E-04
			Trichloroethene	--	6E-08	--	--	6E-08	CVS, Immune, Developmental	--	2.0E-02	--	2E-02
			Vinyl Chloride	--	5E-08	--	--	5E-08	Hepatic	--	3.1E-04	--	3E-04
			1,4-Dioxane	--	3E-09	--	--	3E-09	Nervous, Respiratory	--	6.1E-05	--	6E-05
			2,6-Dinitrotoluene	--	- -	--	--	- -	NA	--	--	--	--
			Bis(2-Chloroethyl)Ether	--	2E-07	--	--	2E-07	NA	--	--	--	--
			Naphthalene	--	4E-07	--	--	4E-07	Nervous, Respiratory	--	1.0E-02	--	1E-02
			Pentachlorophenol	--	- -	--	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	9E-08	--	--	9E-08	Reproductive, Developmental, Endocrine	--	1.6E-04	--	2E-04
			Dieldrin	--	- -	--	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	--	7E-08	--	--	7E-08	Reproductive, Developmental, Endocrine	--	1.3E-04	--	1E-04
			Arsenic	--	- -	--	--	- -	CVS, Dermal	--	--	--	--
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cyanide	--	- -	--	--	- -	Endocrine	--	1.5E-01	--	2E-01
			Chemical Total	--	2E-06	--	--	2E-06		- -	1.9E-01	- -	2E-01
		Exposure Point Total						2E-06					2E-01
	Exposure Medium Total							2E-06					2E-01
Medium Total								2E-06					2E-01

TABLE 10.7.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Shower	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	--	6E-07	--	--	6E-07	Reproductive	--	1.5E-03	--	1E-03
			1,2-Dichloroethane	--	4E-08	--	--	4E-08	Nervous	--	6.6E-04	--	7E-04
			Benzene	--	9E-08	--	--	9E-08	Immune	--	1.0E-03	--	1E-03
			Trichloroethene	--	4E-08	--	--	4E-08	CVS, Immune, Developmental	--	1.3E-02	--	1E-02
			Vinyl Chloride	--	4E-08	--	--	4E-08	Hepatic	--	2.6E-04	--	3E-04
			1,4-Dioxane	--	1E-08	--	--	1E-08	Nervous, Respiratory	--	2.0E-04	--	2E-04
			2,6-Dinitrotoluene	--	- -	--	--	- -	NA	--	--	--	--
			Bis(2-Chloroethyl)Ether	--	4E-08	--	--	4E-08	NA	--	--	--	--
			Naphthalene	--	3E-07	--	--	3E-07	Nervous, Respiratory	--	7.8E-03	--	8E-03
			Pentachlorophenol	--	- -	--	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	2E-08	--	--	2E-08	Reproductive, Developmental, Endocrine	--	4.0E-05	--	4E-05
			Dieldrin	--	- -	--	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	--	4E-08	--	--	4E-08	Reproductive, Developmental, Endocrine	--	6.7E-05	--	7E-05
			Arsenic	--	- -	--	--	- -	CVS, Dermal	--	--	--	--
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cyanide	--	- -	--	--	- -	Endocrine	--	1.9E-01	--	2E-01
			Chemical Total	--	1E-06	--	--	1E-06		- -	2.2E-01	- -	2E-01
		Exposure Point Total						1E-06					2E-01
	Exposure Medium Total							1E-06					2E-01
Medium Total								1E-06					2E-01
Receptor Total							Receptor Risk Total	1E-04				Receptor HI Total	1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	4E-03
Total Nervous HI	3E+00
Total CVS HI	7E-01
Total Developmental HI	7E-01
Total Endocrine HI	9E+00
Total Immune HI	7E-01
Total Hepatic HI	6E-02
Total Reproductive HI	1E-01
Total Respiratory HI	5E-01
Total Dermal HI	2E-02
Total Spleen HI	3E-02
Total Urinary HI	5E-04
Total None Specified HI	3E-02

TABLE 10.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	4.2E-06	- -	7.1E-07	--	5E-06	Reproductive	5.7E-02	--	9.7E-03	7E-02
			Benzene	1.4E-06	- -	1.8E-07	--	2E-06	Immune	7.2E-02	--	9.6E-03	8E-02
			cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	1.3E+00	--	1.5E-01	1E+00
			Trichloroethene (Kidney)	1.3E-06	- -	1.9E-07	--	2E-06	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	9.8E-07	- -	1.4E-07	--	1E-06	CVS, Immune, Developmental	6.2E-01	--	9.0E-02	7E-01
			Vinyl Chloride	1.7E-04	- -	1.1E-05	--	2E-04	Hepatic	7.0E-02	--	4.7E-03	7E-02
			1,4-Dioxane	2.4E-05	- -	7.6E-08	--	2E-05	Hepatic, Urinary	9.4E-02	--	3.0E-04	9E-02
			2,6-Dinitrotoluene	5.5E-05	- -	3.5E-06	--	6E-05	Hepatic, Spleen	1.4E+00	--	9.2E-02	2E+00
			Benzo(a)pyrene	2.7E-06	- -	- -	--	3E-06	Developmental, Immune, Reproductive	2.0E-02	--	--	2E-02
			Bis(2-Chloroethyl)Ether	5.6E-06	- -	1.4E-07	--	6E-06	NA	--	--	--	--
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.6E+00	--	--	5E+00
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	6.5E-01	--	--	6E-01
			Pentachlorophenol	8.4E-07	- -	2.9E-06	--	4E-06	Hepatic	4.9E-03	--	1.7E-02	2E-02
			2,3,7,8-TCDD Equivalents	1.2E-06	- -	- -	--	1E-06	Reproductive, Developmental, Endocrine	1.5E-01	--	--	2E-01
			Dieldrin	1.2E-06	- -	1.9E-06	--	3E-06	Hepatic	1.7E-02	--	2.8E-02	4E-02
			Aluminum	- -	- -	- -	--	- -	Nervous	3.9E-01	--	1.7E-03	4E-01
			Arsenic	1.2E-04	- -	5.3E-07	--	1E-04	CVS, Dermal	3.1E+00	--	1.4E-02	3E+00
			Barium	- -	- -	- -	--	- -	Urinary	1.3E-01	--	8.1E-03	1E-01
			Boron	- -	- -	- -	--	- -	Developmental	1.8E-01	--	8.1E-04	2E-01
			Cadmium	- -	- -	- -	--	- -	Urinary	1.8E-01	--	1.6E-02	2E-01
			Chromium	9.2E-05	- -	1.6E-05	--	1E-04	None Specified	1.3E-01	--	2.4E-02	2E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.2E+00	--	3.8E-03	2E+00
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.4E+00	--	6.2E-03	1E+00
			Iron	- -	- -	- -	--	- -	GS	2.8E+00	--	1.2E-02	3E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	2.2E+01	--	2.5E+00	2E+01
			Silver	- -	- -	- -	--	- -	Dermal	2.5E-01	--	1.7E-02	3E-01
			Thallium	- -	- -	- -	--	- -	Hair	1.9E+01	--	8.6E-02	2E+01
			Vanadium	- -	- -	- -	--	- -	Dermal	1.1E-01	--	1.9E-02	1E-01
			Chemical Total	4.8E-04	- -	3.8E-05	--	5E-04		6.2E+01	--	3.1E+00	6E+01
		Exposure Point Total						5E-04					6E+01
	Exposure Medium Total							5E-04					6E+01
Medium Total								5E-04					6E+01
Receptor Total							Receptor Risk Total	5E-04				Receptor HI Total	6E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	3E+01
Total CVS HI	4E+00
Total Developmental HI	6E+00
Total GS HI	3E+00
Total Hair HI	2E+01
Total Hepatic HI	2E+00
Total Reproductive HI	2E+00
Total Dermal HI	4E+00
Total Spleen HI	2E+00
Total Thyroid HI	2E+00
Total Urinary HI	2E+00

TABLE 10.9.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	3.2E-06	- -	5.7E-07	--	4E-06	Reproductive	3.4E-02	--	6.2E-03	4.1E-02
			Benzene	2.7E-06	- -	3.5E-07	--	3E-06	Immune	4.3E-02	--	5.5E-03	4.9E-02
			Trichloroethene (Kidney)	9.9E-07	- -	1.4E-07	--	1E-06	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	2.0E-06	- -	2.8E-07	--	2E-06	CVS, Immune, Developmental	3.7E-01	--	5.3E-02	4.2E-01
			Vinyl Chloride	2.6E-05	- -	1.7E-06	--	3E-05	Hepatic	4.2E-02	--	2.7E-03	4.5E-02
			1,4-Dioxane	4.8E-05	- -	1.7E-07	--	5E-05	Hepatic, Urinary	5.7E-02	--	2.0E-04	5.7E-02
			2,6-Dinitrotoluene	1.1E-04	- -	7.9E-06	--	1E-04	Hepatic, Spleen	8.6E-01	--	6.1E-02	9.2E-01
			Benzo(a)pyrene	2.1E-06	- -	- -	--	2E-06	Developmental, Immune, Reproductive	1.2E-02	--	--	1.2E-02
			Bis(2-Chloroethyl)Ether	1.1E-05	- -	3.0E-07	--	1E-05	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	1.2E-02	--	7.0E-03	1.9E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	2.8E+00	--	--	2.8E+00
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	3.9E-01	--	--	3.9E-01
			Pentachlorophenol	1.7E-06	- -	6.3E-06	--	8E-06	Hepatic	2.9E-03	--	1.1E-02	1.4E-02
			2,3,7,8-TCDD Equivalents	2.4E-06	- -	- -	--	2E-06	Reproductive, Developmental, Endocrine	9.1E-02	--	--	9.1E-02
			Dieldrin	2.3E-06	- -	4.2E-06	--	7E-06	Hepatic	1.0E-02	--	1.8E-02	2.9E-02
			Dioxin-Like PCBs	1.6E-06	- -	- -	--	2E-06	Reproductive, Developmental, Endocrine	6.0E-02	--	--	6.0E-02
			Aluminum	- -	- -	- -	--	- -	Nervous	2.4E-01	--	1.3E-03	2.4E-01
			Arsenic	2.4E-04	- -	1.3E-06	--	2E-04	CVS, Dermal	1.9E+00	--	1.0E-02	1.9E+00
			Boron	- -	- -	- -	--	- -	Developmental	1.1E-01	--	6.2E-04	1.1E-01
			Chromium	6.9E-05	- -	1.5E-05	--	8E-05	None Specified	8.0E-02	--	1.8E-02	9.8E-02
			Cyanide	- -	- -	- -	--	- -	Reproductive	8.4E-01	--	3.5E-03	8.4E-01
			Iron	- -	- -	- -	--	- -	GS	1.7E+00	--	9.5E-03	1.7E+00
			Manganese	- -	- -	- -	--	- -	Nervous	1.3E+01	--	1.9E+00	1.5E+01
			Silver	- -	- -	- -	--	- -	Dermal	1.5E-01	--	1.3E-02	1.6E-01
			Thallium	- -	- -	- -	--	- -	Hair	1.2E+01	--	6.5E-02	1.2E+01
			Chemical Total	5.2E-04	- -	3.9E-05	--	6E-04		3.5E+01	--	2.2E+00	3.7E+01
		Exposure Point Total						6E-04					3.7E+01
	Exposure Medium Total							6E-04					3.7E+01
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	- -	1.8E-05	- -	--	2E-05	Reproductive	--	2.7E-02	--	2.7E-02
			Benzene	- -	1.3E-06	- -	--	1E-06	Immune	--	1.9E-02	--	1.9E-02
			m+p-Xylenes	- -	- -	- -	--	- -	Nervous	--	2.2E-02	--	2.2E-02
			Trichloroethene (Kidney)	- -	2.8E-07	- -	--	3E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	4.3E-07	- -	--	4E-07	CVS, Immune, Developmental	--	2.4E-01	--	2.4E-01
			Vinyl Chloride	- -	5.9E-07	- -	--	6E-07	Hepatic	--	4.7E-03	--	4.7E-03
			1,4-Dioxane	- -	1.6E-07	- -	--	2E-07	Nervous, Respiratory	--	3.7E-03	--	3.7E-03
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	5.9E-07	- -	--	6E-07	NA	--	--	--	--
			Naphthalene	- -	4.1E-06	- -	--	4E-06	Nervous, Respiratory	--	1.4E-01	--	1.4E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Pentachlorophenol	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.1E-07	- -	--	2E-07	Reproductive, Developmental, Endocrine	--	4.8E-04	--	4.8E-04
			Dieldrin	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	5.3E-07	- -	--	5E-07	Reproductive, Developmental, Endocrine	--	1.2E-03	--	1.2E-03
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Boron	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	3.5E+00	--	3.5E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Silver	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	2.7E-05	- -	--	3E-05		- -	3.9E+00	- -	4E+00
		Exposure Point Total						3E-05					4E+00
	Exposure Medium Total							3E-05					4E+00
Medium Total								6E-04					4E+01
Receptor Total							Receptor Risk Total	6E-04				Receptor HI Total	4E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	2E+01
Total CVS HI	3E+00
Total Developmental HI	4E+00
Total Endocrine HI	4E+00
Total GS HI	2E+00
Total Hair HI	1E+01
Total Dermal HI	2E+00

TABLE 10.10.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	7.3E-06	- -	1.3E-06	--	9E-06					
			Benzene	4.1E-06	- -	5.3E-07	--	5E-06					
			Trichloroethene (Kidney)	2.3E-06	- -	3.3E-07	--	3E-06					
			Trichloroethene (Non-Kidney)	2.9E-06	- -	4.2E-07	--	3E-06					
			Vinyl Chloride	2.0E-04	- -	1.3E-05	--	2E-04					
			1,4-Dioxane	7.3E-05	- -	2.4E-07	--	7E-05					
			2,6-Dinitrotoluene	1.7E-04	- -	1.1E-05	--	2E-04					
			Benzo(a)pyrene	4.8E-06	- -	- -	--	5E-06					
			Bis(2-Chloroethyl)Ether	1.7E-05	- -	4.3E-07	--	2E-05					
			Pentachlorophenol	2.5E-06	- -	9.2E-06	--	1E-05					
			2,3,7,8-TCDD Equivalents	3.5E-06	- -	- -	--	4E-06					
			Dieldrin	3.5E-06	- -	6.1E-06	--	1E-05					
			Dioxin-Like PCBs	2.3E-06	- -	- -	--	2E-06					
			Arsenic	3.6E-04	- -	1.9E-06	--	4E-04					
			Chromium	1.6E-04	- -	3.1E-05	--	2E-04					
			Chemical Total	1.0E-03	- -	7.6E-05	--	1E-03					
		Exposure Point Total						1E-03					
	Exposure Medium Total							1E-03					
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	- -	1.8E-05	- -	--	2E-05					
			Benzene	- -	1.3E-06	- -	--	1E-06					
			Trichloroethene (Kidney)	- -	2.8E-07	- -	--	3E-07					
			Trichloroethene (Non-Kidney)	- -	4.3E-07	- -	--	4E-07					
			Vinyl Chloride	- -	5.9E-07	- -	--	6E-07					
			1,4-Dioxane	- -	1.6E-07	- -	--	2E-07					
			2,6-Dinitrotoluene	- -	- -	- -	--	- -					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Bis(2-Chloroethyl)Ether	- -	5.9E-07	- -	--	6E-07					
			Pentachlorophenol	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	2.1E-07	- -	--	2E-07					
			Dieldrin	- -	- -	- -	--	- -					
			Dioxin-Like PCBs	- -	5.3E-07	- -	--	5E-07					
			Arsenic	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Chemical Total	- -	2.2E-05	- -	--	2E-05					
		Exposure Point Total						2E-05					
	Exposure Medium Total							2E-05					
Medium Total								1E-03					
Receptor Total							Receptor Risk Total	1E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.11.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	8.6E-02	--	2.4E+00	3E+00
		Deep Wells	Trichloroethene	4.6E-07	- -	1.5E-05	--	2E-05	CVS, Immune, Developmental	5.7E-02	--	1.8E+00	2E+00
			Vinyl Chloride	2.4E-07	- -	4.9E-06	--	5E-06	Hepatic	3.1E-04	--	6.4E-03	7E-03
			Chromium	4.6E-07	- -	5.2E-05	--	5E-05	None Specified	8.7E-04	--	9.8E-02	1E-01
			Chemical Total	1.2E-06	- -	7.2E-05	--	7E-05		1.4E-01	--	4.3E+00	4E+00
		Exposure Point Total						7E-05					4E+00
	Exposure Medium Total							7E-05					4E+00
	Air - Irrigation	Outside Landfill	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
		Deep Wells	Trichloroethene	- -	3.1E-06	- -	--	3E-06	CVS, Immune, Developmental	--	1.1E+00	--	1E+00
			Vinyl Chloride	- -	1.3E-07	- -	--	1E-07	Hepatic	--	8.0E-04	--	8E-04
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	3.2E-06	- -	--	3E-06		- -	1.1E+00	- -	1E+00
		Exposure Point Total						3E-06					1E+00
	Exposure Medium Total							3E-06					1E+00
Medium Total								8E-05					6E+00
Groundwater	Air - Showering	Outside Landfill	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
		Deep Wells	Trichloroethene	- -	2.1E-06	- -	--	2E-06	CVS, Immune, Developmental	--	7.1E-01	--	7E-01
			Vinyl Chloride	- -	1.1E-07	- -	--	1E-07	Hepatic	--	6.8E-04	--	7E-04
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	2.2E-06	- -	--	2E-06		- -	7.1E-01	- -	7E-01
		Exposure Point Total						2E-06					7E-01
	Exposure Medium Total							2E-06					7E-01
Medium Total								2E-06					7E-01
Receptor Total							Receptor Risk Total	8E-05				Receptor HI Total	6E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	4E+00
Total Developmental HI	4E+00
Total Immune HI	4E+00
Total Hepatic HI	8E-03
Total Urinary HI	3E+00

TABLE 10.12.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	5.0E+01	--	5.5E+00	6E+01
			Trichloroethene (Kidney)	7.0E-05	- -	1.0E-05	--	8E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	5.2E-05	- -	7.6E-06	--	6E-05	CVS, Immune, Developmental	3.3E+01	--	4.8E+00	4E+01
			Vinyl Chloride	4.5E-04	- -	3.0E-05	--	5E-04	Hepatic	1.8E-01	--	1.2E-02	2E-01
			1,4-Dioxane	9.4E-06	- -	3.0E-08	--	9E-06	Hepatic, Urinary	3.7E-02	--	1.2E-04	4E-02
			Benzo(a)pyrene	1.8E-06	- -	- -	--	2E-06	Developmental, Immune, Reproductive	1.3E-02	--	--	1E-02
			Dibenzo(a,h)anthracene	7.3E-06	- -	- -	--	7E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.9E-07	- -	- -	--	9E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	3.7E-04	--	2.1E-04	6E-04
			2,3,7,8-TCDD Equivalents	1.6E-06	- -	- -	--	2E-06	Reproductive, Developmental, Endocrine	2.0E-01	--	--	2E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.2E-01	--	--	1E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	1.1E-01	--	--	1E-01
			Aluminum	- -	- -	- -	--	- -	Nervous	1.6E+00	--	6.9E-03	2E+00
			Arsenic	2.9E-05	- -	1.3E-07	--	3E-05	CVS, Dermal	7.6E-01	--	3.4E-03	8E-01
			Barium	- -	- -	- -	--	- -	Urinary	5.2E-02	--	3.2E-03	5E-02
			Beryllium	- -	- -	- -	--	- -	GS	3.0E-02	--	1.9E-02	5E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	1.4E-01	--	1.2E-02	2E-01
			Chromium	3.5E-04	- -	6.1E-05	--	4E-04	None Specified	5.1E-01	--	8.9E-02	6E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	4.5E+00	--	8.0E-03	5E+00
			Cyanide	- -	- -	- -	--	- -	Reproductive	9.2E-01	--	4.1E-03	9E-01
			Iron	- -	- -	- -	--	- -	GS	2.6E+00	--	1.2E-02	3E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	6.9E+00	--	7.6E-01	8E+00
			Chemical Total	9.6E-04	- -	1.1E-04	--	1E-03		1.0E+02	--	1.1E+01	1E+02
		Exposure Point Total						1E-03					1E+02
	Exposure Medium Total							1E-03					1E+02
Medium Total								1E-03					1E+02
Receptor Total							Receptor Risk Total	1E-03				Receptor HI Total	1E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	9E+00
Total CVS HI	4E+01
Total Developmental HI	4E+01
Total GS HI	3E+00
Total Immune HI	4E+01
Total Thyroid HI	5E+00
Total Urinary HI	6E+01

TABLE 10.13.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	3.0E+01	--	3.2E+00	3E+01
			Trichloroethene (Kidney)	5.3E-05	- -	7.4E-06	--	6E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.0E-04	- -	1.5E-05	--	1E-04	CVS, Immune, Developmental	2.0E+01	--	2.8E+00	2E+01
			Vinyl Chloride	6.8E-05	- -	4.4E-06	--	7E-05	Hepatic	1.1E-01	--	7.1E-03	1E-01
			1,4-Dioxane	1.9E-05	- -	6.5E-08	--	2E-05	Hepatic, Urinary	2.2E-02	--	7.6E-05	2E-02
			Dibenzo(a,h)anthracene	5.5E-06	- -	- -	--	5E-06	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	3.1E-06	- -	- -	--	3E-06	Reproductive, Developmental, Endocrine	1.2E-01	--	--	1E-01
			Aluminum	- -	- -	- -	--	- -	Nervous	9.4E-01	--	5.2E-03	9E-01
			Arsenic	5.9E-05	- -	3.3E-07	--	6E-05	CVS, Dermal	4.6E-01	--	2.6E-03	5E-01
			Barium	- -	- -	- -	--	- -	Urinary	3.1E-02	--	2.5E-03	3E-02
			Chromium	2.6E-04	- -	5.8E-05	--	3E-04	None Specified	3.0E-01	--	6.8E-02	4E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	2.7E+00	--	6.1E-03	3E+00
			Cyanide	- -	- -	- -	--	- -	Reproductive	5.5E-01	--	2.3E-03	6E-01
			Iron	- -	- -	- -	--	- -	GS	1.6E+00	--	8.8E-03	2E+00
			Manganese	- -	- -	- -	--	- -	Nervous	4.1E+00	--	5.8E-01	5E+00
			Chemical Total	5.7E-04	- -	8.5E-05	--	7E-04		6.1E+01	--	6.6E+00	7E+01
		Exposure Point Total						7E-04					7E+01
	Exposure Medium Total							7E-04					7E+01
	Air-Shower	Outside Landfill Deep Wells	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene (Kidney)	- -	1.5E-05	- -	--	1E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	2.3E-05	- -	--	2E-05	CVS, Immune, Developmental	--	1.3E+01	--	1E+01
			Vinyl Chloride	- -	1.6E-06	- -	--	2E-06	Hepatic	--	1.2E-02	--	1E-02
			1,4-Dioxane	- -	6.2E-08	- -	--	6E-08	Nervous, Respiratory	--	1.4E-03	--	1E-03
			Benzo(a)pyrene	- -	- -	- -	--	- -	Developmental, Immune, Reproductive	--	--	--	--
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	- -	2.8E-07	- -	--	3E-07	Reproductive, Developmental, Endocrine	--	6.3E-04	--	6E-04
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Antimony	- -	- -	- -	--	- -	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Barium	- -	- -	- -	--	- -	Developmental	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cobalt	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	2.3E+00	--	2E+00
			Iron	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Chemical Total	- -	4.0E-05	- -	--	4E-05		- -	1.5E+01	- -	2E+01
		Exposure Point Total						4E-05					2E+01
	Exposure Medium Total							4E-05					2E+01
Medium Total								7E-04					8E+01
Receptor Total							Receptor Risk Total	7E-04				Receptor HI Total	8E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	6E+00
Total CVS HI	4E+01
Total Developmental HI	4E+01
Total Endocrine HI	2E+00
Total GS HI	2E+00
Total Immune HI	4E+01
Total Thyroid HI	3E+00
Total Urinary HI	3E+01

TABLE 10.14.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	Trichloroethene (Kidney)	1.2E-04	- -	1.8E-05	--	1E-04					
			Trichloroethene (Non-Kidney)	1.6E-04	- -	2.2E-05	--	2E-04					
			Vinyl Chloride	5.1E-04	- -	3.4E-05	--	5E-04					
			1,4-Dioxane	2.8E-05	- -	9.5E-08	--	3E-05					
			Benzo(a)pyrene	3.1E-06	- -	- -	--	3E-06					
			Dibenzo(a,h)anthracene	1.3E-05	- -	- -	--	1E-05					
			Indeno(1,2,3-cd)pyrene	1.6E-06	- -	- -	--	2E-06					
			2,3,7,8-TCDD Equivalents	4.7E-06	- -	- -	--	5E-06					
			delta-BHC	1.1E-06	- -	7.1E-07	--	2E-06					
			Arsenic	8.8E-05	- -	4.6E-07	--	9E-05					
			Chromium	6.1E-04	- -	1.2E-04	--	7E-04					
			Chemical Total	1.5E-03	- -	1.9E-04	--	2E-03					
		Exposure Point Total						2E-03					
	Exposure Medium Total							2E-03					
	Air-Shower	Outside Landfill Deep Wells	Trichloroethene (Kidney)	- -	1.5E-05	- -	--	1E-05					
			Trichloroethene (Non-Kidney)	- -	2.3E-05	- -	--	2E-05					
			Vinyl Chloride	- -	1.6E-06	- -	--	2E-06					
			1,4-Dioxane	- -	6.2E-08	- -	--	6E-08					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			Bis(2-ethylhexyl)phthalate	- -	- -	- -	--	- -					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					
			Indeno(1,2,3-cd)pyrene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	2.8E-07	- -	--	3E-07					
			delta-BHC	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Chemical Total	- -	4.0E-05	- -	--	4E-05					
		Exposure Point Total						4E-05					
	Exposure Medium Total							4E-05					
Medium Total								2E-03					
Receptor Total							Receptor Risk Total	2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.1.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	2,3,7,8-TCDD Equivalents						Immune	6.4E-03	--	--	6E-03
			Dioxin-Like PCBs						Immune	6.4E-04	--	--	6E-04
			Cyanide						Whole Body, Thyroid, Nervous	2.8E-04	--	7.8E-05	4E-04
			Chemical Total	- -	- -	- -	--	- -		7.3E-03	--	7.8E-05	7E-03
		Exposure Point Total						- -					7E-03
	Exposure Medium Total							- -					7E-03
	Air - Trench	Inside Landfill	2,3,7,8-TCDD Equivalents						Reproductive, Developmental, Endocrine	--	2.0E+00	--	2E+00
			Dioxin-Like PCBs						Reproductive, Developmental, Endocrine	--	3.6E-01	--	4E-01
			Cyanide						Endocrine	--	2.9E+01	--	3E+01
			Chemical Total	- -	- -	- -	--	- -		- -	3.1E+01	- -	3E+01
		Exposure Point Total						- -					3E+01
	Exposure Medium Total							- -					3E+01
Medium Total								- -					3E+01
Receptor Total							Receptor Risk Total	- -				Receptor HI Total	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	4E-04
Total Developmental HI	2E+00
Total Endocrine HI	3E+01
Total Immune HI	7E-03
Total Reproductive HI	2E+00
Total Thyroid HI	4E-04
Total Whole Body HI	4E-04

TABLE 10.2.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	2,3,7,8-TCDD Equivalents	2.3E-06	- -	- -	- -	2E-06	Reproductive, Developmental, Endocrine	2.7E-01	--	--	3E-01
			Dioxin-Like PCBs	2.3E-07	- -	- -	- -	2E-07	Reproductive, Developmental, Endocrine	2.7E-02	--	--	3E-02
			Chromium	5.3E-07	- -	3.0E-05	- -	3E-05	None Specified	3.8E-03	--	2.1E-01	2E-01
			Cyanide	- -	- -	- -	- -	- -	Reproductive	1.4E-02	--	1.4E-02	3E-02
			Chemical Total	3.1E-06	- -	3.0E-05	- -	3E-05		3.1E-01	--	2.3E-01	5E-01
		Exposure Point Total						3E-05					5E-01
	Exposure Medium Total							3E-05					5E-01
	Air - Trench	Inside Landfill	2,3,7,8-TCDD Equivalents	- -	2.8E-04	- -	- -	3E-04	Reproductive, Developmental, Endocrine	--	2.0E+00	--	2E+00
			Dioxin-Like PCBs	- -	5.1E-05	- -	- -	5E-05	Reproductive, Developmental, Endocrine	--	3.6E-01	--	4E-01
			Nondioxin-Like PCBs	- -	7.2E-05	- -	- -	7E-05	NA	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	2.9E+01	--	3E+01
			Chemical Total	- -	4.1E-04	- -	- -	4E-04		- -	3.1E+01	- -	3E+01
		Exposure Point Total						4E-04					3E+01
	Exposure Medium Total							4E-04					3E+01
Medium Total								4E-04					3E+01
Groundwater	Air - Irrigation	Inside Landfill	2,3,7,8-TCDD Equivalents	- -	7.9E-06	- -	- -	8E-06	Reproductive, Developmental, Endocrine	--	5.5E-02	--	5E-02
			Dioxin-Like PCBs	- -	1.5E-06	- -	- -	1E-06	Reproductive, Developmental, Endocrine	--	1.0E-02	--	1E-02
			Nondioxin-Like PCBs	- -	2.1E-06	- -	- -	2E-06	NA	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	4.3E-01	--	4E-01
			Chemical Total	- -	1.1E-05	- -	- -	1E-05		- -	4.9E-01	- -	5E-01
		Exposure Point Total						1E-05					5E-01
	Exposure Medium Total							1E-05					5E-01
Medium Total								1E-05					5E-01
Groundwater	Air - Showering	Inside Landfill	2,3,7,8-TCDD Equivalents	- -	3.9E-06	- -	- -	4E-06	Reproductive, Developmental, Endocrine	--	2.7E-02	--	3E-02
			Dioxin-Like PCBs	- -	1.5E-06	- -	- -	2E-06	Reproductive, Developmental, Endocrine	--	1.1E-02	--	1E-02
			Nondioxin-Like PCBs	- -	2.1E-06	- -	- -	2E-06	NA	--	--	--	--
			Chromium	- -	- -	- -	- -	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	- -	- -	Endocrine	--	1.1E+00	--	1E+00
			Chemical Total	- -	7.5E-06	- -	- -	8E-06		- -	1.1E+00	- -	1E+00
		Exposure Point Total						8E-06					1E+00
	Exposure Medium Total							8E-06					1E+00
Medium Total								8E-06					1E+00
Receptor Total							Receptor Risk Total	5E-04				Receptor HI Total	3E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Developmental HI	3E+00
Total Endocrine HI	3E+01
Total Reproductive HI	3E+00
Total None Specified HI	2E-01

TABLE 10.3.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	Trichloroethene (Kidney)	1.4E-07	- -	2.7E-08	--	2E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	7.0E-08	- -	1.4E-08	--	8E-08	CVS, Immune, Developmental	8.8E-02	--	1.7E-02	1E-01
			1,4-Dioxane	7.6E-06	- -	3.2E-08	--	8E-06	Hepatic, Urinary	5.9E-02	--	2.5E-04	6E-02
			Benzo(a)pyrene	5.2E-06	- -	- -	--	5E-06	Developmental, Immune, Reproductive	5.3E-02	--	--	5E-02
			2,3,7,8-TCDD Equivalents	2.7E-04	- -	- -	--	3E-04	Reproductive, Developmental, Endocrine	6.9E+01	--	--	7E+01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	2.8E-01	--	--	3E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	5.0E-01	--	--	5E-01
			Dioxin-Like PCBs	2.7E-05	- -	- -	--	3E-05	Reproductive, Developmental, Endocrine	6.9E+00	--	--	7E+00
			Nondioxin-Like PCBs	4.4E-05	- -	- -	--	4E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	2.2E-01	--	1.0E-03	2E-01
			Arsenic	3.1E-05	- -	1.5E-07	--	3E-05	CVS, Dermal	1.6E+00	--	7.5E-03	2E+00
			Beryllium	- -	- -	- -	--	- -	GS	7.7E-02	--	5.1E-02	1E-01
			Boron	- -	- -	- -	--	- -	Developmental	2.3E-01	--	1.1E-03	2E-01
			Chromium	4.8E-04	- -	8.9E-05	--	6E-04	None Specified	9.7E-01	--	1.8E-01	1E+00
			Copper	- -	- -	- -	--	- -	GS	1.3E-01	--	6.3E-04	1E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	3.5E+00	--	1.6E-02	3E+00
			Iron	- -	- -	- -	--	- -	GS	1.5E+00	--	6.8E-03	1E+00
			Manganese	- -	- -	- -	--	- -	Nervous	3.7E+00	--	4.3E-01	4E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	1.6E+00	--	7.4E-03	2E+00
			Silver	- -	- -	- -	--	- -	Dermal	1.0E-01	--	7.1E-03	1E-01
			Thallium	- -	- -	- -	--	- -	Hair	5.6E+00	--	2.6E-02	6E+00
			Vanadium	- -	- -	- -	--	- -	Dermal	3.5E-01	--	6.3E-02	4E-01
			Chemical Total	8.6E-04	- -	8.9E-05	--	9E-04		9.6E+01	--	8.2E-01	1E+02
		Exposure Point Total						9E-04					1E+02
	Exposure Medium Total							9E-04					1E+02
Medium Total								9E-04					1E+02
Receptor Total							Receptor Risk Total	9E-04				Receptor HI Total	1E+02

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	6E+00
Total CVS HI	2E+00
Total Developmental HI	8E+01
Total Endocrine HI	8E+01
Total GS HI	2E+00
Total Hair HI	6E+00
Total Reproductive HI	8E+01
Total Dermal HI	2E+00

TABLE 10.4.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,4-Dioxane	1.1E-05	- -	4.9E-08	--	1E-05	Hepatic, Urinary	2.9E-02	--	1.3E-04	3E-02
			2,3,7,8-TCDD Equivalents	4.0E-04	- -	- -	--	4E-04	Reproductive, Developmental, Endocrine	3.4E+01	--	--	3E+01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.4E-01	--	--	1E-01
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	2.5E-01	--	--	3E-01
			Dioxin-Like PCBs	4.0E-05	- -	- -	--	4E-05	Reproductive, Developmental, Endocrine	3.4E+00	--	--	3E+00
			Nondioxin-Like PCBs	6.5E-05	- -	- -	--	7E-05	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	1.1E-01	--	4.5E-04	1E-01
			Arsenic	4.7E-05	- -	1.9E-07	--	5E-05	CVS, Dermal	8.1E-01	--	3.3E-03	8E-01
			Chromium	1.3E-04	- -	2.2E-05	--	2E-04	None Specified	4.8E-01	--	7.9E-02	6E-01
			Cyanide	- -	- -	- -	--	- -	Reproductive	1.7E+00	--	5.3E-03	2E+00
			Manganese	- -	- -	- -	--	- -	Nervous	1.9E+00	--	1.9E-01	2E+00
			Mercury	- -	- -	- -	--	- -	Developmental, Nervous	7.9E-01	--	3.2E-03	8E-01
			Thallium	- -	- -	- -	--	- -	Hair	2.8E+00	--	1.1E-02	3E+00
			Chemical Total	7.0E-04	- -	2.2E-05	--	7E-04		4.7E+01	--	2.9E-01	5E+01
		Exposure Point Total						7E-04					5E+01
	Exposure Medium Total							7E-04					5E+01
	Air-Shower	Inside Landfill	1,4-Dioxane	- -	6.0E-09	- -	--	6E-09	Nervous, Respiratory	--	3.1E-04	--	3E-04
			2,3,7,8-TCDD Equivalents	- -	5.7E-06	- -	--	6E-06	Reproductive, Developmental, Endocrine	--	2.9E-02	--	3E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	NA	--	--	--	--
			Dioxin-Like PCBs	- -	2.2E-06	- -	--	2E-06	Reproductive, Developmental, Endocrine	--	1.1E-02	--	1E-02
			Nondioxin-Like PCBs	- -	3.1E-06	- -	--	3E-06	NA	--	--	--	--
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.2E+00	--	1E+00
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Mercury	- -	- -	- -	--	- -	NA	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Vanadium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Chemical Total	- -	1.1E-05	- -	--	1E-05		- -	1.2E+00	- -	1E+00
		Exposure Point Total						1E-05					1E+00
	Exposure Medium Total							1E-05					1E+00
Medium Total								7E-04					5E+01
Receptor Total							Receptor Risk Total	7E-04				Receptor HI Total	5E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	3E+00
Total Developmental HI	4E+01
Total Endocrine HI	4E+01
Total Hair HI	3E+00
Total Reproductive HI	4E+01

TABLE 10.5.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Inside Landfill	1,4-Dioxane	1.9E-05	- -	8.1E-08	--	2E-05					
			Benzo(a)pyrene	6.7E-06	- -	- -	--	7E-06					
			2,3,7,8-TCDD Equivalents	6.7E-04	- -	- -	--	7E-04					
			Aldrin	1.6E-06	- -	- -	--	2E-06					
			Dieldrin	7.3E-07	- -	1.6E-06	--	2E-06					
			Dioxin-Like PCBs	6.7E-05	- -	- -	--	7E-05					
			Nondioxin-Like PCBs	1.1E-04	- -	- -	--	1E-04					
			Arsenic	7.8E-05	- -	3.4E-07	--	8E-05					
			Chromium	6.1E-04	- -	1.1E-04	--	7E-04					
			Chemical Total	1.6E-03	- -	1.1E-04	--	2E-03					
		Exposure Point Total						2E-03					
	Exposure Medium Total							2E-03					
	Air-Shower	Inside Landfill	1,4-Dioxane	- -	6.0E-09	- -	--	6E-09					
			Benzo(a)pyrene	- -	- -	- -	--	- -					
			2,3,7,8-TCDD Equivalents	- -	5.7E-06	- -	--	6E-06					
			Aldrin	- -	1.2E-08	- -	--	1E-08					
			Dieldrin	- -	- -	- -	--	- -					
			Heptachlor	- -	1.1E-09	- -	--	1E-09					
			Dioxin-Like PCBs	- -	2.2E-06	- -	--	2E-06					
			Nondioxin-Like PCBs	- -	3.1E-06	- -	--	3E-06					
			Arsenic	- -	- -	- -	--	- -					
			Barium	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Chemical Total	- -	1.1E-05	- -	--	1E-05					
		Exposure Point Total						1E-05					
	Exposure Medium Total							1E-05					
Medium Total								2E-03					
Receptor Total							Receptor Risk Total	2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.6.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Construcion Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill	Cyanide	- -	- -	- -	--	- -	Whole Body, Thyroid, Nervous	4.3E-05	--	1.2E-05	6E-05
		Shallow Wells	Chemical Total	- -	- -	- -	--	- -		4.3E-05	--	1.2E-05	6E-05
		Exposure Point Total						- -					6E-05
	Exposure Medium Total							- -					6E-05
	Air - Trench	Outside Landfill	Cyanide	- -	- -	- -	--	- -	Endocrine	--	4.5E+00	--	4E+00
		Shallow Wells	Chemical Total	- -	- -	- -	--	- -		- -	4.5E+00	- -	4E+00
		Exposure Point Total						- -					4E+00
	Exposure Medium Total							- -					4E+00
Medium Total								- -					4E+00
Receptor Total							Receptor Risk Total	- -				Receptor HI Total	4E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	6E-05
Total Endocrine HI	4E+00
Total Thyroid HI	6E-05
Total Whole Body HI	6E-05

TABLE 10.7.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current/Future
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	Naphthalene	- -	- -	- -	--	- -	Body Weight	3.0E-05	--	2.1E-03	2E-03
			Cyanide	- -	- -	- -	--	- -	Reproductive	2.1E-03	--	2.2E-03	4E-03
			Manganese	- -	- -	- -	--	- -	Nervous	3.4E-02	--	1.2E+00	1E+00
			Chemical Total	- -	- -	- -	--	- -		3.6E-02	--	1.2E+00	1E+00
		Exposure Point Total						- -					1E+00
	Exposure Medium Total							- -					1E+00
Groundwater	Air - Trench	Outside Landfill Shallow Wells	Naphthalene	- -	2.2E-06	- -	--	2E-06	Nervous, Respiratory	--	2.3E-01	--	2E-01
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	4.5E+00	--	4E+00
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Chemical Total	- -	2.2E-06	- -	--	2E-06		- -	5	- -	5E+00
		Exposure Point Total						2E-06					5E+00
	Exposure Medium Total							2E-06					5E+00
Medium Total								2E-06					6E+00
Groundwater	Air - Irrigation	Outside Landfill Shallow Wells	Naphthalene	- -	4.3E-08	- -	--	4E-08	Nervous, Respiratory	--	4.5E-03	--	4E-03
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	6.6E-02	--	7E-02
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Chemical Total	- -	4.3E-08	- -	--	4E-08		- -	7.1E-02	- -	7E-02
		Exposure Point Total						4E-08					7E-02
	Exposure Medium Total							4E-08					7E-02
Medium Total								4E-08					7E-02
Groundwater	Air - Shower	Outside Landfill Shallow Wells	Naphthalene	- -	6.6E-08	- -	--	7E-08	Nervous, Respiratory	--	6.8E-03	--	7E-03
			Cyanide	- -	- -	- -	--	- -	Endocrine	--	1.7E-01	--	2E-01
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Chemical Total	- -	6.6E-08	- -	--	7E-08		- -	1.7E-01	- -	2E-01
		Exposure Point Total						7E-08					2E-01
	Exposure Medium Total							7E-08					2E-01
Medium Total								7E-08					2E-01
Receptor Total							Receptor Risk Total	2E-06				Receptor HI Total	6E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	2E-03
Total Nervous HI	1E+00
Total Endocrine HI	5E+00
Total Reproductive HI	4E-03
Total Respiratory HI	2E-01

TABLE 10.8.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	Trichloroethene (Kidney)	3.6E-07	- -	7.2E-08	--	4E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.9E-07	- -	3.7E-08	--	2E-07	CVS, Immune, Developmental	2.4E-01	--	4.7E-02	3E-01
			Vinyl Chloride	9.3E-05	- -	8.5E-06	--	1E-04	Hepatic	2.7E-02	--	2.5E-03	3E-02
			1,4-Dioxane	4.7E-06	- -	2.0E-08	--	5E-06	Hepatic, Urinary	3.6E-02	--	1.5E-04	4E-02
			2,6-Dinitrotoluene	1.1E-05	- -	9.3E-07	--	1E-05	Hepatic, Spleen	5.5E-01	--	4.8E-02	6E-01
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	1.8E+00	--	--	2E+00
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	2.5E-01	--	--	3E-01
			Aluminum	- -	- -	- -	--	- -	Nervous	1.5E-01	--	7.1E-04	2E-01
			Arsenic	2.3E-05	- -	1.1E-07	--	2E-05	CVS, Dermal	1.2E+00	--	5.6E-03	1E+00
			Chromium	2.5E-05	- -	4.7E-06	--	3E-05	None Specified	5.1E-02	--	9.6E-03	6E-02
			Manganese	- -	- -	- -	--	- -	Nervous	8.7E+00	--	1.0E+00	1E+01
			Thallium	- -	- -	- -	--	- -	Hair	7.5E+00	--	3.5E-02	8E+00
			Chemical Total	1.6E-04	- -	1.4E-05	--	2E-04		2.0E+01	--	1.2E+00	2E+01
		Exposure Point Total						2E-04					2E+01
	Exposure Medium Total							2E-04					2E+01
Medium Total								2E-04					2E+01
Receptor Total							Receptor Risk Total	2E-04				Receptor HI Total	2E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	1E+01
Total Developmental HI	2E+00
Total Hair HI	8E+00

TABLE 10.9.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	Vinyl Chloride	3.7E-06	- -	2.9E-07	--	4E-06	Hepatic	1.3E-02	--	1.0E-03	1E-02
			1,4-Dioxane	7.0E-06	- -	3.0E-08	--	7E-06	Hepatic, Urinary	1.8E-02	--	7.8E-05	2E-02
			2,6-Dinitrotoluene	1.6E-05	- -	1.4E-06	--	2E-05	Hepatic, Spleen	2.8E-01	--	2.4E-02	3E-01
			Bis(2-Chloroethyl)Ether	1.6E-06	- -	5.3E-08	--	2E-06	NA	--	--	--	--
			Arsenic	3.5E-05	- -	1.4E-07	--	3E-05	CVS, Dermal	6.0E-01	--	2.5E-03	6E-01
			Chromium	7.2E-06	- -	1.2E-06	--	8E-06	None Specified	2.6E-02	--	4.2E-03	3E-02
			Manganese	- -	- -	- -	--	- -	Nervous	4.3E+00	--	4.4E-01	5E+00
			Thallium	- -	- -	- -	--	- -	Hair	3.8E+00	--	1.5E-02	4E+00
			Chemical Total	7.0E-05	- -	3.1E-06	--	7E-05		9.0E+00	--	4.9E-01	1E+01
		Exposure Point Total						7E-05					1E+01
	Exposure Medium Total							7E-05					1E+01
Groundwater	Air-Shower	Outside Landfill Shallow Wells	Vinyl Chloride	- -	1.4E-08	- -	--	1E-08	Hepatic	--	2.4E-04	--	2E-04
			1,4-Dioxane	- -	3.7E-09	- -	--	4E-09	Nervous, Respiratory	--	1.9E-04	--	2E-04
			2,6-Dinitrotoluene	- -	- -	- -	--	- -	NA	--	--	--	--
			Bis(2-Chloroethyl)Ether	- -	1.4E-08	- -	--	1E-08	NA	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Thallium	- -	- -	- -	--	- -	NA	--	--	--	--
			Chemical Total	- -	3.1E-08	- -	--	3E-08		- -	4.3E-04	- -	4E-04
		Exposure Point Total						3E-08					4E-04
	Exposure Medium Total							3E-08					4E-04
Medium Total								7E-05					1E+01
Receptor Total							Receptor Risk Total	7E-05				Receptor HI Total	1E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	5E+00
Total Hair HI	4E+00

TABLE 10.10.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	1.5E-06	- -	3.4E-07	--	2E-06					
			Vinyl Chloride	9.7E-05	- -	8.8E-06	--	1E-04					
			1,4-Dioxane	1.2E-05	- -	5.0E-08	--	1E-05					
			2,6-Dinitrotoluene	2.7E-05	- -	2.3E-06	--	3E-05					
			Bis(2-Chloroethyl)Ether	2.7E-06	- -	8.9E-08	--	3E-06					
			Pentachlorophenol	4.0E-07	- -	1.9E-06	--	2E-06					
			Dieldrin	5.6E-07	- -	1.2E-06	--	2E-06					
			Arsenic	5.8E-05	- -	2.5E-07	--	6E-05					
			Chromium	3.3E-05	- -	5.9E-06	--	4E-05					
			Chemical Total	2.3E-04	- -	2.1E-05	--	3E-04					
		Exposure Point Total						3E-04					
	Exposure Medium Total							3E-04					
Groundwater	Air-Shower	Outside Landfill Shallow Wells	1,2-Dibromo-3-Chloropropane	- -	3.1E-07	- -	--	3E-07					
			Vinyl Chloride	- -	1.4E-08	- -	--	1E-08					
			1,4-Dioxane	- -	3.7E-09	- -	--	4E-09					
			2,6-Dinitrotoluene	- -	- -	- -	--	- -					
			Bis(2-Chloroethyl)Ether	- -	1.4E-08	- -	--	1E-08					
			Pentachlorophenol	- -	- -	- -	--	- -					
			Dieldrin	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Chemical Total	- -	3.4E-07	- -	--	3E-07					
		Exposure Point Total						3E-07					
	Exposure Medium Total							3E-07					
Medium Total								3E-04					
Receptor Total							Receptor Risk Total	3E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.11.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Current
Receptor Population: Industrial Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill	Trichloroethene	1.1E-07	- -	1.9E-06	--	2E-06	CVS, Immune, Developmental	5.0E-02	--	8.9E-01	9E-01
		Deep Wells	Chemical Total	1.1E-07	- -	1.9E-06	--	2E-06		5.0E-02	--	8.9E-01	9E-01
		Exposure Point Total						2E-06					9E-01
	Exposure Medium Total							2E-06					9E-01
	Air - Irrigation	Outside Landfill	Trichloroethene	- -	3.6E-07	- -	--	4E-07	CVS, Immune, Developmental	--	4.7E-01	--	5E-01
		Deep Wells	Chemical Total	- -	3.6E-07	- -	--	4E-07		- -	4.7E-01	- -	5E-01
		Exposure Point Total						4E-07					5E-01
	Exposure Medium Total							4E-07					5E-01
Medium Total								2E-06					1E+00
Groundwater	Air - Showering	Outside Landfill	Trichloroethene	--	5E-07	--	--	5E-07	CVS, Immune, Developmental	--	6.3E-01	--	6E-01
		Deep Wells	Chemical Total	--	5E-07	--	--	5E-07		- -	6.3E-01	- -	6E-01
		Exposure Point Total						5E-07					6E-01
	Exposure Medium Total							5E-07					6E-01
Medium Total								5E-07					6E-01
Receptor Total							Receptor Risk Total	3E-06				Receptor HI Total	2E+00

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	2E+00
Total Developmental HI	2E+00
Total Immune HI	2E+00

TABLE 10.12.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	1.9E+01	--	2.9E+00	2E+01
			Trichloroethene (Kidney)	1.9E-05	- -	3.8E-06	--	2E-05	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.0E-05	- -	2.0E-06	--	1E-05	CVS, Immune, Developmental	1.3E+01	--	2.5E+00	2E+01
			Vinyl Chloride	2.4E-04	- -	2.2E-05	--	3E-04	Hepatic	7.1E-02	--	6.4E-03	8E-02
			1,4-Dioxane	1.8E-06	- -	7.7E-09	--	2E-06	Hepatic, Urinary	1.4E-02	--	6.0E-05	1E-02
			Benzo(a)pyrene	4.9E-07	- -	- -	--	5E-07	Developmental, Immune, Reproductive	4.9E-03	--	--	5E-03
			Dibenzo(a,h)anthracene	2.0E-06	- -	- -	--	2E-06	NA	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.5E-07	- -	- -	--	2E-07	NA	--	--	--	--
			Naphthalene	- -	- -	- -	--	- -	Body Weight	1.4E-04	--	1.1E-04	3E-04
			2,3,7,8-TCDD Equivalents	3.0E-07	- -	- -	--	3E-07	Reproductive, Developmental, Endocrine	7.7E-02	--	--	8E-02
			Pentadecafluorooctanoic Acid	- -	- -	- -	--	- -	Developmental	4.8E-02	--	--	5E-02
			Perfluorooctane Sulfonic Acid	- -	- -	- -	--	- -	Developmental	4.2E-02	--	--	4E-02
			Aluminum	- -	- -	- -	--	- -	Nervous	6.0E-01	--	2.8E-03	6E-01
			Arsenic	5.7E-06	- -	2.6E-08	--	6E-06	CVS, Dermal	2.9E-01	--	1.4E-03	3E-01
			Barium	- -	- -	- -	--	- -	Urinary	2.0E-02	--	1.3E-03	2E-02
			Cadmium	- -	- -	- -	--	- -	Urinary	5.4E-02	--	5.0E-03	6E-02
			Chromium	9.6E-05	- -	1.8E-05	--	1E-04	None Specified	1.9E-01	--	3.6E-02	2E-01
			Cobalt	- -	- -	- -	--	- -	Thyroid	1.7E+00	--	3.3E-03	2E+00
			Lead	- -	- -	- -	--	- -	NA	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	2.7E+00	--	3.1E-01	3E+00
			Chemical Total	3.8E-04	- -	4.6E-05	--	4E-04		3.8E+01	--	5.7E+00	4E+01
		Exposure Point Total						4E-04					4E+01
	Exposure Medium Total							4E-04					4E+01
Medium Total								4E-04					4E+01
Receptor Total							Receptor Risk Total	4E-04				Receptor HI Total	4E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	4E+00
Total CVS HI	2E+01
Total Developmental HI	2E+01
Total Immune HI	2E+01
Total Thyroid HI	2E+00
Total Urinary HI	2E+01

TABLE 10.13.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	Urinary	9.6E+00	--	1.3E+00	1E+01
			Trichloroethene (Kidney)	5.5E-06	- -	9.6E-07	--	6E-06	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	1.5E-05	- -	2.6E-06	--	2E-05	CVS, Immune, Developmental	6.3E+00	--	1.1E+00	7E+00
			Vinyl Chloride	9.8E-06	- -	7.5E-07	--	1E-05	Hepatic	3.5E-02	--	2.7E-03	4E-02
			1,4-Dioxane	2.7E-06	- -	1.2E-08	--	3E-06	Hepatic, Urinary	7.1E-03	--	3.0E-05	7E-03
			Aluminum	- -	- -	- -	--	- -	Nervous	3.0E-01	--	1.2E-03	3E-01
			Arsenic	8.5E-06	- -	3.5E-08	--	9E-06	CVS, Dermal	1.5E-01	--	6.0E-04	1E-01
			Chromium	2.7E-05	- -	4.4E-06	--	3E-05	None Specified	9.7E-02	--	1.6E-02	1E-01
			Manganese	- -	- -	- -	--	- -	Nervous	1.3E+00	--	1.4E-01	1E+00
			Chemical Total	6.9E-05	- -	8.8E-06	--	8E-05		1.8E+01	--	2.5E+00	2E+01
		Exposure Point Total						8E-05					2E+01
	Exposure Medium Total							8E-05					2E+01
	Air-Shower	Outside Landfill Deep Wells	cis-1,2-Dichloroethene	- -	- -	- -	--	- -	NA	--	--	--	--
			Trichloroethene (Kidney)	- -	2.5E-07	- -	--	2E-07	NA	--	--	--	--
			Trichloroethene (Non-Kidney)	- -	5.3E-07	- -	--	5E-07	CVS, Immune, Developmental	--	6.7E-01	--	7E-01
			Vinyl Chloride	- -	3.6E-08	- -	--	4E-08	Hepatic	--	6.4E-04	--	6E-04
			1,4-Dioxane	- -	1.4E-09	- -	--	1E-09	Nervous, Respiratory	--	7.4E-05	--	7E-05
			Aluminum	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Arsenic	- -	- -	- -	--	- -	CVS, Dermal	--	--	--	--
			Chromium	- -	- -	- -	--	- -	Respiratory	--	--	--	--
			Manganese	- -	- -	- -	--	- -	Nervous	--	--	--	--
			Chemical Total	- -	8.2E-07	- -	--	8E-07		- -	6.7E-01	- -	7E-01
		Exposure Point Total						8E-07					7E-01
	Exposure Medium Total							8E-07					7E-01
Medium Total								8E-05					2E+01
Receptor Total							Receptor Risk Total	8E-05				Receptor HI Total	2E+01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Nervous HI	2E+00
Total CVS HI	8E+00
Total Developmental HI	8E+00
Total Immune HI	8E+00
Total Urinary HI	1E+01

TABLE 10.14.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
LOWER DARBY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Outside Landfill Deep Wells	Trichloroethene (Kidney)	2.5E-05	- -	4.8E-06	--	3E-05					
			Trichloroethene (Non-Kidney)	2.5E-05	- -	4.6E-06	--	3E-05					
			Vinyl Chloride	2.5E-04	- -	2.3E-05	--	3E-04					
			1,4-Dioxane	4.5E-06	- -	1.9E-08	--	5E-06					
			Dibenzo(a,h)anthracene	2.6E-06	- -	- -	--	3E-06					
			Arsenic	1.4E-05	- -	6.1E-08	--	1E-05					
			Chromium	1.2E-04	- -	2.2E-05	--	1E-04					
			Chemical Total	4.5E-04	- -	5.5E-05	--	5E-04					
		Exposure Point Total						5E-04					
	Exposure Medium Total							5E-04					
	Air-Shower	Outside Landfill Deep Wells	Trichloroethene (Kidney)	- -	2.5E-07	- -	--	2E-07					
			Trichloroethene (Non-Kidney)	- -	5.3E-07	- -	--	5E-07					
			Vinyl Chloride	- -	3.6E-08	- -	--	4E-08					
			1,4-Dioxane	- -	1.4E-09	- -	--	1E-09					
			Dibenzo(a,h)anthracene	- -	- -	- -	--	- -					
			Arsenic	- -	- -	- -	--	- -					
			Chromium	- -	- -	- -	--	- -					
			Chemical Total	- -	8.2E-07	- -	--	8E-07					
		Exposure Point Total						8E-07					
	Exposure Medium Total							8E-07					
Medium Total								5E-04					
Receptor Total							Receptor Risk Total	5E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

APPENDIX G-3

PART 3 - SAMPLES USED IN HHRA

APPENDIX G, PART 3, TABLE 1
SAMPLES USED IN THE HUMAN HEALTH RISH ASSESSMENT
INSIDE LANDFILL

Event 1	Event 2	Event 3	Event 4
LDCA-MW01D-0314	LDCA-MW01D-1014	LDCA-MW01D-0615	LDCA-MW01D-0416
LDCA-MW01S-0314	LDCA-MW01S-1014	LDCA-MW01S-0615	LDCA-MW01S-0416
LDCA-MW02-0314	LDCA-MW02-1014	LDCA-MW02-0615	LDCA-MW02-0416
LDCA-MW03-0314	LDCA-MW03-1014	LDCA-MW03-0615	LDCA-MW03-0416
LDCA-MW04-0314	LDCA-MW04-1014	LDCA-MW04-0615	LDCA-MW04-0416
LDCA-MW05D-0314	LDCA-MW05D-1014	LDCA-MW04-0615-D	LDCA-MW05D-0416
LDCA-MW05S-0314	LDCA-MW05S-1014	LDCA-MW05D-0615	LDCA-MW05S-0416
LDCA-MW06-0314	LDCA-MW06-1014	LDCA-MW05S-0615	LDCA-MW06-0416
LDCA-MW07D-0314	LDCA-MW07D-1014	LDCA-MW06-0615	LDCA-MW07D-0416
LDCA-MW07S-0314	LDCA-MW07S-1014	LDCA-MW07D-0615	LDCA-MW07S-0416
LDCA-MW09-0314	LDCA-MW09-1014	LDCA-MW07S-0615	LDCA-MW09-0416
LDCA-MW11-0314	LDCA-MW11-1014	LDCA-MW09-0615	LDCA-MW11-0416
LDCA-MW12-0314	LDCA-MW12-1014	LDCA-MW11-0615	LDCA-MW34D-0416
LDCA-MW20D-0314	LDCA-MW20D-1014	LDCA-MW12-0615	LDCA-MW34S-0416
LDCA-MW20D-0314-D	LDCA-MW20D-1014-D	LDCA-MW20D-0615	LDCA-MW36-0416
LDCA-MW20I-0314	LDCA-MW20I-1014	LDCA-MW20D-0615-D	LDCA-MW37-0416
LDCA-MW20S-0314	LDCA-MW20S-1014	LDCA-MW20I-0615	
LDCA-MW34D-0314	LDCA-MW34D-1014	LDCA-MW20S-0615	
LDCA-MW34S-0314	LDCA-MW34S-1014	LDCA-MW34D-0615	
LDCA-MW36-0314	LDCA-MW36-1014	LDCA-MW34D-0615-D	
LDCA-MW37-0314	LDCA-MW37-1014	LDCA-MW34S-0615	
		LDCA-MW36-0615	
		LDCA-MW37-0615	

APPENDIX G, PART 3, TABLE 2
SAMPLES USED IN THE HUMAN HEALTH RISH ASSESSMENT
OUTSIDE LANDFILL - SHALLOW WELLS

Event 1	Event 2	Event 3	Event 4
LDCA-MW08-0314	LDCA-MW08-1014	LDCA-MW08-0615	LDCA-MW13S-0416
LDCA-MW13S-0314	LDCA-MW13S-1014	LDCA-MW13S-0615	LDCA-MW13S-0416-D
LDCA-MW14S-0314	LDCA-MW14S-1014	LDCA-MW14S-0615	LDCA-MW14S-0416
LDCA-MW15S-0314	LDCA-MW15S-1014	LDCA-MW15S-0615	LDCA-MW15S-0416
LDCA-MW16S-0314	LDCA-MW16S-1014	LDCA-MW16S-0615	LDCA-MW24-0416
LDCA-MW17S-0314	LDCA-MW17S-1014	LDCA-MW16S-0615-D	LDCA-MW25-0416
LDCA-MW17S-0314-D	LDCA-MW17S-1014-D	LDCA-MW17S-0615	LDCA-MW26D-0416
LDCA-MW18S-0314	LDCA-MW18S-1014	LDCA-MW17S-0615-D	LDCA-MW26S-0416
LDCA-MW24-0314	LDCA-MW24-1014	LDCA-MW18S-0615	LDCA-MW27-0416
LDCA-MW25-0314	LDCA-MW25-1014	LDCA-MW24-0615	LDCA-MW33-0416
LDCA-MW26D-0314	LDCA-MW26D-1014	LDCA-MW25-0615	LDCA-MW38-0416
LDCA-MW26S-0314	LDCA-MW26S-1014	LDCA-MW26D-0615	LDCA-MW39-0416
LDCA-MW27-0314	LDCA-MW27-1014	LDCA-MW26S-0615	LDCA-MW41D-0416
LDCA-MW28-0314	LDCA-MW28-1014	LDCA-MW27-0615	LDCA-MW41S-0416
LDCA-MW29-0314	LDCA-MW29-1014	LDCA-MW28-0615	
LDCA-MW30-0314	LDCA-MW30-1014	LDCA-MW29-0615	
LDCA-MW31-0314	LDCA-MW31-1014	LDCA-MW30-0615	
LDCA-MW32-0314	LDCA-MW32-1014	LDCA-MW31-0615	
LDCA-MW33-0314	LDCA-MW33-1014	LDCA-MW32-0615	
LDCA-MW35-0314	LDCA-MW35-1014	LDCA-MW33-0615	
LDCA-MW38-0314	LDCA-MW38-1014	LDCA-MW35-0615	
LDCA-MW39-0314	LDCA-MW39-1014	LDCA-MW38-0615	
LDCA-MW40-0314	LDCA-MW40-1014	LDCA-MW39-0615	
LDCA-MW41D-0314	LDCA-MW41D-1014	LDCA-MW40-0615	
LDCA-MW41D-0314-D	LDCA-MW41D-1014-D	LDCA-MW41D-0615	
LDCA-MW41S-0314	LDCA-MW41S-1014	LDCA-MW41D-0615-D	
LDCA-MW42-0314	LDCA-MW42-1014	LDCA-MW41S-0615	
LDCA-MW43-0314	LDCA-MW43-1014	LDCA-MW42-0615	
LDCA-MW44-0314	LDCA-MW44-1014	LDCA-MW43-0615	
LDCA-MW45-0314	LDCA-MW46-1014	LDCA-MW44-0615	
LDCA-MW46-0314	LDCA-MW47-1014	LDCA-MW46-0615	
LDCA-MW47-0314	LDCA-MW47-1014-D	LDCA-MW47-0615	
LDCA-MW47-0314-D			

APPENDIX G, PART 3, TABLE 3
SAMPLES USED IN THE HUMAN HEALTH RISH ASSESSMENT
OUTSIDE LANDFILL - DEEP WELLS

Event 1	Event 2	Event 3	Event 4
LDCA-MW13D-0314	LDCA-MW13D-1014	LDCA-MW13D-0615	LDCA-MW13D-0416
LDCA-MW13I-0314	LDCA-MW13I-1014	LDCA-MW13I-0615	LDCA-MW13I-0416
LDCA-MW14D-0314	LDCA-MW14D-1014	LDCA-MW14D-0615	LDCA-MW14D-0416
LDCA-MW15D-0314	LDCA-MW15D-1014	LDCA-MW15D-0615	LDCA-MW15D-0416
LDCA-MW15D-0314-D	LDCA-MW15D-1014-D	LDCA-MW15D-0615-D	LDCA-MW19-0416
LDCA-MW16D-0314	LDCA-MW16D-1014	LDCA-MW16D-0615	LDCA-MW19-0416-D
LDCA-MW16D-0314-D	LDCA-MW16D-1014-D	LDCA-MW17D-0615	LDCA-MW21D-0416
LDCA-MW17D-0314	LDCA-MW17D-1014	LDCA-MW18D-0615	LDCA-MW21S-0416
LDCA-MW18D-0314	LDCA-MW18D-1014	LDCA-MW19-0615	
LDCA-MW19-0314	LDCA-MW19-1014	LDCA-MW21D-0615	
LDCA-MW21D-0314	LDCA-MW21D-1014	LDCA-MW21S-0615	
LDCA-MW21S-0314	LDCA-MW21S-1014	LDCA-MW22-0615	
LDCA-MW22-0314	LDCA-MW22-1014	LDCA-MW23D-0615	
LDCA-MW23D-0314	LDCA-MW23D-1014	LDCA-MW23I-0615	
LDCA-MW23I-0314	LDCA-MW23I-1014	LDCA-MW23S-0615	
LDCA-MW23S-0314	LDCA-MW23S-1014		

APPENDIX G-4

PART 4 - PROUCL DATA AND PRINTOUTS

Inside Landfill

Event 1

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	TCDD-TEQ	d_TCDD_TEQ	ALUMINUM	d_ALUMINUM	ANTIMONY	d_ANTIMONY	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	BORON	d_BORON	CADMIUM	d_CADMIUM
LDCA-MW01D-0314	0.268	0	20	0	2	0	1.4	1	756	1	272	1	1	0
LDCA-MW01S-0314	0.030	1	71.7	1	2	0	8.8	1	178	1	350	1	1	0
LDCA-MW02-0314	0.187	0	48.3	1	2	0	15.5	1	104	1	1440	1	1	0
LDCA-MW03-0314	0.187	0	20	0	2	0	5.1	1	453	1	2490	1	0.099	1
LDCA-MW04-0314	2.83	1	25.9	1	2	0	1	0	1530	1	1430	1	1	0
LDCA-MW05D-0314	0.286	0	24.6	1	2	0	2.3	1	333	1	261	1	1	0
LDCA-MW05S-0314	0.651	1	20	0	2	0	1.8	1	1140	1	4080	1	1	0
LDCA-MW06-0314	0.057	1	20	0	2	0	1	0	326	1	1490	1	1	0
LDCA-MW07D-0314	0.27	0	20	0	2	0	5.5	1	253	1	2950	1	1	0
LDCA-MW07S-0314	0.216	0	20	0	2	0	28.7	1	266	1	1770	1	1	0
LDCA-MW09-0314	0.299	0	20	0	2	0	6.6	1	24.2	1	51.2	1	1	0
LDCA-MW11-0314	4111	1	30500	1	27.8	1	51.9	1	3960	1	3640	1	21.9	1
LDCA-MW12-0314	0.192	0	20	0	2	0	1	0	1240	1	3310	1	1	0
LDCA-MW20D-0314-AVG	0.243	0	4120	1	2	0	1.43	1	157	1	632	1	0.8	1
LDCA-MW20I-0314	0.128	0	44.4	1	2	0	1.8	1	51.1	1	258	1	1	0
LDCA-MW20S-0314			680	1	2	0	4.9	1	104	1	27.3	1	1	0
LDCA-MW34D-0314	0.213	0	33.8	1	2	0	1	0	272	1	87.5	1	1	0
LDCA-MW34S-0314	0.087	1	20	0	2	0	1	0	643	1	762	1	1	0
LDCA-MW36-0314	0.12	1	162	1	2	0	2.6	1	118	1	995	1	1	0
LDCA-MW37-0314	0.199	0	47.9	1	2	0	20.8	1	249	1	2930	1	1	0

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	COPPER	d_COPPER	CYANIDE	d_CYANIDE	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	MERCURY	d_MERCURY
LDCA-MW01D-0314	5.8	1	17.3	1	15.3	1	10	0	37200	1	1	1	2370	1	0.2	0
LDCA-MW01S-0314	1.6	1	6.1	1	2.2	1	10	0	26500	1	3.6	1	709	1	0.2	0
LDCA-MW02-0314	4.2	1	6.5	1	8.6	1	10	0	21600	1	0.51	1	750	1	0.2	0
LDCA-MW03-0314	6.5	1	6.5	1	5.2	1	12.3	1	44900	1	2.8	1	535	1	0.2	0
LDCA-MW04-0314	5.1	1	0.78	1	6.4	1	10	0	21200	1	2.9	1	293	1	0.2	0
LDCA-MW05D-0314	5.6	1	1.6	1	4.3	0	19.6	1	61600	1	0.73	1	4290	1	0.2	0
LDCA-MW05S-0314	9.9	1	4	1	6.1	1	16.7	1	22600	1	2.5	1	157	1	0.2	0
LDCA-MW06-0314	5.4	1	7.5	1	5	1	10	0	15700	1	1.8	1	442	1	0.2	0
LDCA-MW07D-0314	3.9	1	10.2	1	2.8	0	3.9	1	9210	1	1	0	321	1	0.2	0
LDCA-MW07S-0314	5.3	1	11.5	1	5.1	1	4.3	1	46000	1	1	0	857	1	0.2	0
LDCA-MW09-0314	2	0	3.3	1	3.5	1	10	0	35100	1	0.68	1	3650	1	0.2	0
LDCA-MW11-0314	399	1	50.2	1	753	1	367	1	157000	1	4470	1	1340	1	8.2	1
LDCA-MW12-0314	11.3	1	2.3	1	9.7	1	10	0	7610	1	0.94	1	98.2	1	0.2	0
LDCA-MW20D-0314-AVG	31.6	1	9.7	1	56.2	1	21	1	9400	1	12.7	1	343	1	0.2	0
LDCA-MW20I-0314	2.5	1	1.9	1	4.4	1	10	0	2220	1	1.8	1	188	1	0.2	0
LDCA-MW20S-0314	5.6	1	0.71	1	4.6	1	10	0	489	1	1.5	1	28.1	1	0.2	0
LDCA-MW34D-0314	4.9	1	3.6	1	3.1	1	10	0	82300	1	2.2	1	12800	1	0.2	0
LDCA-MW34S-0314	3.3	1	7.5	1	2	0	10	0	30800	1	2.6	1	436	1	0.2	0
LDCA-MW36-0314	32.6	1	2	1	6.9	1	10	0	13600	1	1.1	1	287	1	0.2	0
LDCA-MW37-0314	10.7	1	7.4	1	24	1	7.7	1	21500	1	0.57	1	122	1	0.2	0

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	NICKEL	d_NICKEL	SILVER	d_SILVER	VANADIUM	d_VANADIUM	ZINC	d_ZINC	DIOXIN-LIKE PCB_TEQ	d_DIOXIN-LIKE PCB_TEQ	NON-DIOXIN-LIKE PCBS	d_NON-DIOXIN-LIKE PCBS
LDCA-MW01D-0314	21.8	1	1	0	3.8	1	12.8	1				
LDCA-MW01S-0314	2.8	1	1	0	1.9	1	6.1	1				
LDCA-MW02-0314	6.2	1	1	0	3.4	1	11.5	1	0.00087	1	27557	1
LDCA-MW03-0314	6.4	1	1	0	2.2	1	19.3	1	20	0	9859	1
LDCA-MW04-0314	6.6	1	1	0	5	0	9.4	1	0.146	1	594655	1
LDCA-MW05D-0314	3.7	1	1	0	5	0	6.8	1	21	0	318	1
LDCA-MW05S-0314	5.5	1	1	0	5	0	17.8	1	0.016	1	182000	1
LDCA-MW06-0314	4.8	1	1	0	0.89	1	8.4	1				
LDCA-MW07D-0314	14	1	1	0	5	0	4.4	0	0.0031	1	777476	1
LDCA-MW07S-0314	9.7	1	1	0	5.8	1	6	1	19	0	201373	1
LDCA-MW09-0314	1.8	1	1	0	0.15	1	5.8	1				
LDCA-MW11-0314	464	1	26.3	1	327	1	5660	1	109	1	180194000	1
LDCA-MW12-0314	5.1	1	1	0	5	0	1470	1	0.095	1	4608655	1
LDCA-MW20D-0314-AVG	27.8	1	1	0	5	0	96.4	1	0.010	1	70170	1
LDCA-MW20I-0314	9.5	1	1	0	5	0	15.3	1	0.00078	1	6627	1
LDCA-MW20S-0314	20.8	1	1	0	1.1	1	14.2	1				
LDCA-MW34D-0314	5	1	1	0	0.51	1	8.8	1	20	0	1342	1
LDCA-MW34S-0314	5.7	1	1	0	1.2	1	11.8	1	0.021	1	418029	1
LDCA-MW36-0314	15	1	1	0	5	0	4.6	1	0.0029	1	15743	1
LDCA-MW37-0314	8.5	1	1	0	11.8	1	6	1	20	0	7191	1

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	ALDRIN	d_ALDRIN	BETA-BHC	d_BETA-BHC	DELTA-BHC	d_DELTA-BHC	DIELDRIN	d_DIELDRIN	GAMMA-BHC (LINDANE)	d_GAMMA-BHC (LINDANE)	BENZO(A)PYRENE	d_BENZO(A)PYRENE
LDCA-MW01D-0314	0.05	0	0.022	1	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW01S-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW02-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	5	0
LDCA-MW03-0314	0.05	0	0.078	1	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW04-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	5	0
LDCA-MW05D-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW05S-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	5	0
LDCA-MW06-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	5	0
LDCA-MW07D-0314	0.05	0	0.05	0	0.034	1	0.1	0	0.05	0	0.1	0
LDCA-MW07S-0314	0.039	1	0.03	1	0.05	0	0.022	1	0.05	0	5	0
LDCA-MW09-0314	0.05	0	0.026	1	0.05	0	0.1	0	0.05	0	5	0
LDCA-MW11-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.83	1
LDCA-MW12-0314	0.047	1	0.081	1	0.015	1	0.1	0	0.044	1	0.1	0
LDCA-MW20D-0314-AVG	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW20I-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW20S-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW34D-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW34S-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW36-0314	0.05	0	0.05	0	0.05	0	0.1	0	0.05	0	0.1	0
LDCA-MW37-0314	0.05	0	0.067	1	0.05	0	0.019	1	0.05	0	0.1	0

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	BENZO(K)FLUORANTHENE	d_BENZO(K)FLUORANTHENE	INDENO(1,2,3-CD)PYRENE	d_INDENO(1,2,3-CD)PYRENE	1,4-DIOXANE	d_1,4-DIOXANE
LDCA-MW01D-0314	5	0	0.1	0	110	1
LDCA-MW01S-0314	0.1	0	0.1	0	4.1	1
LDCA-MW02-0314	0.1	0	0.1	0	15	1
LDCA-MW03-0314	0.1	0	0.1	0	13	1
LDCA-MW04-0314	0.1	0	5	0	14	1
LDCA-MW05D-0314	5	0	0.1	0	8.4	1
LDCA-MW05S-0314	5	0	0.1	0	16	1
LDCA-MW06-0314	0.1	0	5	0	11	1
LDCA-MW07D-0314	0.1	0	0.1	0	4.7	1
LDCA-MW07S-0314	5	0	5	0	2.3	1
LDCA-MW09-0314	5	0	5	0	2	0
LDCA-MW11-0314	0.53	1	0.48	1	63	1
LDCA-MW12-0314	0.1	0	0.1	0	78	1
LDCA-MW20D-0314-AVG	0.1	0	0.1	0	40	1
LDCA-MW20I-0314	5	0	0.1	0	9.5	1
LDCA-MW20S-0314	5	0	5	0	12	1
LDCA-MW34D-0314	5	0	5	0	6.5	1
LDCA-MW34S-0314	0.1	0	0.1	0	2	0
LDCA-MW36-0314	5	0	5	0	13	1
LDCA-MW37-0314	5	0	0.1	0	90	1

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	BIS(2-ETHYLHEXYL)PHTHALATE	d_BIS(2-ETHYLHEXYL)PHTHALATE	1,3-DICHLOROBENZENE	d_1,3-DICHLOROBENZENE	1,4-DICHLOROBENZENE	d_1,4-DICHLOROBENZENE	BENZENE	d_BENZENE
LDCA-MW01D-0314	10	1	5	0	5	0	5	0
LDCA-MW01S-0314	5	0	5	0	5	0	5	0
LDCA-MW02-0314	5	0	5	0	5	0	5	0
LDCA-MW03-0314	5	0	5	0	5	0	5	0
LDCA-MW04-0314	2.8	1	0.6	1	1.9	1	0.5	0
LDCA-MW05D-0314	5	0	0.5	0	0.5	0	0.5	0
LDCA-MW05S-0314	5	0	0.5	0	1.2	1	0.5	0
LDCA-MW06-0314	5	0	5	0	5	0	5	0
LDCA-MW07D-0314	5	0	0.5	0	3.1	1	0.5	0
LDCA-MW07S-0314	5	0	0.5	0	1.6	1	0.5	0
LDCA-MW09-0314	5	0	5	0	5	0	5	0
LDCA-MW11-0314	48	1	0.5	0	2.6	1	0.5	0
LDCA-MW12-0314	5	0	0.77	1	1.2	1	1.5	1
LDCA-MW20D-0314-AVG	37	1	0.5	0	0.5	0	1.6	1
LDCA-MW20I-0314	2.4	1	5	0	5	0	5	0
LDCA-MW20S-0314	5	0	5	0	5	0	5	0
LDCA-MW34D-0314	5	0	0.5	0	0.5	0	0.5	0
LDCA-MW34S-0314	5	0	0.5	0	2.6	1	0.5	0
LDCA-MW36-0314	5	0	0.5	0	0.5	0	0.5	0
LDCA-MW37-0314	5	0	0.5	0	0.5	0	0.5	0

PROUCL DATA - INSIDE LANDFILL - EVENT 1

Samples	CHLOROBENZENE	d_CHLOROBENZENE	TRICHLOROETHENE	d_TRICHLOROETHENE
LDCA-MW01D-0314	5	0	5	0
LDCA-MW01S-0314	5	0	5	0
LDCA-MW02-0314	5	0	5	0
LDCA-MW03-0314	5	0	5	0
LDCA-MW04-0314	29	1	0.5	0
LDCA-MW05D-0314	0.5	0	0.5	0
LDCA-MW05S-0314	12	1	0.5	0
LDCA-MW06-0314	5	0	2.3	1
LDCA-MW07D-0314	19	1	0.5	0
LDCA-MW07S-0314	10	1	0.5	0
LDCA-MW09-0314	5	0	5	0
LDCA-MW11-0314	2	1	0.5	0
LDCA-MW12-0314	63	1	0.5	0
LDCA-MW20D-0314-AVG	3.1	1	0.5	0
LDCA-MW20I-0314	5	0	5	0
LDCA-MW20S-0314	5	0	5	0
LDCA-MW34D-0314	0.5	0	0.5	0
LDCA-MW34S-0314	23	1	0.5	0
LDCA-MW36-0314	1.9	1	0.5	0
LDCA-MW37-0314	17	1	0.5	0

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.1 6/21/2016 8:24:44 AM
From File	ProUCL Data Inside-Event 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BARIUM

General Statistics

Total Number of Observations	20	Number of Distinct Observations	19
		Number of Missing Observations	0
Minimum	24.2	Mean	607.8
Maximum	3960	Median	269
SD	895.7	Std. Error of Mean	200.3
Coefficient of Variation	1.474	Skewness	3.07

Normal GOF Test

Shapiro Wilk Test Statistic	0.612	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	954.2	95% Adjusted-CLT UCL (Chen-1995)	1084
		95% Modified-t UCL (Johnson-1978)	977.1

Gamma GOF Test

A-D Test Statistic	0.606	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.199	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.201	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.844	k star (bias corrected MLE)	0.751
Theta hat (MLE)	719.9	Theta star (bias corrected MLE)	809.4
nu hat (MLE)	33.77	nu star (bias corrected)	30.04
MLE Mean (bias corrected)	607.8	MLE Sd (bias corrected)	701.4
		Approximate Chi Square Value (0.05)	18.52
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	17.81

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	985.7	95% Adjusted Gamma UCL (use when n<50)	1025

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	3.186	Mean of logged Data	5.712
Maximum of Logged Data	8.284	SD of logged Data	1.216
Assuming Lognormal Distribution			
95% H-UCL	1447	90% Chebyshev (MVUE) UCL	1160
95% Chebyshev (MVUE) UCL	1416	97.5% Chebyshev (MVUE) UCL	1770
99% Chebyshev (MVUE) UCL	2465		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	937.3	95% Jackknife UCL	954.2
95% Standard Bootstrap UCL	925	95% Bootstrap-t UCL	1301
95% Hall's Bootstrap UCL	2149	95% Percentile Bootstrap UCL	951.6
95% BCA Bootstrap UCL	1103		
90% Chebyshev(Mean, Sd) UCL	1209	95% Chebyshev(Mean, Sd) UCL	1481
97.5% Chebyshev(Mean, Sd) UCL	1859	99% Chebyshev(Mean, Sd) UCL	2601
Suggested UCL to Use			
95% Adjusted Gamma UCL	1025		
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.			

BORON			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	27.3	Mean	1461
Maximum	4080	Median	1213
SD	1326	Std. Error of Mean	296.5
Coefficient of Variation	0.908	Skewness	0.66
Normal GOF Test			
Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	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	1974	95% Adjusted-CLT UCL (Chen-1995)	1996
		95% Modified-t UCL (Johnson-1978)	1981
Gamma GOF Test			
A-D Test Statistic	0.377	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.2	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.857	k star (bias corrected MLE)	0.762
Theta hat (MLE)	1705	Theta star (bias corrected MLE)	1918
nu hat (MLE)	34.28	nu star (bias corrected)	30.48
MLE Mean (bias corrected)	1461	MLE Sd (bias corrected)	1674
		Approximate Chi Square Value (0.05)	18.87
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	18.15
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	2360	95% Adjusted Gamma UCL (use when n<50)	2454
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.307	Mean of logged Data	6.601
Maximum of Logged Data	8.314	SD of logged Data	1.479
Assuming Lognormal Distribution			
95% H-UCL	6937	90% Chebyshev (MVUE) UCL	4335
95% Chebyshev (MVUE) UCL	5400	97.5% Chebyshev (MVUE) UCL	6877
99% Chebyshev (MVUE) UCL	9779		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1949	95% Jackknife UCL	1974
95% Standard Bootstrap UCL	1936	95% Bootstrap-t UCL	2073
95% Hall's Bootstrap UCL	1977	95% Percentile Bootstrap UCL	1954
95% BCA Bootstrap UCL	1999		
90% Chebyshev(Mean, Sd) UCL	2351	95% Chebyshev(Mean, Sd) UCL	2754
97.5% Chebyshev(Mean, Sd) UCL	3313	99% Chebyshev(Mean, Sd) UCL	4412
Suggested UCL to Use			
95% Student's-t UCL	1974		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

COBALT

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	0.71	Mean	8.03
Maximum	50.2	Median	6.3
SD	10.77	Std. Error of Mean	2.409
Coefficient of Variation	1.342	Skewness	3.455

Normal GOF Test		
Shapiro Wilk Test Statistic	0.581	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	12.2	95% Adjusted-CLT UCL (Chen-1995)	13.98
		95% Modified-t UCL (Johnson-1978)	12.51

Gamma GOF Test		
A-D Test Statistic	0.524	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.15	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.199	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	1.101	k star (bias corrected MLE)	0.969
Theta hat (MLE)	7.291	Theta star (bias corrected MLE)	8.283
nu hat (MLE)	44.05	nu star (bias corrected)	38.78
MLE Mean (bias corrected)	8.03	MLE Sd (bias corrected)	8.155
		Approximate Chi Square Value (0.05)	25.52
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	24.67

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	12.2	95% Adjusted Gamma UCL (use when n<50)	12.62

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	-0.342	Mean of logged Data	1.565
Maximum of Logged Data	3.916	SD of logged Data	1.036

Assuming Lognormal Distribution			
95% H-UCL	15.49	90% Chebyshev (MVUE) UCL	14.02
95% Chebyshev (MVUE) UCL	16.81	97.5% Chebyshev (MVUE) UCL	20.68
99% Chebyshev (MVUE) UCL	28.27		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	11.99	95% Jackknife UCL	12.2
95% Standard Bootstrap UCL	11.81	95% Bootstrap-t UCL	18.28
95% Hall's Bootstrap UCL	28.98	95% Percentile Bootstrap UCL	12.33
95% BCA Bootstrap UCL	15.32		
90% Chebyshev(Mean, Sd) UCL	15.26	95% Chebyshev(Mean, Sd) UCL	18.53
97.5% Chebyshev(Mean, Sd) UCL	23.08	99% Chebyshev(Mean, Sd) UCL	32
Suggested UCL to Use			
95% Adjusted Gamma UCL	12.62		
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.			

MANGANESE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	28.1	Mean	1501
Maximum	12800	Median	439
SD	2910	Std. Error of Mean	650.7
Coefficient of Variation	1.939	Skewness	3.443
Normal GOF Test			
Shapiro Wilk Test Statistic	0.516	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.338	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	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	2626	95% Adjusted-CLT UCL (Chen-1995)	3106
		95% Modified-t UCL (Johnson-1978)	2709
Gamma GOF Test			
A-D Test Statistic	1.08	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.794	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.227	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.592	k star (bias corrected MLE)	0.536
Theta hat (MLE)	2536	Theta star (bias corrected MLE)	2798
nu hat (MLE)	23.67	nu star (bias corrected)	21.45
MLE Mean (bias corrected)	1501	MLE Sd (bias corrected)	2049
		Approximate Chi Square Value (0.05)	11.93
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	11.37
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	2699	95% Adjusted Gamma UCL (use when n<50)	2832
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.336	Mean of logged Data	6.268
Maximum of Logged Data	9.457	SD of logged Data	1.436
Assuming Lognormal Distribution			
95% H-UCL	4414	90% Chebyshev (MVUE) UCL	2890
95% Chebyshev (MVUE) UCL	3588	97.5% Chebyshev (MVUE) UCL	4558
99% Chebyshev (MVUE) UCL	6463		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2571	95% Jackknife UCL	2626
95% Standard Bootstrap UCL	2530	95% Bootstrap-t UCL	4543
95% Hall's Bootstrap UCL	6062	95% Percentile Bootstrap UCL	2611
95% BCA Bootstrap UCL	3237		
90% Chebyshev(Mean, Sd) UCL	3453	95% Chebyshev(Mean, Sd) UCL	4337
97.5% Chebyshev(Mean, Sd) UCL	5564	99% Chebyshev(Mean, Sd) UCL	7975
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	4337		
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.			

NICKEL

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	1.8	Mean	32.23
Maximum	464	Median	6.5
SD	101.9	Std. Error of Mean	22.78
Coefficient of Variation	3.16	Skewness	4.438

Normal GOF Test		
Shapiro Wilk Test Statistic	0.288	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.468	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	71.62	95% Adjusted-CLT UCL (Chen-1995)	93.85
		95% Modified-t UCL (Johnson-1978)	75.39

Gamma GOF Test		
A-D Test Statistic	3.414	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.802	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.312	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.205	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.505	k star (bias corrected MLE)	0.462
Theta hat (MLE)	63.84	Theta star (bias corrected MLE)	69.69
nu hat (MLE)	20.2	nu star (bias corrected)	18.5
MLE Mean (bias corrected)	32.23	MLE Sd (bias corrected)	47.4
		Approximate Chi Square Value (0.05)	9.753
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	9.253

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	61.14	95% Adjusted Gamma UCL (use when n<50)	64.44

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level
Data appear Approximate Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	0.588	Mean of logged Data	2.217
Maximum of Logged Data	6.14	SD of logged Data	1.155

Assuming Lognormal Distribution			
95% H-UCL	38.26	90% Chebyshev (MVUE) UCL	32.09
95% Chebyshev (MVUE) UCL	38.93	97.5% Chebyshev (MVUE) UCL	48.41
99% Chebyshev (MVUE) UCL	67.05		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	69.7	95% Jackknife UCL	71.62
95% Standard Bootstrap UCL	69.41	95% Bootstrap-t UCL	482.4
95% Hall's Bootstrap UCL	248.7	95% Percentile Bootstrap UCL	77.24
95% BCA Bootstrap UCL	101.3		
90% Chebyshev(Mean, Sd) UCL	100.6	95% Chebyshev(Mean, Sd) UCL	131.5
97.5% Chebyshev(Mean, Sd) UCL	174.5	99% Chebyshev(Mean, Sd) UCL	258.9
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	131.5		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.1 6/21/2016 8:22:39 AM
From File	ProUCL Data Inside-Event 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TCDD-TEQ

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	7	Number of Non-Detects	12
Number of Distinct Detects	7	Number of Distinct Non-Detects	11
Minimum Detect	0.0297	Minimum Non-Detect	0.128
Maximum Detect	4111	Maximum Non-Detect	0.299
Variance Detects	2413758	Percent Non-Detects	63.16%
Mean Detects	587.8	SD Detects	1554
Median Detects	0.12	CV Detects	2.643
Skewness Detects	2.646	Kurtosis Detects	7
Mean of Logged Detects	-0.287	SD of Logged Detects	4.102

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.454	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.504	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	216.6	KM Standard Error of Mean	227.5
KM SD	917.9	95% KM (BCA) UCL	649.4
95% KM (t) UCL	611.1	95% KM (Percentile Bootstrap) UCL	649.2
95% KM (z) UCL	590.8	95% KM Bootstrap t UCL	1388526
90% KM Chebyshev UCL	899	95% KM Chebyshev UCL	1208
97.5% KM Chebyshev UCL	1637	99% KM Chebyshev UCL	2480

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.394	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.893	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.422	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.351	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)	0.119	k star (bias corrected MLE)	0.163
Theta hat (MLE)	4935	Theta star (bias corrected MLE)	3600
nu hat (MLE)	1.668	nu star (bias corrected)	2.286
Mean (detects)	587.8		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	216.6
Maximum	4111	Median	0.01
SD	943.1	CV	4.355
k hat (MLE)	0.0971	k star (bias corrected MLE)	0.117
Theta hat (MLE)	2230	Theta star (bias corrected MLE)	1853
nu hat (MLE)	3.691	nu star (bias corrected)	4.441
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (4.44, α)	0.903	Adjusted Chi Square Value (4.44, β)	0.776
95% Gamma Approximate UCL (use when n>=50)	1065	95% Gamma Adjusted UCL (use when n<50)	1240

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	216.6	SD (KM)	917.9
Variance (KM)	842627	SE of Mean (KM)	227.5
k hat (KM)	0.0557	k star (KM)	0.082
nu hat (KM)	2.116	nu star (KM)	3.115
theta hat (KM)	3890	theta star (KM)	2642
80% gamma percentile (KM)	108.1	90% gamma percentile (KM)	521.4
95% gamma percentile (KM)	1261	99% gamma percentile (KM)	3792

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.12, α)	0.407	Adjusted Chi Square Value (3.12, β)	0.338
95% Gamma Approximate KM-UCL (use when n>=50)	1656	95% Gamma Adjusted KM-UCL (use when n<50)	1996
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Approximate Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	216.6	Mean in Log Scale	-1.733
SD in Original Scale	943.1	SD in Log Scale	2.657
95% t UCL (assumes normality of ROS data)	591.8	95% Percentile Bootstrap UCL	649.2
95% BCA Bootstrap UCL	865.7	95% Bootstrap t UCL	1521391
95% H-UCL (Log ROS)	182.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.834	KM Geo Mean	0.16
KM SD (logged)	2.623	95% Critical H Value (KM-Log)	5.379
KM Standard Error of Mean (logged)	0.682	95% H-UCL (KM -Log)	138.8
KM SD (logged)	2.623	95% Critical H Value (KM-Log)	5.379
KM Standard Error of Mean (logged)	0.682		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	216.6	Mean in Log Scale	-1.504
SD in Original Scale	943.1	SD in Log Scale	2.561
95% t UCL (Assumes normality)	591.8	95% H-Stat UCL	141.3
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	2480		
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.			

ALUMINUM

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	9
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	24.6	Minimum Non-Detect	20
Maximum Detect	30500	Maximum Non-Detect	20
Variance Detects	83148380	Percent Non-Detects	45%
Mean Detects	3251	SD Detects	9119
Median Detects	48.3	CV Detects	2.805
Skewness Detects	3.217	Kurtosis Detects	10.48
Mean of Logged Detects	5.095	SD of Logged Detects	2.337

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.416	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.429	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	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	1797	KM Standard Error of Mean	1558
KM SD	6645	95% KM (BCA) UCL	4809
95% KM (t) UCL	4492	95% KM (Percentile Bootstrap) UCL	4807
95% KM (z) UCL	4360	95% KM Bootstrap t UCL	81381
90% KM Chebyshev UCL	6472	95% KM Chebyshev UCL	8590
97.5% KM Chebyshev UCL	11529	99% KM Chebyshev UCL	17303

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.765	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.845	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.347	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.279	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)	0.239	k star (bias corrected MLE)	0.235
Theta hat (MLE)	13593	Theta star (bias corrected MLE)	13861
nu hat (MLE)	5.261	nu star (bias corrected)	5.16
Mean (detects)	3251		

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	1788
Maximum	30500	Median	25.25
SD	6820	CV	3.815
k hat (MLE)	0.118	k star (bias corrected MLE)	0.133
Theta hat (MLE)	15198	Theta star (bias corrected MLE)	13410
nu hat (MLE)	4.706	nu star (bias corrected)	5.333
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (5.33, α)	1.309	Adjusted Chi Square Value (5.33, β)	1.16
95% Gamma Approximate UCL (use when n>=50)	7283	95% Gamma Adjusted UCL (use when n<50)	8219

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1797	SD (KM)	6645
Variance (KM)	44157583	SE of Mean (KM)	1558
k hat (KM)	0.0731	k star (KM)	0.0955
nu hat (KM)	2.925	nu star (KM)	3.82
theta hat (KM)	24574	theta star (KM)	18818
80% gamma percentile (KM)	1164	90% gamma percentile (KM)	4688
95% gamma percentile (KM)	10453	99% gamma percentile (KM)	29208
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.82, α)	0.652	Adjusted Chi Square Value (3.82, β)	0.56
95% Gamma Approximate KM-UCL (use when n>=50)	10531	95% Gamma Adjusted KM-UCL (use when n<50)	12253
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1788	Mean in Log Scale	2.274
SD in Original Scale	6820	SD in Log Scale	3.844
95% t UCL (assumes normality of ROS data)	4425	95% Percentile Bootstrap UCL	4802
95% BCA Bootstrap UCL	6528	95% Bootstrap t UCL	81033
95% H-UCL (Log ROS)	12173848		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	4.151	KM Geo Mean	63.47
KM SD (logged)	1.955	95% Critical H Value (KM-Log)	4.224
KM Standard Error of Mean (logged)	0.458	95% H-UCL (KM -Log)	2854
KM SD (logged)	1.955	95% Critical H Value (KM-Log)	4.224
KM Standard Error of Mean (logged)	0.458		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1792	Mean in Log Scale	3.839
SD in Original Scale	6819	SD in Log Scale	2.215
95% t UCL (Assumes normality)	4429	95% H-Stat UCL	5878
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	11529		
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.			

ANTIMONY

General Statistics

Total Number of Observations	20	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ANTIMONY was not processed!

ARSENIC

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	15
Number of Detects	15	Number of Non-Detects	5
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	1.4	Minimum Non-Detect	1
Maximum Detect	51.9	Maximum Non-Detect	1
Variance Detects	194.7	Percent Non-Detects	25%
Mean Detects	10.61	SD Detects	13.95
Median Detects	5.1	CV Detects	1.315
Skewness Detects	2.212	Kurtosis Detects	5.111
Mean of Logged Detects	1.715	SD of Logged Detects	1.146

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.697	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	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	8.207	KM Standard Error of Mean	2.869
KM SD	12.39	95% KM (BCA) UCL	13.19
95% KM (t) UCL	13.17	95% KM (Percentile Bootstrap) UCL	12.68
95% KM (z) UCL	12.92	95% KM Bootstrap t UCL	17.87
90% KM Chebyshev UCL	16.81	95% KM Chebyshev UCL	20.71
97.5% KM Chebyshev UCL	26.12	99% KM Chebyshev UCL	36.75

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.694	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.229	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.904	k star (bias corrected MLE)	0.767
Theta hat (MLE)	11.74	Theta star (bias corrected MLE)	13.83
nu hat (MLE)	27.11	nu star (bias corrected)	23.02
Mean (detects)	10.61		

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	7.959
Maximum	51.9	Median	2.45
SD	12.87	CV	1.617
k hat (MLE)	0.347	k star (bias corrected MLE)	0.328
Theta hat (MLE)	22.92	Theta star (bias corrected MLE)	24.23
nu hat (MLE)	13.89	nu star (bias corrected)	13.14
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (13.14, α)	5.985	Adjusted Chi Square Value (13.14, β)	5.607
95% Gamma Approximate UCL (use when n>=50)	17.47	95% Gamma Adjusted UCL (use when n<50)	18.65

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	8.207	SD (KM)	12.39
Variance (KM)	153.6	SE of Mean (KM)	2.869
k hat (KM)	0.438	k star (KM)	0.406
nu hat (KM)	17.54	nu star (KM)	16.24
theta hat (KM)	18.72	theta star (KM)	20.21
80% gamma percentile (KM)	13.27	90% gamma percentile (KM)	23.12
95% gamma percentile (KM)	33.92	99% gamma percentile (KM)	61.05
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (16.24, α)	8.132	Adjusted Chi Square Value (16.24, β)	7.681
95% Gamma Approximate KM-UCL (use when n>=50)	16.39	95% Gamma Adjusted KM-UCL (use when n<50)	17.35
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	8.054	Mean in Log Scale	1.016
SD in Original Scale	12.81	SD in Log Scale	1.611
95% t UCL (assumes normality of ROS data)	13.01	95% Percentile Bootstrap UCL	13.03
95% BCA Bootstrap UCL	14.28	95% Bootstrap t UCL	18.19
95% H-UCL (Log ROS)	38.48		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.286	KM Geo Mean	3.619
KM SD (logged)	1.213	95% Critical H Value (KM-Log)	2.956
KM Standard Error of Mean (logged)	0.281	95% H-UCL (KM -Log)	17.18
KM SD (logged)	1.213	95% Critical H Value (KM-Log)	2.956
KM Standard Error of Mean (logged)	0.281		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.082	Mean in Log Scale	1.113
SD in Original Scale	12.79	SD in Log Scale	1.453
95% t UCL (Assumes normality)	13.03	95% H-Stat UCL	26.71
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	17.35		
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.			

CADMIUM

General Statistics

Total Number of Observations	20	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.099	Minimum Non-Detect	1
Maximum Detect	21.9	Maximum Non-Detect	1
Variance Detects	153.5	Percent Non-Detects	85%
Mean Detects	7.6	SD Detects	12.39
Median Detects	0.8	CV Detects	1.63
Skewness Detects	1.726	Kurtosis Detects	N/A
Mean of Logged Detects	0.184	SD of Logged Detects	2.722

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.774	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

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

KM Mean	1.522	KM Standard Error of Mean	1.312
KM SD	4.687	95% KM (BCA) UCL	N/A
95% KM (t) UCL	3.791	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	3.681	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	5.459	95% KM Chebyshev UCL	7.243
97.5% KM Chebyshev UCL	9.718	99% KM Chebyshev UCL	14.58

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.362	k star (bias corrected MLE)	N/A
Theta hat (MLE)	20.97	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.175	nu star (bias corrected)	N/A
Mean (detects)	7.6		

Gamma ROS Statistics using Imputed Non-Detects

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

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

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

This is especially true when the sample size is small.

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

Minimum	0.01	Mean	2.707
Maximum	21.9	Median	0.293
SD	5.287	CV	1.953
k hat (MLE)	0.275	k star (bias corrected MLE)	0.267
Theta hat (MLE)	9.843	Theta star (bias corrected MLE)	10.13
nu hat (MLE)	11	nu star (bias corrected)	10.68
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (10.68, α)	4.373	Adjusted Chi Square Value (10.68, β)	4.057
95% Gamma Approximate UCL (use when n>=50)	6.612	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.522	SD (KM)	4.687
Variance (KM)	21.97	SE of Mean (KM)	1.312
k hat (KM)	0.105	k star (KM)	0.123
nu hat (KM)	4.217	nu star (KM)	4.918
theta hat (KM)	14.44	theta star (KM)	12.38
80% gamma percentile (KM)	1.371	90% gamma percentile (KM)	4.34
95% gamma percentile (KM)	8.658	99% gamma percentile (KM)	21.76
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.92, α)	1.114	Adjusted Chi Square Value (4.92, β)	0.981
95% Gamma Approximate KM-UCL (use when n>=50)	6.716	95% Gamma Adjusted KM-UCL (use when n<50)	7.633
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.868	Mean in Log Scale	-1.118
SD in Original Scale	4.876	SD in Log Scale	1.94
95% t UCL (assumes normality of ROS data)	3.754	95% Percentile Bootstrap UCL	3.895
95% BCA Bootstrap UCL	4.887	95% Bootstrap t UCL	11.21
95% H-UCL (Log ROS)	13.92		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.05	KM Geo Mean	0.35
KM SD (logged)	1.392	95% Critical H Value (KM-Log)	3.245
KM Standard Error of Mean (logged)	0.898	95% H-UCL (KM -Log)	2.598
KM SD (logged)	1.392	95% Critical H Value (KM-Log)	3.245
KM Standard Error of Mean (logged)	0.898		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.565	Mean in Log Scale	-0.562
SD in Original Scale	4.788	SD in Log Scale	0.94
95% t UCL (Assumes normality)	3.416	95% H-Stat UCL	1.536
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	3.791		
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.			

CHROMIUM			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	19
Number of Detects	19	Number of Non-Detects	1
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	1.6	Minimum Non-Detect	2
Maximum Detect	399	Maximum Non-Detect	2
Variance Detects	8094	Percent Non-Detects	5%
Mean Detects	29.2	SD Detects	89.97
Median Detects	5.6	CV Detects	3.081
Skewness Detects	4.294	Kurtosis Detects	18.59
Mean of Logged Detects	2.055	SD of Logged Detects	1.207
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.307	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.432	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	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	27.82	KM Standard Error of Mean	19.66
KM SD	85.56	95% KM (BCA) UCL	67.27
95% KM (t) UCL	61.81	95% KM (Percentile Bootstrap) UCL	66.05
95% KM (z) UCL	60.15	95% KM Bootstrap t UCL	319.1
90% KM Chebyshev UCL	86.79	95% KM Chebyshev UCL	113.5
97.5% KM Chebyshev UCL	150.6	99% KM Chebyshev UCL	223.4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.407	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.806	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.369	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.21	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)	0.484	k star (bias corrected MLE)	0.443
Theta hat (MLE)	60.35	Theta star (bias corrected MLE)	65.98
nu hat (MLE)	18.39	nu star (bias corrected)	16.82
Mean (detects)	29.2		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	27.74
Maximum	399	Median	5.5
SD	87.81	CV	3.166
k hat (MLE)	0.409	k star (bias corrected MLE)	0.381
Theta hat (MLE)	67.75	Theta star (bias corrected MLE)	72.74
nu hat (MLE)	16.38	nu star (bias corrected)	15.25
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (15.25, α)	7.438	Adjusted Chi Square Value (15.25, β)	7.009
95% Gamma Approximate UCL (use when n>=50)	56.88	95% Gamma Adjusted UCL (use when n<50)	60.36

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	27.82	SD (KM)	85.56
Variance (KM)	7321	SE of Mean (KM)	19.66
k hat (KM)	0.106	k star (KM)	0.123
nu hat (KM)	4.228	nu star (KM)	4.927
theta hat (KM)	263.2	theta star (KM)	225.8
80% gamma percentile (KM)	25.11	90% gamma percentile (KM)	79.36
95% gamma percentile (KM)	158.2	99% gamma percentile (KM)	397.3
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.93, α)	1.119	Adjusted Chi Square Value (4.93, β)	0.984
95% Gamma Approximate KM-UCL (use when n>=50)	122.5	95% Gamma Adjusted KM-UCL (use when n<50)	139.2
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.791	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	27.78	Mean in Log Scale	1.949
SD in Original Scale	87.8	SD in Log Scale	1.266
95% t UCL (assumes normality of ROS data)	61.73	95% Percentile Bootstrap UCL	66.42
95% BCA Bootstrap UCL	89.92	95% Bootstrap t UCL	322.8
95% H-UCL (Log ROS)	37.86		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.975	KM Geo Mean	7.209
KM SD (logged)	1.196	95% Critical H Value (KM-Log)	2.929
KM Standard Error of Mean (logged)	0.275	95% H-UCL (KM -Log)	32.9
KM SD (logged)	1.196	95% Critical H Value (KM-Log)	2.929
KM Standard Error of Mean (logged)	0.275		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	27.79	Mean in Log Scale	1.952
SD in Original Scale	87.8	SD in Log Scale	1.261
95% t UCL (Assumes normality)	61.73	95% H-Stat UCL	37.49
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	113.5		
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.			

COPPER			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
Number of Detects	17	Number of Non-Detects	3
Number of Distinct Detects	17	Number of Distinct Non-Detects	3
Minimum Detect	2.2	Minimum Non-Detect	2
Maximum Detect	753	Maximum Non-Detect	4.3
Variance Detects	32607	Percent Non-Detects	15%
Mean Detects	54.08	SD Detects	180.6
Median Detects	6.1	CV Detects	3.339
Skewness Detects	4.088	Kurtosis Detects	16.79
Mean of Logged Detects	2.215	SD of Logged Detects	1.38
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.305	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.448	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	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	46.3	KM Standard Error of Mean	37.47
KM SD	162.6	95% KM (BCA) UCL	120.7
95% KM (t) UCL	111.1	95% KM (Percentile Bootstrap) UCL	120
95% KM (z) UCL	107.9	95% KM Bootstrap t UCL	1330
90% KM Chebyshev UCL	158.7	95% KM Chebyshev UCL	209.6
97.5% KM Chebyshev UCL	280.3	99% KM Chebyshev UCL	419.1
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.46	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.825	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.363	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.225	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)	0.375	k star (bias corrected MLE)	0.348
Theta hat (MLE)	144.4	Theta star (bias corrected MLE)	155.6
nu hat (MLE)	12.73	nu star (bias corrected)	11.82
Mean (detects)	54.08		
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	45.97
Maximum	753	Median	5.15
SD	166.9	CV	3.631
k hat (MLE)	0.267	k star (bias corrected MLE)	0.26
Theta hat (MLE)	172.4	Theta star (bias corrected MLE)	176.8
nu hat (MLE)	10.67	nu star (bias corrected)	10.4
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (10.40, α)	4.192	Adjusted Chi Square Value (10.40, β)	3.885
95% Gamma Approximate UCL (use when n>=50)	114	95% Gamma Adjusted UCL (use when n<50)	123

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	46.3	SD (KM)	162.6
Variance (KM)	26428	SE of Mean (KM)	37.47
k hat (KM)	0.0811	k star (KM)	0.102
nu hat (KM)	3.244	nu star (KM)	4.091
theta hat (KM)	570.8	theta star (KM)	452.7
80% gamma percentile (KM)	33.18	90% gamma percentile (KM)	124.4
95% gamma percentile (KM)	268.4	99% gamma percentile (KM)	727.2
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.09, α)	0.758	Adjusted Chi Square Value (4.09, β)	0.656
95% Gamma Approximate KM-UCL (use when n>=50)	249.9	95% Gamma Adjusted KM-UCL (use when n<50)	288.9
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.752	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	46.09	Mean in Log Scale	1.841
SD in Original Scale	166.8	SD in Log Scale	1.57
95% t UCL (assumes normality of ROS data)	110.6	95% Percentile Bootstrap UCL	118.3
95% BCA Bootstrap UCL	158	95% Bootstrap t UCL	1392
95% H-UCL (Log ROS)	77.43		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2	KM Geo Mean	7.39
KM SD (logged)	1.337	95% Critical H Value (KM-Log)	3.155
KM Standard Error of Mean (logged)	0.309	95% H-UCL (KM -Log)	47.58
KM SD (logged)	1.337	95% Critical H Value (KM-Log)	3.155
KM Standard Error of Mean (logged)	0.309		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	46.19	Mean in Log Scale	1.937
SD in Original Scale	166.8	SD in Log Scale	1.441
95% t UCL (Assumes normality)	110.7	95% H-Stat UCL	58.94
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	209.6		
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.			

CYANIDE

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	12
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	3.9	Minimum Non-Detect	10
Maximum Detect	367	Maximum Non-Detect	10
Variance Detects	15778	Percent Non-Detects	60%
Mean Detects	56.56	SD Detects	125.6
Median Detects	14.5	CV Detects	2.221
Skewness Detects	2.813	Kurtosis Detects	7.934
Mean of Logged Detects	2.764	SD of Logged Detects	1.427

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.468	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.486	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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	25.81	KM Standard Error of Mean	18.77
KM SD	78.45	95% KM (BCA) UCL	62.98
95% KM (t) UCL	58.26	95% KM (Percentile Bootstrap) UCL	61.65
95% KM (z) UCL	56.67	95% KM Bootstrap t UCL	346.5
90% KM Chebyshev UCL	82.11	95% KM Chebyshev UCL	107.6
97.5% KM Chebyshev UCL	143	99% KM Chebyshev UCL	212.5

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.273	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.762	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.417	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.309	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)	0.5	k star (bias corrected MLE)	0.396
Theta hat (MLE)	113.2	Theta star (bias corrected MLE)	143
nu hat (MLE)	7.994	nu star (bias corrected)	6.33
Mean (detects)	56.56		

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	23.24
Maximum	367	Median	0.01
SD	81.23	CV	3.495
k hat (MLE)	0.17	k star (bias corrected MLE)	0.178
Theta hat (MLE)	137	Theta star (bias corrected MLE)	130.9
nu hat (MLE)	6.787	nu star (bias corrected)	7.102
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (7.10, α)	2.227	Adjusted Chi Square Value (7.10, β)	2.017
95% Gamma Approximate UCL (use when n>=50)	74.13	95% Gamma Adjusted UCL (use when n<50)	81.83

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	25.81	SD (KM)	78.45
Variance (KM)	6155	SE of Mean (KM)	18.77
k hat (KM)	0.108	k star (KM)	0.125
nu hat (KM)	4.328	nu star (KM)	5.012
theta hat (KM)	238.5	theta star (KM)	205.9
80% gamma percentile (KM)	23.73	90% gamma percentile (KM)	73.94
95% gamma percentile (KM)	146.4	99% gamma percentile (KM)	365.2
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.01, α)	1.158	Adjusted Chi Square Value (5.01, β)	1.02
95% Gamma Approximate KM-UCL (use when n>=50)	111.7	95% Gamma Adjusted KM-UCL (use when n<50)	126.7
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	25.93	Mean in Log Scale	1.958
SD in Original Scale	80.5	SD in Log Scale	1.274
95% t UCL (assumes normality of ROS data)	57.06	95% Percentile Bootstrap UCL	61.4
95% BCA Bootstrap UCL	80.75	95% Bootstrap t UCL	325.8
95% H-UCL (Log ROS)	38.88		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.078	KM Geo Mean	7.986
KM SD (logged)	1.04	95% Critical H Value (KM-Log)	2.692
KM Standard Error of Mean (logged)	0.278	95% H-UCL (KM -Log)	26.05
KM SD (logged)	1.04	95% Critical H Value (KM-Log)	2.692
KM Standard Error of Mean (logged)	0.278		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	25.63	Mean in Log Scale	2.071
SD in Original Scale	80.53	SD in Log Scale	1.043
95% t UCL (Assumes normality)	56.76	95% H-Stat UCL	26.04
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	107.6		
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.			

LEAD			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	17
Number of Detects	18	Number of Non-Detects	2
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	0.51	Minimum Non-Detect	1
Maximum Detect	4470	Maximum Non-Detect	1
Variance Detects	1108891	Percent Non-Detects	10%
Mean Detects	250.6	SD Detects	1053
Median Detects	1.8	CV Detects	4.203
Skewness Detects	4.243	Kurtosis Detects	18
Mean of Logged Detects	0.926	SD of Logged Detects	2.026
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.254	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.534	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	225.6	KM Standard Error of Mean	224
KM SD	973.7	95% KM (BCA) UCL	672.2
95% KM (t) UCL	613	95% KM (Percentile Bootstrap) UCL	672
95% KM (z) UCL	594.1	95% KM Bootstrap t UCL	244361
90% KM Chebyshev UCL	897.7	95% KM Chebyshev UCL	1202
97.5% KM Chebyshev UCL	1625	99% KM Chebyshev UCL	2455
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	5.283	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.922	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.491	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.229	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)	0.165	k star (bias corrected MLE)	0.174
Theta hat (MLE)	1520	Theta star (bias corrected MLE)	1437
nu hat (MLE)	5.934	nu star (bias corrected)	6.279
Mean (detects)	250.6		
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	225.5
Maximum	4470	Median	1.65
SD	999.1	CV	4.43
k hat (MLE)	0.152	k star (bias corrected MLE)	0.163
Theta hat (MLE)	1483	Theta star (bias corrected MLE)	1387
nu hat (MLE)	6.081	nu star (bias corrected)	6.502
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (6.50, α)	1.902	Adjusted Chi Square Value (6.50, β)	1.712
95% Gamma Approximate UCL (use when n>=50)	771	95% Gamma Adjusted UCL (use when n<50)	856.5

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	225.6	SD (KM)	973.7
Variance (KM)	948177	SE of Mean (KM)	224
k hat (KM)	0.0537	k star (KM)	0.0789
nu hat (KM)	2.146	nu star (KM)	3.158
theta hat (KM)	4204	theta star (KM)	2857
80% gamma percentile (KM)	104.6	90% gamma percentile (KM)	530.3
95% gamma percentile (KM)	1311	99% gamma percentile (KM)	4020
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.16, α)	0.421	Adjusted Chi Square Value (3.16, β)	0.356
95% Gamma Approximate KM-UCL (use when n>=50)	1693	95% Gamma Adjusted KM-UCL (use when n<50)	2002
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.61	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	225.5	Mean in Log Scale	0.744
SD in Original Scale	999	SD in Log Scale	2
95% t UCL (assumes normality of ROS data)	611.8	95% Percentile Bootstrap UCL	671.9
95% BCA Bootstrap UCL	896.3	95% Bootstrap t UCL	244426
95% H-UCL (Log ROS)	112.3		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.793	KM Geo Mean	2.21
KM SD (logged)	1.911	95% Critical H Value (KM-Log)	4.145
KM Standard Error of Mean (logged)	0.44	95% H-UCL (KM -Log)	84.42
KM SD (logged)	1.911	95% Critical H Value (KM-Log)	4.145
KM Standard Error of Mean (logged)	0.44		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	225.5	Mean in Log Scale	0.764
SD in Original Scale	999	SD in Log Scale	1.98
95% t UCL (Assumes normality)	611.8	95% H-Stat UCL	106
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	1625		
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.			

MERCURY

General Statistics

Total Number of Observations	20	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable MERCURY was not processed!

SILVER

General Statistics

Total Number of Observations	20	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable SILVER was not processed!

VANADIUM			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	8
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.15	Minimum Non-Detect	5
Maximum Detect	327	Maximum Non-Detect	5
Variance Detects	8760	Percent Non-Detects	40%
Mean Detects	29.98	SD Detects	93.59
Median Detects	2.05	CV Detects	3.122
Skewness Detects	3.457	Kurtosis Detects	11.96
Mean of Logged Detects	0.966	SD of Logged Detects	1.905
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.353	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.494	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	18.66	KM Standard Error of Mean	16.53
KM SD	70.78	95% KM (BCA) UCL	51.14
95% KM (t) UCL	47.25	95% KM (Percentile Bootstrap) UCL	50.98
95% KM (z) UCL	45.86	95% KM Bootstrap t UCL	713.1
90% KM Chebyshev UCL	68.26	95% KM Chebyshev UCL	90.73
97.5% KM Chebyshev UCL	121.9	99% KM Chebyshev UCL	183.2
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.965	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.831	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.353	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.266	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)	0.286	k star (bias corrected MLE)	0.27
Theta hat (MLE)	105	Theta star (bias corrected MLE)	111.1
nu hat (MLE)	6.854	nu star (bias corrected)	6.474
Mean (detects)	29.98		
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	19.73
Maximum	327	Median	1.15
SD	72.61	CV	3.68
k hat (MLE)	0.208	k star (bias corrected MLE)	0.21
Theta hat (MLE)	94.92	Theta star (bias corrected MLE)	93.95
nu hat (MLE)	8.314	nu star (bias corrected)	8.4
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (8.40, α)	2.969	Adjusted Chi Square Value (8.40, β)	2.719
95% Gamma Approximate UCL (use when n>=50)	55.82	95% Gamma Adjusted UCL (use when n<50)	60.95

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	18.66	SD (KM)	70.78
Variance (KM)	5010	SE of Mean (KM)	16.53
k hat (KM)	0.0695	k star (KM)	0.0924
nu hat (KM)	2.78	nu star (KM)	3.696
theta hat (KM)	268.5	theta star (KM)	201.9
80% gamma percentile (KM)	11.47	90% gamma percentile (KM)	47.93
95% gamma percentile (KM)	108.7	99% gamma percentile (KM)	308.3
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.70, α)	0.606	Adjusted Chi Square Value (3.70, β)	0.519
95% Gamma Approximate KM-UCL (use when n>=50)	113.9	95% Gamma Adjusted KM-UCL (use when n<50)	132.9
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	18.83	Mean in Log Scale	0.662
SD in Original Scale	72.59	SD in Log Scale	1.667
95% t UCL (assumes normality of ROS data)	46.89	95% Percentile Bootstrap UCL	51.03
95% BCA Bootstrap UCL	67.69	95% Bootstrap t UCL	686.9
95% H-UCL (Log ROS)	32.22		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.65	KM Geo Mean	1.916
KM SD (logged)	1.584	95% Critical H Value (KM-Log)	3.569
KM Standard Error of Mean (logged)	0.417	95% H-UCL (KM -Log)	24.55
KM SD (logged)	1.584	95% Critical H Value (KM-Log)	3.569
KM Standard Error of Mean (logged)	0.417		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	18.99	Mean in Log Scale	0.946
SD in Original Scale	72.54	SD in Log Scale	1.45
95% t UCL (Assumes normality)	47.03	95% H-Stat UCL	22.39
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	90.73		
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.			

ZINC

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	19
Number of Detects	19	Number of Non-Detects	1
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	4.6	Minimum Non-Detect	4.4
Maximum Detect	5660	Maximum Non-Detect	4.4
Variance Detects	1740707	Percent Non-Detects	5%
Mean Detects	389	SD Detects	1319
Median Detects	11.5	CV Detects	3.392
Skewness Detects	3.969	Kurtosis Detects	16.24
Mean of Logged Detects	2.964	SD of Logged Detects	1.899

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.331	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.483	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.197	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	369.8	KM Standard Error of Mean	288.2
KM SD	1254	95% KM (BCA) UCL	929.1
95% KM (t) UCL	868.1	95% KM (Percentile Bootstrap) UCL	930.9
95% KM (z) UCL	843.8	95% KM Bootstrap t UCL	23593
90% KM Chebyshev UCL	1234	95% KM Chebyshev UCL	1626
97.5% KM Chebyshev UCL	2170	99% KM Chebyshev UCL	3237

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	4.492	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.872	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.461	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.218	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)	0.239	k star (bias corrected MLE)	0.236
Theta hat (MLE)	1630	Theta star (bias corrected MLE)	1648
nu hat (MLE)	9.067	nu star (bias corrected)	8.968
Mean (detects)	389		

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	369.5
Maximum	5660	Median	10.45
SD	1287	CV	3.483
k hat (MLE)	0.218	k star (bias corrected MLE)	0.219
Theta hat (MLE)	1694	Theta star (bias corrected MLE)	1689
nu hat (MLE)	8.729	nu star (bias corrected)	8.753
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (8.75, α)	3.178	Adjusted Chi Square Value (8.75, β)	2.918
95% Gamma Approximate UCL (use when n>=50)	1018	95% Gamma Adjusted UCL (use when n<50)	1109

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	369.8	SD (KM)	1254
Variance (KM)	1573662	SE of Mean (KM)	288.2
k hat (KM)	0.0869	k star (KM)	0.107
nu hat (KM)	3.475	nu star (KM)	4.287
theta hat (KM)	4256	theta star (KM)	3450
80% gamma percentile (KM)	282.5	90% gamma percentile (KM)	1011
95% gamma percentile (KM)	2136	99% gamma percentile (KM)	5672
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.29, α)	0.838	Adjusted Chi Square Value (4.29, β)	0.728
95% Gamma Approximate KM-UCL (use when n>=50)	1891	95% Gamma Adjusted KM-UCL (use when n<50)	2176
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.654	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	369.6	Mean in Log Scale	2.771
SD in Original Scale	1287	SD in Log Scale	2.041
95% t UCL (assumes normality of ROS data)	867.2	95% Percentile Bootstrap UCL	870.4
95% BCA Bootstrap UCL	1218	95% Bootstrap t UCL	23561
95% H-UCL (Log ROS)	998		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.89	KM Geo Mean	17.99
KM SD (logged)	1.831	95% Critical H Value (KM-Log)	4.001
KM Standard Error of Mean (logged)	0.421	95% H-UCL (KM -Log)	516.1
KM SD (logged)	1.831	95% Critical H Value (KM-Log)	4.001
KM Standard Error of Mean (logged)	0.421		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	369.7	Mean in Log Scale	2.855
SD in Original Scale	1287	SD in Log Scale	1.912
95% t UCL (Assumes normality)	867.3	95% H-Stat UCL	665.8
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1626		
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.			

DIOXIN-LIKE PCB_TEQ			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	5
Number of Detects	10	Number of Non-Detects	5
Number of Distinct Detects	10	Number of Distinct Non-Detects	3
Minimum Detect	7.8000E-4	Minimum Non-Detect	19
Maximum Detect	109.2	Maximum Non-Detect	21
Variance Detects	1192	Percent Non-Detects	33.33%
Mean Detects	10.95	SD Detects	34.52
Median Detects	0.0131	CV Detects	3.153
Skewness Detects	3.162	Kurtosis Detects	10
Mean of Logged Detects	-3.799	SD of Logged Detects	3.47
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.367	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.523	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	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	7.311	KM Standard Error of Mean	7.411
KM SD	27.23	95% KM (BCA) UCL	21.88
95% KM (t) UCL	20.36	95% KM (Percentile Bootstrap) UCL	21.87
95% KM (z) UCL	19.5	95% KM Bootstrap t UCL	6048
90% KM Chebyshev UCL	29.54	95% KM Chebyshev UCL	39.62
97.5% KM Chebyshev UCL	53.59	99% KM Chebyshev UCL	81.05
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.992	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.921	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.428	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.301	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)	0.127	k star (bias corrected MLE)	0.156
Theta hat (MLE)	86.17	Theta star (bias corrected MLE)	70.36
nu hat (MLE)	2.542	nu star (bias corrected)	3.112
Mean (detects)	10.95		
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	7.8000E-4	Mean	7.388
Maximum	109.2	Median	0.01
SD	28.17	CV	3.812
k hat (MLE)	0.136	k star (bias corrected MLE)	0.153
Theta hat (MLE)	54.43	Theta star (bias corrected MLE)	48.28
nu hat (MLE)	4.072	nu star (bias corrected)	4.591
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (4.59, α)	0.968	Adjusted Chi Square Value (4.59, β)	0.784

95% Gamma Approximate UCL (use when n>=50)	35.03	95% Gamma Adjusted UCL (use when n<50)	43.28
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	7.311	SD (KM)	27.23
Variance (KM)	741.5	SE of Mean (KM)	7.411
k hat (KM)	0.0721	k star (KM)	0.102
nu hat (KM)	2.162	nu star (KM)	3.063
theta hat (KM)	101.4	theta star (KM)	71.6
80% gamma percentile (KM)	5.226	90% gamma percentile (KM)	19.62
95% gamma percentile (KM)	42.38	99% gamma percentile (KM)	114.9
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.06, α)	0.391	Adjusted Chi Square Value (3.06, β)	0.3
95% Gamma Approximate KM-UCL (use when n>=50)	57.22	95% Gamma Adjusted KM-UCL (use when n<50)	74.58
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	7.309	Mean in Log Scale	-4.002
SD in Original Scale	28.19	SD in Log Scale	2.917
95% t UCL (assumes normality of ROS data)	20.13	95% Percentile Bootstrap UCL	21.86
95% BCA Bootstrap UCL	29.15	95% Bootstrap t UCL	6355
95% H-UCL (Log ROS)	189.6		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.113	KM Geo Mean	0.0164
KM SD (logged)	2.91	95% Critical H Value (KM-Log)	6.386
KM Standard Error of Mean (logged)	0.865	95% H-UCL (KM -Log)	161.8
KM SD (logged)	2.91	95% Critical H Value (KM-Log)	6.386
KM Standard Error of Mean (logged)	0.865		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10.63	Mean in Log Scale	-1.765
SD in Original Scale	27.68	SD in Log Scale	4.075
95% t UCL (Assumes normality)	23.22	95% H-Stat UCL	9857025
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	81.05		
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.			

NON-DIOXIN-LIKE PCBS			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	5
Minimum	318	Mean	12474333
Maximum	1.802E+8	Median	70170
SD	46412895	Std. Error of Mean	11983758
Coefficient of Variation	3.721	Skewness	3.869
Normal GOF Test			
Shapiro Wilk Test Statistic	0.297	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.501	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	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	33581448	95% Adjusted-CLT UCL (Chen-1995)	44976884
		95% Modified-t UCL (Johnson-1978)	35576589
Gamma GOF Test			
A-D Test Statistic	1.966	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.926	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.339	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.249	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.152	k star (bias corrected MLE)	0.166
Theta hat (MLE)	82087021	Theta star (bias corrected MLE)	75139234
nu hat (MLE)	4.559	nu star (bias corrected)	4.98
MLE Mean (bias corrected)	12474333	MLE Sd (bias corrected)	30615549
		Approximate Chi Square Value (0.05)	1.143
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	0.936
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	54347042	95% Adjusted Gamma UCL (use when n<50)	66361909
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.762	Mean of logged Data	11.29
Maximum of Logged Data	19.01	SD of logged Data	3.348
Assuming Lognormal Distribution			
95% H-UCL	1.452E+10	90% Chebyshev (MVUE) UCL	19447068
95% Chebyshev (MVUE) UCL	25819061	97.5% Chebyshev (MVUE) UCL	34663140
99% Chebyshev (MVUE) UCL	52035620		
Nonparametric Distribution Free UCL Statistics			

Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	32185861	95% Jackknife UCL	33581448
95% Standard Bootstrap UCL	31662420	95% Bootstrap-t UCL	2.432E+9
95% Hall's Bootstrap UCL	1.386E+9	95% Percentile Bootstrap UCL	36387321
95% BCA Bootstrap UCL	48443918		
90% Chebyshev(Mean, Sd) UCL	48425607	95% Chebyshev(Mean, Sd) UCL	64710323
97.5% Chebyshev(Mean, Sd) UCL	87312877	99% Chebyshev(Mean, Sd) UCL	1.317E+8
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	1.317E+8		
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.			

ALDRIN

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.039	Minimum Non-Detect	0.05
Maximum Detect	0.047	Maximum Non-Detect	0.05
Variance Detects	3.2000E-5	Percent Non-Detects	90%
Mean Detects	0.043	SD Detects	0.00566
Median Detects	0.043	CV Detects	0.132
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.151	SD of Logged Detects	0.132

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.043	KM Standard Error of Mean	0.004
KM SD	0.004	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0499	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0496	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.055	95% KM Chebyshev UCL	0.0604
97.5% KM Chebyshev UCL	0.068	99% KM Chebyshev UCL	0.0828

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	115.2	k star (bias corrected MLE)	N/A
Theta hat (MLE)	3.7317E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	460.9	nu star (bias corrected)	N/A
Mean (detects)	0.043		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.043	SD (KM)	0.004
Variance (KM)	1.6000E-5	SE of Mean (KM)	0.004
k hat (KM)	115.6	k star (KM)	98.26
nu hat (KM)	4623	nu star (KM)	3930
theta hat (KM)	3.7209E-4	theta star (KM)	4.3761E-4
80% gamma percentile (KM)	0.0466	90% gamma percentile (KM)	0.0486
95% gamma percentile (KM)	0.0504	99% gamma percentile (KM)	0.0537

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (N/A, α)	3786	Adjusted Chi Square Value (N/A, β)	3775
95% Gamma Approximate KM-UCL (use when n>=50)	0.0446	95% Gamma Adjusted KM-UCL (use when n<50)	0.0448

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0435	Mean in Log Scale	-3.151
SD in Original Scale	0.008	SD in Log Scale	0.184
95% t UCL (assumes normality of ROS data)	0.0466	95% Percentile Bootstrap UCL	0.0465
95% BCA Bootstrap UCL	0.0468	95% Bootstrap t UCL	0.0468
95% H-UCL (Log ROS)	0.0469		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.151	KM Geo Mean	0.0428
KM SD (logged)	0.0933	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0933	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0933	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0933		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0268	Mean in Log Scale	-3.635
SD in Original Scale	0.00569	SD in Log Scale	0.168
95% t UCL (Assumes normality)	0.029	95% H-Stat UCL	0.0286
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0499	KM H-UCL	N/A
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BETA-BHC			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	14
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.022	Minimum Non-Detect	0.05
Maximum Detect	0.081	Maximum Non-Detect	0.05
Variance Detects	7.5827E-4	Percent Non-Detects	70%
Mean Detects	0.0507	SD Detects	0.0275
Median Detects	0.0485	CV Detects	0.543
Skewness Detects	0.0761	Kurtosis Detects	-2.958
Mean of Logged Detects	-3.123	SD of Logged Detects	0.597
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0334	KM Standard Error of Mean	0.00469
KM SD	0.018	95% KM (BCA) UCL	0.0435
95% KM (t) UCL	0.0415	95% KM (Percentile Bootstrap) UCL	0.043
95% KM (z) UCL	0.0411	95% KM Bootstrap t UCL	0.0419
90% KM Chebyshev UCL	0.0475	95% KM Chebyshev UCL	0.0539
97.5% KM Chebyshev UCL	0.0627	99% KM Chebyshev UCL	0.0801
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.609	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.7	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.273	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.334	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)	3.707	k star (bias corrected MLE)	1.965
Theta hat (MLE)	0.0137	Theta star (bias corrected MLE)	0.0258
nu hat (MLE)	44.48	nu star (bias corrected)	23.57
Mean (detects)	0.0507		
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	0.0351
Maximum	0.081	Median	0.0295
SD	0.0209	CV	0.595
k hat (MLE)	3.163	k star (bias corrected MLE)	2.722
Theta hat (MLE)	0.0111	Theta star (bias corrected MLE)	0.0129
nu hat (MLE)	126.5	nu star (bias corrected)	108.9
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (108.86, α)	85.78	Adjusted Chi Square Value (108.86, β)	84.16
95% Gamma Approximate UCL (use when n>=50)	0.0445	95% Gamma Adjusted UCL (use when n<50)	0.0454

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0334	SD (KM)	0.018
Variance (KM)	3.2481E-4	SE of Mean (KM)	0.00469
k hat (KM)	3.435	k star (KM)	2.953
nu hat (KM)	137.4	nu star (KM)	118.1
theta hat (KM)	0.00972	theta star (KM)	0.0113
80% gamma percentile (KM)	0.0477	90% gamma percentile (KM)	0.0595
95% gamma percentile (KM)	0.0704	99% gamma percentile (KM)	0.0942
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (118.11, α)	94.01	Adjusted Chi Square Value (118.11, β)	92.32
95% Gamma Approximate KM-UCL (use when n>=50)	0.042	95% Gamma Adjusted KM-UCL (use when n<50)	0.0427
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0352	Mean in Log Scale	-3.477
SD in Original Scale	0.0198	SD in Log Scale	0.515
95% t UCL (assumes normality of ROS data)	0.0429	95% Percentile Bootstrap UCL	0.0426
95% BCA Bootstrap UCL	0.0441	95% Bootstrap t UCL	0.0453
95% H-UCL (Log ROS)	0.0449		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.497	KM Geo Mean	0.0303
KM SD (logged)	0.4	95% Critical H Value (KM-Log)	1.929
KM Standard Error of Mean (logged)	0.116	95% H-UCL (KM -Log)	0.0392
KM SD (logged)	0.4	95% Critical H Value (KM-Log)	1.929
KM Standard Error of Mean (logged)	0.116		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0327	Mean in Log Scale	-3.519
SD in Original Scale	0.0186	SD in Log Scale	0.405
95% t UCL (Assumes normality)	0.0399	95% H-Stat UCL	0.0385
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0415		
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.			

DELTA-BHC

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.015	Minimum Non-Detect	0.05
Maximum Detect	0.034	Maximum Non-Detect	0.05
Variance Detects	1.8050E-4	Percent Non-Detects	90%
Mean Detects	0.0245	SD Detects	0.0134
Median Detects	0.0245	CV Detects	0.548
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.791	SD of Logged Detects	0.579

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0245	KM Standard Error of Mean	0.0095
KM SD	0.0095	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0409	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0401	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.053	95% KM Chebyshev UCL	0.0659
97.5% KM Chebyshev UCL	0.0838	99% KM Chebyshev UCL	0.119

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	6.299	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00389	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	25.2	nu star (bias corrected)	N/A
Mean (detects)	0.0245		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0245	SD (KM)	0.0095
Variance (KM)	9.0250E-5	SE of Mean (KM)	0.0095
k hat (KM)	6.651	k star (KM)	5.687
nu hat (KM)	266	nu star (KM)	227.5
theta hat (KM)	0.00368	theta star (KM)	0.00431
80% gamma percentile (KM)	0.0325	90% gamma percentile (KM)	0.0382
95% gamma percentile (KM)	0.0435	99% gamma percentile (KM)	0.0545

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (227.47, α)	193.6	Adjusted Chi Square Value (227.47, β)	191.1
95% Gamma Approximate KM-UCL (use when n>=50)	0.0288	95% Gamma Adjusted KM-UCL (use when n<50)	0.0292

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0304	Mean in Log Scale	-3.791

SD in Original Scale	0.0253	SD in Log Scale	0.805
95% t UCL (assumes normality of ROS data)	0.0402	95% Percentile Bootstrap UCL	0.0401
95% BCA Bootstrap UCL	0.0416	95% Bootstrap t UCL	0.0442
95% H-UCL (Log ROS)	0.0483		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.791	KM Geo Mean	0.0226
KM SD (logged)	0.409	95% Critical H Value (KM-Log)	1.937
KM Standard Error of Mean (logged)	0.409	95% H-UCL (KM -Log)	0.0295
KM SD (logged)	0.409	95% Critical H Value (KM-Log)	1.937
KM Standard Error of Mean (logged)	0.409		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.025	Mean in Log Scale	-3.699
SD in Original Scale	0.00309	SD in Log Scale	0.136
95% t UCL (Assumes normality)	0.0261	95% H-Stat UCL	0.0264
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0659		
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

DIELDRIN

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.019	Minimum Non-Detect	0.1
Maximum Detect	0.022	Maximum Non-Detect	0.1
Variance Detects	4.5000E-6	Percent Non-Detects	90%
Mean Detects	0.0205	SD Detects	0.00212
Median Detects	0.0205	CV Detects	0.103
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.89	SD of Logged Detects	0.104

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0205	KM Standard Error of Mean	0.0015
KM SD	0.0015	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0231	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.023	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.025	95% KM Chebyshev UCL	0.027
97.5% KM Chebyshev UCL	0.0299	99% KM Chebyshev UCL	0.0354

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	186.4	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.0995E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	745.8	nu star (bias corrected)	N/A
Mean (detects)	0.0205		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0205	SD (KM)	0.0015
Variance (KM)	2.2500E-6	SE of Mean (KM)	0.0015
k hat (KM)	186.8	k star (KM)	158.8
nu hat (KM)	7471	nu star (KM)	6352
theta hat (KM)	1.0976E-4	theta star (KM)	1.2910E-4
80% gamma percentile (KM)	0.0219	90% gamma percentile (KM)	0.0226
95% gamma percentile (KM)	0.0232	99% gamma percentile (KM)	0.0245

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (N/A, α)	6168	Adjusted Chi Square Value (N/A, β)	6153
95% Gamma Approximate KM-UCL (use when n>=50)	0.0211	95% Gamma Adjusted KM-UCL (use when n<50)	0.0212

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0206	Mean in Log Scale	-3.89

SD in Original Scale	0.00298	SD in Log Scale	0.144
95% t UCL (assumes normality of ROS data)	0.0218	95% Percentile Bootstrap UCL	0.0217
95% BCA Bootstrap UCL	0.0218	95% Bootstrap t UCL	0.0219
95% H-UCL (Log ROS)	0.0219		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.89	KM Geo Mean	0.0204
KM SD (logged)	0.0733	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0733	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0733	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0733		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0471	Mean in Log Scale	-3.085
SD in Original Scale	0.00909	SD in Log Scale	0.276
95% t UCL (Assumes normality)	0.0506	95% H-Stat UCL	0.0534
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0231	KM H-UCL	N/A
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

GAMMA-BHC (LINDANE)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable GAMMA-BHC (LINDANE) was not processed!

BENZO(A)PYRENE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZO(A)PYRENE was not processed!

BENZO(K)FLUORANTHENE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZO(K)FLUORANTHENE was not processed!

INDENO(1,2,3-CD)PYRENE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable INDENO(1,2,3-CD)PYRENE was not processed!

1,4-DIOXANE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	18
Number of Detects	18	Number of Non-Detects	2
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	2.3	Minimum Non-Detect	2
Maximum Detect	110	Maximum Non-Detect	2
Variance Detects	1112	Percent Non-Detects	10%
Mean Detects	28.36	SD Detects	33.34
Median Detects	13	CV Detects	1.176
Skewness Detects	1.516	Kurtosis Detects	1.025
Mean of Logged Detects	2.754	SD of Logged Detects	1.108
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.367	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	25.73	KM Standard Error of Mean	7.304
KM SD	31.74	95% KM (BCA) UCL	38.57
95% KM (t) UCL	38.35	95% KM (Percentile Bootstrap) UCL	37.46
95% KM (z) UCL	37.74	95% KM Bootstrap t UCL	45.47
90% KM Chebyshev UCL	47.64	95% KM Chebyshev UCL	57.56
97.5% KM Chebyshev UCL	71.34	99% KM Chebyshev UCL	98.4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.088	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.768	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.287	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.21	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)	0.978	k star (bias corrected MLE)	0.852
Theta hat (MLE)	28.99	Theta star (bias corrected MLE)	33.27
nu hat (MLE)	35.22	nu star (bias corrected)	30.69
Mean (detects)	28.36		
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	25.53
Maximum	110	Median	12.5
SD	32.73	CV	1.282
k hat (MLE)	0.517	k star (bias corrected MLE)	0.473
Theta hat (MLE)	49.36	Theta star (bias corrected MLE)	53.98
nu hat (MLE)	20.68	nu star (bias corrected)	18.91
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (18.91, α)	10.05	Adjusted Chi Square Value (18.91, β)	9.546
95% Gamma Approximate UCL (use when n>=50)	48.02	95% Gamma Adjusted UCL (use when n<50)	50.58

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	25.73	SD (KM)	31.74
Variance (KM)	1008	SE of Mean (KM)	7.304
k hat (KM)	0.657	k star (KM)	0.592
nu hat (KM)	26.27	nu star (KM)	23.66
theta hat (KM)	39.17	theta star (KM)	43.49
80% gamma percentile (KM)	42.4	90% gamma percentile (KM)	67.12
95% gamma percentile (KM)	93.04	99% gamma percentile (KM)	155.8
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (23.66, α)	13.59	Adjusted Chi Square Value (23.66, β)	12.99
95% Gamma Approximate KM-UCL (use when n>=50)	44.78	95% Gamma Adjusted KM-UCL (use when n<50)	46.86
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data Not Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	25.65	Mean in Log Scale	2.495
SD in Original Scale	32.63	SD in Log Scale	1.319
95% t UCL (assumes normality of ROS data)	38.26	95% Percentile Bootstrap UCL	38.64
95% BCA Bootstrap UCL	40.53	95% Bootstrap t UCL	44.82
95% H-UCL (Log ROS)	74.38		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.548	KM Geo Mean	12.78
KM SD (logged)	1.194	95% Critical H Value (KM-Log)	2.926
KM Standard Error of Mean (logged)	0.275	95% H-UCL (KM -Log)	58.08
KM SD (logged)	1.194	95% Critical H Value (KM-Log)	2.926
KM Standard Error of Mean (logged)	0.275		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	25.63	Mean in Log Scale	2.478
SD in Original Scale	32.65	SD in Log Scale	1.348
95% t UCL (Assumes normality)	38.25	95% H-Stat UCL	78.83
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	57.56		
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.			

BIS(2-ETHYLHEXYL)PHTHALATE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	15
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	2.4	Minimum Non-Detect	5
Maximum Detect	48	Maximum Non-Detect	5
Variance Detects	444.6	Percent Non-Detects	75%
Mean Detects	20.04	SD Detects	21.09
Median Detects	10	CV Detects	1.052
Skewness Detects	0.672	Kurtosis Detects	-2.378
Mean of Logged Detects	2.338	SD of Logged Detects	1.398
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	6.96	KM Standard Error of Mean	3.023
KM SD	12.08	95% KM (BCA) UCL	13.55
95% KM (t) UCL	12.19	95% KM (Percentile Bootstrap) UCL	12.07
95% KM (z) UCL	11.93	95% KM Bootstrap t UCL	25.61
90% KM Chebyshev UCL	16.03	95% KM Chebyshev UCL	20.14
97.5% KM Chebyshev UCL	25.84	99% KM Chebyshev UCL	37.04
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.422	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.694	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.245	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.365	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.888	k star (bias corrected MLE)	0.488
Theta hat (MLE)	22.58	Theta star (bias corrected MLE)	41.03
nu hat (MLE)	8.876	nu star (bias corrected)	4.884
Mean (detects)	20.04		
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	7.696
Maximum	48	Median	2.6
SD	12.92	CV	1.679
k hat (MLE)	0.263	k star (bias corrected MLE)	0.257
Theta hat (MLE)	29.23	Theta star (bias corrected MLE)	29.93
nu hat (MLE)	10.53	nu star (bias corrected)	10.29
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (10.29, α)	4.121	Adjusted Chi Square Value (10.29, β)	3.817
95% Gamma Approximate UCL (use when n>=50)	19.21	95% Gamma Adjusted UCL (use when n<50)	20.74

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	6.96	SD (KM)	12.08
Variance (KM)	146	SE of Mean (KM)	3.023
k hat (KM)	0.332	k star (KM)	0.315
nu hat (KM)	13.27	nu star (KM)	12.62
theta hat (KM)	20.98	theta star (KM)	22.07
80% gamma percentile (KM)	10.8	90% gamma percentile (KM)	20.4
95% gamma percentile (KM)	31.33	99% gamma percentile (KM)	59.56
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (12.62, α)	5.635	Adjusted Chi Square Value (12.62, β)	5.269
95% Gamma Approximate KM-UCL (use when n>=50)	15.58	95% Gamma Adjusted KM-UCL (use when n<50)	16.66
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	7.762	Mean in Log Scale	1.278
SD in Original Scale	12.39	SD in Log Scale	1.22
95% t UCL (assumes normality of ROS data)	12.55	95% Percentile Bootstrap UCL	12.48
95% BCA Bootstrap UCL	14.05	95% Bootstrap t UCL	23.68
95% H-UCL (Log ROS)	17.33		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.299	KM Geo Mean	3.665
KM SD (logged)	0.869	95% Critical H Value (KM-Log)	2.45
KM Standard Error of Mean (logged)	0.223	95% H-UCL (KM -Log)	8.717
KM SD (logged)	0.869	95% Critical H Value (KM-Log)	2.45
KM Standard Error of Mean (logged)	0.223		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.885	Mean in Log Scale	1.272
SD in Original Scale	12.42	SD in Log Scale	0.9
95% t UCL (Assumes normality)	11.69	95% H-Stat UCL	8.952
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	12.19		
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.			

1,3-DICHLOROBENZENE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.6	Minimum Non-Detect	0.5
Maximum Detect	0.77	Maximum Non-Detect	5
Variance Detects	0.0145	Percent Non-Detects	90%
Mean Detects	0.685	SD Detects	0.12
Median Detects	0.685	CV Detects	0.175
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.386	SD of Logged Detects	0.176

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.531	KM Standard Error of Mean	0.0315
KM SD	0.0772	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.585	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.583	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.625	95% KM Chebyshev UCL	0.668
97.5% KM Chebyshev UCL	0.728	99% KM Chebyshev UCL	0.844

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	64.61	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0106	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	258.4	nu star (bias corrected)	N/A
Mean (detects)	0.685		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.531	SD (KM)	0.0772
Variance (KM)	0.00596	SE of Mean (KM)	0.0315
k hat (KM)	47.3	k star (KM)	40.24
nu hat (KM)	1892	nu star (KM)	1609
theta hat (KM)	0.0112	theta star (KM)	0.0132
80% gamma percentile (KM)	0.6	90% gamma percentile (KM)	0.641
95% gamma percentile (KM)	0.676	99% gamma percentile (KM)	0.745

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (N/A, α)	1517	Adjusted Chi Square Value (N/A, β)	1510
95% Gamma Approximate KM-UCL (use when n>=50)	0.563	95% Gamma Adjusted KM-UCL (use when n<50)	0.566

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.31	Mean in Log Scale	-1.322
SD in Original Scale	0.18	SD in Log Scale	0.563
95% t UCL (assumes normality of ROS data)	0.38	95% Percentile Bootstrap UCL	0.377
95% BCA Bootstrap UCL	0.387	95% Bootstrap t UCL	0.4
95% H-UCL (Log ROS)	0.409		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.642	KM Geo Mean	0.526
KM SD (logged)	0.125	95% Critical H Value (KM-Log)	1.745
KM Standard Error of Mean (logged)	0.0511	95% H-UCL (KM -Log)	0.558
KM SD (logged)	0.125	95% Critical H Value (KM-Log)	1.745
KM Standard Error of Mean (logged)	0.0511		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.194	Mean in Log Scale	-0.365
SD in Original Scale	1.102	SD in Log Scale	1.114
95% t UCL (Assumes normality)	1.62	95% H-Stat UCL	2.645
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.585	KM H-UCL	0.558
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
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.			

1,4-DICHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	7
Number of Detects	7	Number of Non-Detects	13
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	1.2	Minimum Non-Detect	0.5
Maximum Detect	3.1	Maximum Non-Detect	5
Variance Detects	0.562	Percent Non-Detects	65%
Mean Detects	2.029	SD Detects	0.75
Median Detects	1.9	CV Detects	0.37
Skewness Detects	0.213	Kurtosis Detects	-1.7
Mean of Logged Detects	0.646	SD of Logged Detects	0.385
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.206	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1.392	KM Standard Error of Mean	0.287
KM SD	0.921	95% KM (BCA) UCL	1.84
95% KM (t) UCL	1.888	95% KM (Percentile Bootstrap) UCL	1.842
95% KM (z) UCL	1.864	95% KM Bootstrap t UCL	1.877
90% KM Chebyshev UCL	2.254	95% KM Chebyshev UCL	2.644
97.5% KM Chebyshev UCL	3.186	99% KM Chebyshev UCL	4.25
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.385	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.709	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.233	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.312	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)	8.258	k star (bias corrected MLE)	4.814
Theta hat (MLE)	0.246	Theta star (bias corrected MLE)	0.421
nu hat (MLE)	115.6	nu star (bias corrected)	67.39
Mean (detects)	2.029		
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	1.315
Maximum	3.1	Median	1.2
SD	0.985	CV	0.749
k hat (MLE)	0.887	k star (bias corrected MLE)	0.787
Theta hat (MLE)	1.483	Theta star (bias corrected MLE)	1.67
nu hat (MLE)	35.46	nu star (bias corrected)	31.48
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (31.48, α)	19.66	Adjusted Chi Square Value (31.48, β)	18.92
95% Gamma Approximate UCL (use when n>=50)	2.105	95% Gamma Adjusted UCL (use when n<50)	2.187

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.392	SD (KM)	0.921
Variance (KM)	0.849	SE of Mean (KM)	0.287
k hat (KM)	2.281	k star (KM)	1.972
nu hat (KM)	91.24	nu star (KM)	78.89
theta hat (KM)	0.61	theta star (KM)	0.706
80% gamma percentile (KM)	2.087	90% gamma percentile (KM)	2.716
95% gamma percentile (KM)	3.316	99% gamma percentile (KM)	4.648
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (78.89, α)	59.42	Adjusted Chi Square Value (78.89, β)	58.09
95% Gamma Approximate KM-UCL (use when n>=50)	1.847	95% Gamma Adjusted KM-UCL (use when n<50)	1.89
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.449	Mean in Log Scale	0.207
SD in Original Scale	0.836	SD in Log Scale	0.598
95% t UCL (assumes normality of ROS data)	1.772	95% Percentile Bootstrap UCL	1.782
95% BCA Bootstrap UCL	1.773	95% Bootstrap t UCL	1.828
95% H-UCL (Log ROS)	1.968		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.0878	KM Geo Mean	1.092
KM SD (logged)	0.714	95% Critical H Value (KM-Log)	2.253
KM Standard Error of Mean (logged)	0.223	95% H-UCL (KM -Log)	2.037
KM SD (logged)	0.714	95% Critical H Value (KM-Log)	2.253
KM Standard Error of Mean (logged)	0.223		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.773	Mean in Log Scale	0.246
SD in Original Scale	1.017	SD in Log Scale	0.998
95% t UCL (Assumes normality)	2.166	95% H-Stat UCL	3.843
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.888		
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.			

BENZENE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	1.5	Minimum Non-Detect	0.5
Maximum Detect	1.6	Maximum Non-Detect	5
Variance Detects	0.005	Percent Non-Detects	90%
Mean Detects	1.55	SD Detects	0.0707
Median Detects	1.55	CV Detects	0.0456
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.438	SD of Logged Detects	0.0456

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.675	KM Standard Error of Mean	0.16
KM SD	0.392	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.952	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.938	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.155	95% KM Chebyshev UCL	1.372
97.5% KM Chebyshev UCL	1.674	99% KM Chebyshev UCL	2.267

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	960.7	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00161	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3843	nu star (bias corrected)	N/A
Mean (detects)	1.55		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.675	SD (KM)	0.392
Variance (KM)	0.154	SE of Mean (KM)	0.16
k hat (KM)	2.967	k star (KM)	2.556
nu hat (KM)	118.7	nu star (KM)	102.2
theta hat (KM)	0.227	theta star (KM)	0.264
80% gamma percentile (KM)	0.981	90% gamma percentile (KM)	1.241
95% gamma percentile (KM)	1.485	99% gamma percentile (KM)	2.018

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (102.23, α)	79.9	Adjusted Chi Square Value (102.23, β)	78.34
95% Gamma Approximate KM-UCL (use when n>=50)	0.864	95% Gamma Adjusted KM-UCL (use when n<50)	0.881

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.228	Mean in Log Scale	0.196
SD in Original Scale	0.18	SD in Log Scale	0.146
95% t UCL (assumes normality of ROS data)	1.298	95% Percentile Bootstrap UCL	1.295
95% BCA Bootstrap UCL	1.297	95% Bootstrap t UCL	1.305
95% H-UCL (Log ROS)	1.303		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.505	KM Geo Mean	0.604
KM SD (logged)	0.422	95% Critical H Value (KM-Log)	1.947
KM Standard Error of Mean (logged)	0.172	95% H-UCL (KM -Log)	0.797
KM SD (logged)	0.422	95% Critical H Value (KM-Log)	1.947
KM Standard Error of Mean (logged)	0.172		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.28	Mean in Log Scale	-0.283
SD in Original Scale	1.092	SD in Log Scale	1.141
95% t UCL (Assumes normality)	1.702	95% H-Stat UCL	3.04
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.952	KM H-UCL	0.797
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
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.			

CHLOROBENZENE

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	12
Number of Detects	10	Number of Non-Detects	10
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	1.9	Minimum Non-Detect	0.5
Maximum Detect	63	Maximum Non-Detect	5
Variance Detects	334.5	Percent Non-Detects	50%
Mean Detects	18	SD Detects	18.29
Median Detects	14.5	CV Detects	1.016
Skewness Detects	1.823	Kurtosis Detects	4.056
Mean of Logged Detects	2.368	SD of Logged Detects	1.184

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level
Detected Data appear Approximate Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	9.69	KM Standard Error of Mean	3.505
KM SD	14.83	95% KM (BCA) UCL	15.75
95% KM (t) UCL	15.75	95% KM (Percentile Bootstrap) UCL	15.33
95% KM (z) UCL	15.45	95% KM Bootstrap t UCL	19.91
90% KM Chebyshev UCL	20.2	95% KM Chebyshev UCL	24.97
97.5% KM Chebyshev UCL	31.58	99% KM Chebyshev UCL	44.56

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.284	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.273	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	1.093	k star (bias corrected MLE)	0.832
Theta hat (MLE)	16.46	Theta star (bias corrected MLE)	21.64
nu hat (MLE)	21.87	nu star (bias corrected)	16.64
Mean (detects)	18		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	9.282
Maximum	63	Median	1.95
SD	15.47	CV	1.667
k hat (MLE)	0.253	k star (bias corrected MLE)	0.248
Theta hat (MLE)	36.73	Theta star (bias corrected MLE)	37.41
nu hat (MLE)	10.11	nu star (bias corrected)	9.925
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (9.93, α)	3.895	Adjusted Chi Square Value (9.93, β)	3.601
95% Gamma Approximate UCL (use when n>=50)	23.65	95% Gamma Adjusted UCL (use when n<50)	25.59

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	9.69	SD (KM)	14.83
Variance (KM)	220.1	SE of Mean (KM)	3.505
k hat (KM)	0.427	k star (KM)	0.396
nu hat (KM)	17.07	nu star (KM)	15.84
theta hat (KM)	22.71	theta star (KM)	24.47
80% gamma percentile (KM)	15.62	90% gamma percentile (KM)	27.42
95% gamma percentile (KM)	40.4	99% gamma percentile (KM)	73.08
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.84, α)	7.85	Adjusted Chi Square Value (15.84, β)	7.408
95% Gamma Approximate KM-UCL (use when n>=50)	19.55	95% Gamma Adjusted KM-UCL (use when n<50)	20.72
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	9.781	Mean in Log Scale	1.192
SD in Original Scale	15.18	SD in Log Scale	1.615
95% t UCL (assumes normality of ROS data)	15.65	95% Percentile Bootstrap UCL	15.77
95% BCA Bootstrap UCL	17.45	95% Bootstrap t UCL	20.05
95% H-UCL (Log ROS)	46.43		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.201	KM Geo Mean	3.323
KM SD (logged)	1.513	95% Critical H Value (KM-Log)	3.449
KM Standard Error of Mean (logged)	0.401	95% H-UCL (KM -Log)	34.6
KM SD (logged)	1.513	95% Critical H Value (KM-Log)	3.449
KM Standard Error of Mean (logged)	0.401		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10.03	Mean in Log Scale	1.412
SD in Original Scale	15.03	SD in Log Scale	1.44
95% t UCL (Assumes normality)	15.84	95% H-Stat UCL	34.67
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	15.75		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

TRICHLOROETHENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	2
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable TRICHLOROETHENE was not processed!			

PCB-105

General Statistics			
Total Number of Observations	15	Number of Distinct Observations	11
Number of Detects	8	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	3
Minimum Detect	25	Minimum Non-Detect	19
Maximum Detect	690000	Maximum Non-Detect	21
Variance Detects	5.948E+10	Percent Non-Detects	46.67%
Mean Detects	86435	SD Detects	243877
Median Detects	108.5	CV Detects	2.822
Skewness Detects	2.828	Kurtosis Detects	8
Mean of Logged Detects	5.776	SD of Logged Detects	3.309

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.419	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.512	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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	46107	KM Standard Error of Mean	47501
KM SD	172088	95% KM (BCA) UCL	138047
95% KM (t) UCL	129771	95% KM (Percentile Bootstrap) UCL	138068
95% KM (z) UCL	124239	95% KM Bootstrap t UCL	79480477
90% KM Chebyshev UCL	188609	95% KM Chebyshev UCL	253158
97.5% KM Chebyshev UCL	342749	99% KM Chebyshev UCL	518733

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.757	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.891	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.457	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.331	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)	0.139	k star (bias corrected MLE)	0.17
Theta hat (MLE)	621877	Theta star (bias corrected MLE)	507835
nu hat (MLE)	2.224	nu star (bias corrected)	2.723
Mean (detects)	86435		

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	46098
Maximum	690000	Median	25
SD	178130	CV	3.864
k hat (MLE)	0.0845	k star (bias corrected MLE)	0.112
Theta hat (MLE)	545409	Theta star (bias corrected MLE)	411369
nu hat (MLE)	2.536	nu star (bias corrected)	3.362
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (3.36, α)	0.487	Adjusted Chi Square Value (3.36, β)	0.377
95% Gamma Approximate UCL (use when n>=50)	318078	95% Gamma Adjusted UCL (use when n<50)	410639

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	46107	SD (KM)	172088
Variance (KM)	2.961E+10	SE of Mean (KM)	47501
k hat (KM)	0.0718	k star (KM)	0.102
nu hat (KM)	2.154	nu star (KM)	3.056
theta hat (KM)	642289	theta star (KM)	452595
80% gamma percentile (KM)	32856	90% gamma percentile (KM)	123648
95% gamma percentile (KM)	267316	99% gamma percentile (KM)	725620
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.06, α)	0.389	Adjusted Chi Square Value (3.06, β)	0.299
95% Gamma Approximate KM-UCL (use when n>=50)	362003	95% Gamma Adjusted KM-UCL (use when n<50)	471897
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.739	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	46099	Mean in Log Scale	1.77
SD in Original Scale	178130	SD in Log Scale	5.205
95% t UCL (assumes normality of ROS data)	127106	95% Percentile Bootstrap UCL	138089
95% BCA Bootstrap UCL	184163	95% Bootstrap t UCL	78863770
95% H-UCL (Log ROS)	2.415E+13		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	4.455	KM Geo Mean	86.04
KM SD (logged)	2.666	95% Critical H Value (KM-Log)	5.89
KM Standard Error of Mean (logged)	0.736	95% H-UCL (KM -Log)	199597
KM SD (logged)	2.666	95% Critical H Value (KM-Log)	5.89
KM Standard Error of Mean (logged)	0.736		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	46103	Mean in Log Scale	4.155
SD in Original Scale	178129	SD in Log Scale	2.948
95% t UCL (Assumes normality)	127110	95% H-Stat UCL	803027
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	518733		
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.			

PCB-118

General Statistics			
Total Number of Observations	15	Number of Distinct Observations	13
Number of Detects	10	Number of Non-Detects	5
Number of Distinct Detects	10	Number of Distinct Non-Detects	3
Minimum Detect	26	Minimum Non-Detect	19
Maximum Detect	1700000	Maximum Non-Detect	21
Variance Detects	2.888E+11	Percent Non-Detects	33.33%
Mean Detects	170539	SD Detects	537399
Median Detects	270	CV Detects	3.151
Skewness Detects	3.162	Kurtosis Detects	10
Mean of Logged Detects	6.181	SD of Logged Detects	3.259

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.367	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.523	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	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	113699	KM Standard Error of Mean	115387
KM SD	423957	95% KM (BCA) UCL	340448
95% KM (t) UCL	316931	95% KM (Percentile Bootstrap) UCL	340185
95% KM (z) UCL	303493	95% KM Bootstrap t UCL	1.314E+8
90% KM Chebyshev UCL	459859	95% KM Chebyshev UCL	616658
97.5% KM Chebyshev UCL	834288	99% KM Chebyshev UCL	1261781

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	2.104	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.915	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.429	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.301	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)	0.133	k star (bias corrected MLE)	0.16
Theta hat (MLE)	1279755	Theta star (bias corrected MLE)	1066215
nu hat (MLE)	2.665	nu star (bias corrected)	3.199
Mean (detects)	170539		

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	113693
Maximum	1700000	Median	72
SD	438839	CV	3.86
k hat (MLE)	0.0908	k star (bias corrected MLE)	0.117
Theta hat (MLE)	1252685	Theta star (bias corrected MLE)	971302
nu hat (MLE)	2.723	nu star (bias corrected)	3.512
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (3.51, α)	0.539	Adjusted Chi Square Value (3.51, β)	0.42
95% Gamma Approximate UCL (use when n>=50)	740920	95% Gamma Adjusted UCL (use when n<50)	951279

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	113699	SD (KM)	423957
Variance (KM)	1.797E+11	SE of Mean (KM)	115387
k hat (KM)	0.0719	k star (KM)	0.102
nu hat (KM)	2.158	nu star (KM)	3.059
theta hat (KM)	1580840	theta star (KM)	1114882
80% gamma percentile (KM)	81145	90% gamma percentile (KM)	305042
95% gamma percentile (KM)	659145	99% gamma percentile (KM)	1788387
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.06, α)	0.39	Adjusted Chi Square Value (3.06, β)	0.299
95% Gamma Approximate KM-UCL (use when n>=50)	891362	95% Gamma Adjusted KM-UCL (use when n<50)	1161855
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.796	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	113693	Mean in Log Scale	3.621
SD in Original Scale	438839	SD in Log Scale	4.621
95% t UCL (assumes normality of ROS data)	313263	95% Percentile Bootstrap UCL	340238
95% BCA Bootstrap UCL	453758	95% Bootstrap t UCL	1.309E+8
95% H-UCL (Log ROS)	3.403E+11		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.102	KM Geo Mean	164.4
KM SD (logged)	2.95	95% Critical H Value (KM-Log)	6.467
KM Standard Error of Mean (logged)	0.803	95% H-UCL (KM -Log)	2085604
KM SD (logged)	2.95	95% Critical H Value (KM-Log)	6.467
KM Standard Error of Mean (logged)	0.803		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	113696	Mean in Log Scale	4.888
SD in Original Scale	438838	SD in Log Scale	3.227
95% t UCL (Assumes normality)	313266	95% H-Stat UCL	10330017
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	1261781		
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.			

Inside Landfill

Event 2

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	TCDD-TEQ	d_TCDD_T	ALUMINUM	d_ALUMINUM	ANTIMONY	d_ANTIMONY	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	BERYLLIUM	d_BERYLLIUM	BORON	d_BORON	CADMIUM	d_CADMIUM
LDCA-MW01D-1014	0.672	1	20	0	2	0	0.91	1	861	1	1	0	353	1	1	0
LDCA-MW01S-1014	0.87	1	39.4	1	2	0	72.1	1	138	1	1	0	170	1	1	0
LDCA-MW02-1014	0.668	1	4230	1	0.19	1	30.7	1	234	1	1	0	1380	1	1	0
LDCA-MW03-1014	0.631	1	20	0	0.33	1	10	1	1060	1	1	0	3160	1	1	0
LDCA-MW04-1014	0.298	1	20	0	2	0	1.1	1	2220	1	1	0	1360	1	1	0
LDCA-MW05D-1014	0.811	0	1000	0	60	0	10	0	996	1	5	0	1700	1	5	0
LDCA-MW05S-1014	0.671	1	1000	0	60	0	10	0	1420	1	5	0	3920	1	5	0
LDCA-MW06-1014	0.166	1	29.3	1	2	0	2.8	1	750	1	1	0	3680	1	1	0
LDCA-MW07D-1014	0.121	1	20	0	2	0	9.9	1	373	1	1	0	3320	1	1	0
LDCA-MW07S-1014	0.067	1	20	0	2	0	34.7	1	272	1	1	0	1530	1	1	0
LDCA-MW09-1014	0.364	0	20	0	2	0	24.5	1	87.3	1	1	0	100	0	1	0
LDCA-MW11-1014	1655	1	11500	1	12.8	1	30.2	1	2560	1	0.56	1	3630	1	8.4	1
LDCA-MW12-1014	1.14	1	20	0	2	0	1.5	1	1940	1	1	0	3860	1	0.024	1
LDCA-MW20D-1014-AVG	0.496	0	23650	1	31	0	6.5	1	356	1	6.75	1	361.5	1	3	0
LDCA-MW20I-1014	0.440	1	4010	1	60	0	10	0	70.9	1	0.49	1	100	0	5	0
LDCA-MW20S-1014			166	1	2	0	5.5	1	131	1	1	0	20.5	1	0.038	1
LDCA-MW34D-1014	0.081	1	20	0	2	0	1.6	1	331	1	1	0	100	0	1	0
LDCA-MW34S-1014	1.26	1	20	0	2	0	1.1	1	1010	1	1	0	1420	1	1	0
LDCA-MW36-1014	0.039	1	20	0	2	0	12.8	1	216	1	1	0	2100	1	1	0
LDCA-MW37-1014	0.235	1	1130	1	2	0	15.8	1	754	1	1	0	3380	1	1	0

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	COPPER	d_COPPER	CYANIDE	d_CYANIDE	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	MERCURY	d_MERCURY	NICKEL	d_NICKEL
LDCA-MW01D-1014	6.1	1	50	0	25	0	10	0	53800	1	1	0	2980	1	0.23	1	18.8	1
LDCA-MW01S-1014	1.3	1	50	0	25	0	10	0	35000	1	1	0	2730	1	0.043	1	1.6	1
LDCA-MW02-1014	15.9	1	50	0	25	0	10	0	48300	1	2.7	1	1740	1	0.069	1	8.7	1
LDCA-MW03-1014	10.3	1	50	0	25	0	12.4	1	55100	1	1	0	969	1	0.044	1	5.6	1
LDCA-MW04-1014	5.7	1	1.4	1	0.89	1	10	0	31100	1	1	0	494	1	0.11	1	6.9	1
LDCA-MW05D-1014	15.7	1	50	0	12.1	1	227	1	96100	1	10	0	5900	1	0.06	1	8	1
LDCA-MW05S-1014	9.6	1	50	0	3.9	1	24.8	1	26300	1	10	0	130	1	0.031	1	1.2	1
LDCA-MW06-1014	24.9	1	11.3	1	0.61	1	30.4	1	22900	1	1.5	1	622	1	0.084	1	10.4	1
LDCA-MW07D-1014	2.3	1	8	1	0.33	1	10	0	12300	1	1	0	304	1	0.2	0	14.9	1
LDCA-MW07S-1014	3.2	1	6.5	1	2	0	10	0	37200	1	1	0	757	1	0.2	0	7.2	1
LDCA-MW09-1014	2	0	1	0	2	0	5.2	1	32900	1	1	0	4170	1	0.029	1	0.64	1
LDCA-MW11-1014	183	1	21.7	1	245	1	176	1	89800	1	2330	1	660	1	3.7	1	152	1
LDCA-MW12-1014	13.9	1	3.9	1	0.7	1	2.6	1	9140	1	1	0	191	1	0.2	0	4	1
LDCA-MW20D-1014-AVG	19	1	4.2	1	10.65	1	7.9	1	14800	1	59.4	1	1022.5	1	0.099	1	12.35	1
LDCA-MW20I-1014	4.2	1	50	0	3.7	1	10	0	4980	1	10	0	244	1	0.018	1	24.8	1
LDCA-MW20S-1014	0.51	1	0.14	1	2	0	10	0	200	0	1.5	1	4.3	1	0.2	0	14.2	1
LDCA-MW34D-1014	2	0	1	0	2	0	1.6	1	85600	1	1	0	12700	1	0.055	1	0.93	1
LDCA-MW34S-1014	5.8	1	2.5	1	0.93	1	3.6	1	32000	1	1	0	496	1	0.016	1	3.9	1
LDCA-MW36-1014	9.5	1	3.4	1	2	0	10	0	14600	1	1	0	373	1	0.2	0	7.8	1
LDCA-MW37-1014	20.3	1	10.1	1	1.7	1	10	0	26400	1	4.8	1	305	1	0.2	0	9.3	1

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	SILVER	d_SILVER	THALLIUM	d_THALLIUM	VANADIUM	d_VANADIUM	ZINC	d_ZINC	DIOXIN-LIKE PCB_TEQ	d_DIOXIN-LIKE PCB_TEQ	NON-DIOXIN-LIKE PCBS	d_NON-DIOXIN-LIKE PCBS
LDCA-MW01D-1014	1	0	1	0	5.7	1	2	0				
LDCA-MW01S-1014	1	0	1	0	2.2	1	5.6	1				
LDCA-MW02-1014	1	0	1	0	19	1	9.1	1	0.309	1	46860	1
LDCA-MW03-1014	1	0	1	0	5.8	1	2	0	0.306	1	25307	1
LDCA-MW04-1014	1	0	1	0	2.1	1	4.6	1	0.336	1	399107	1
LDCA-MW05D-1014	10	0	25	0	5.6	1	60	0	20	0	473	1
LDCA-MW05S-1014	10	0	25	0	5	1	60	0	1.54	1	352239	1
LDCA-MW06-1014	1	0	1	0	6	1	5.5	1				
LDCA-MW07D-1014	1	0	1	0	0.62	1	4.1	1	20	0	1000000	1
LDCA-MW07S-1014	1	0	1	0	5	1	2	0	0.306	1	299995	1
LDCA-MW09-1014	1	0	1	0	0.36	1	2.3	1				
LDCA-MW11-1014	10.2	1	1	0	186	1	2720	1	73.8	1	18753600	1
LDCA-MW12-1014	1	0	1	0	3.5	1	2.9	1	2.67	1	3589140	1
LDCA-MW20D-1014-AVG	5.5	0	1.7	1	19.45	1	79.15	1	0.368	1	27968	1
LDCA-MW20I-1014	10	0	25	0	3.1	1	60	0	0.338	1	9534	1
LDCA-MW20S-1014	0.011	1	1	0	2.9	1	56	1				
LDCA-MW34D-1014	1	0	1	0	0.87	1	2	0	0.306	1	847	1
LDCA-MW34S-1014	1	0	1	0	1.8	1	6.9	1	0.316	1	589645	1
LDCA-MW36-1014	1	0	1	0	8.4	1	2	0	0.306	1	14603	1
LDCA-MW37-1014	1	0	1	0	17.2	1	11.7	1	0.453	1	58981	1

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	4,4'-DDE	d_4,4'-DDE	ALDRIN	d_ALDRIN	DELTA-BHC	d_DELTA-BHC	DIELDRIN	d_DIELDRIN	HEPTACHLOR	d_HEPTACHLOR	HEPTACHLOR EPOXIDE	d_HEPTACHLOR EPOXIDE
LDCA-MW01D-1014	0.0012	1	0.0049	0	0.0003	1	0.0019	0	0.00097	0	0.002	0
LDCA-MW01S-1014	0.0009	1	0.0002	1	0.0002	1	0.0001	1	0.001	1	0.002	0
LDCA-MW02-1014	0.0004	1	0.0004	1	0.0084	1	0.0023	1	0.0005	1	0.0019	0
LDCA-MW03-1014	0.0005	1	0.001	1	0.0036	1	0.0019	0	0.0008	1	0.0019	0
LDCA-MW04-1014	0.00025	1	0.0024	1	0.0025	1	0.00039	1	0.0075	1	0.00069	1
LDCA-MW05D-1014	0.00036	1	0.00065	1	0.005	0	0.002	0	0.00052	1	0.002	0
LDCA-MW05S-1014	0.0029	1	0.0021	1	0.014	1	0.0008	1	0.002	1	0.0003	1
LDCA-MW06-1014	0.0026	1	0.0007	1	0.00033	1	0.0016	1	0.01	1	0.0007	1
LDCA-MW07D-1014	0.0012	1	0.0022	1	0.00047	1	0.00042	1	0.00079	1	0.002	0
LDCA-MW07S-1014	0.00069	1	0.00051	1	0.00065	1	0.0015	1	0.00064	1	0.0005	1
LDCA-MW09-1014	0.00017	1	0.00059	1	0.00042	1	0.002	0	0.00073	1	0.00028	1
LDCA-MW11-1014	0.063	1	0.0046	1	0.016	1	0.053	1	0.001	0	0.0023	1
LDCA-MW12-1014	0.0017	1	0.0034	1	0.0094	1	0.0015	1	0.0008	1	0.002	0
LDCA-MW20D-1014-AVG	0.00034	1	0.00055	1	0.000415	1	0.000305	1	0.000855	1	0.00036	1
LDCA-MW20I-1014	0.0012	1	0.00061	1	0.00063	1	0.00076	1	0.00023	1	0.0018	0
LDCA-MW20S-1014	0.00043	1	0.00022	1	0.00044	1	0.002	0	0.0012	1	0.0012	1
LDCA-MW34D-1014	0.00023	1	0.00018	1	0.00044	1	0.002	0	0.00055	1	0.00018	1
LDCA-MW34S-1014	0.00036	1	0.0047	1	0.0057	1	0.0011	1	0.0069	1	0.00061	1
LDCA-MW36-1014	0.00044	1	0.005	0	0.005	0	0.0009	1	0.00025	1	0.00072	1
LDCA-MW37-1014	0.0031	1	0.0018	1	0.005	0	0.0022	1	0.0053	1	0.00061	1

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	1,4-DIOXANE	d_1,4-DIOXANE	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	BENZO(A)PYRENE	d_BENZO(A)PYRENE	BENZO(B)FLUORANTHENE	d_BENZO(B)FLUORANTHENE
LDCA-MW01D-1014	220	1	0.1	0	0.1	0	0.1	0
LDCA-MW01S-1014	1.7	1	0.042	1	0.022	1	0.036	1
LDCA-MW02-1014	43	1	0.033	1	0.1	0	0.1	0
LDCA-MW03-1014	27	1	0.1	0	0.1	0	0.1	0
LDCA-MW04-1014	16	1	0.015	1	0.1	0	0.1	0
LDCA-MW05D-1014	86	1	0.091	0	0.091	0	0.091	0
LDCA-MW05S-1014	21	1	0.056	1	0.098	0	0.098	0
LDCA-MW06-1014	92	1	0.041	1	5	0	5	0
LDCA-MW07D-1014	6.4	1	0.043	1	0.1	0	0.1	0
LDCA-MW07S-1014	7.8	1	0.1	0	0.1	0	0.1	0
LDCA-MW09-1014	0.5	0	0.1	0	0.1	0	0.1	0
LDCA-MW11-1014	140	1	0.23	1	0.12	1	0.17	1
LDCA-MW12-1014	160	1	0.1	0	0.1	0	0.1	0
LDCA-MW20D-1014-AVG	32	1	0.1	0	0.1	0	0.1	0
LDCA-MW20I-1014	6	1	0.1	0	0.1	0	0.0085	1
LDCA-MW20S-1014	39	1	0.1	0	0.1	0	0.0064	1
LDCA-MW34D-1014	12	1	0.1	0	0.1	0	0.1	0
LDCA-MW34S-1014	10	1	0.1	0	0.1	0	0.1	0
LDCA-MW36-1014	40	1	0.091	0	0.091	0	0.091	0
LDCA-MW37-1014	110	1	0.092	1	0.091	0	0.091	0

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	BIS(2-ETHYLHEXYL)PHTHALATE	d_BIS(2-ETHYLHEXYL)PHTHALATE	DIBENZO(A,H)ANTHRACENE	d_DIBENZO(A,H)ANTHRACENE	DIBENZOFURAN	d_DIBENZOFURAN	NAPHTHALENE	d_NAPHTHALENE
LDCA-MW01D-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW01S-1014	5	0	0.1	0	5	0	0.024	1
LDCA-MW02-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW03-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW04-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW05D-1014	4.5	0	0.091	0	4.5	0	0.028	1
LDCA-MW05S-1014	4.9	0	0.098	0	4.9	0	0.083	1
LDCA-MW06-1014	5	0	5	0	5	0	0.1	0
LDCA-MW07D-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW07S-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW09-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW11-1014	5	0	0.1	0	5	0	0.36	1
LDCA-MW12-1014	5	0	0.1	0	0.67	1	0.2	1
LDCA-MW20D-1014-AVG	4.1	1	0.1	0	5	0	0.02	1
LDCA-MW20I-1014	5	0	0.024	1	5	0	0.1	0
LDCA-MW20S-1014	5	0	0.1	0	5	0	0.47	1
LDCA-MW34D-1014	5	0	0.1	0	5	0	0.1	0
LDCA-MW34S-1014	5	0	0.1	0	0.41	1	0.078	1
LDCA-MW36-1014	4.5	0	0.091	0	4.5	0	0.019	1
LDCA-MW37-1014	0.28	1	0.091	0	5.1	1	0.094	1

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	PHENANTHRENE	d_PHENANTHRENE	1,3-DICHLOROBENZENE	d_1,3-DICHLOROBENZENE	1,4-DICHLOROBENZENE	d_1,4-DICHLOROBENZENE	BENZENE	d_BENZENE
LDCA-MW01D-1014	0.1	0	0.5	0	0.5	0	0.25	1
LDCA-MW01S-1014	0.22	1	0.5	0	0.5	0	0.5	0
LDCA-MW02-1014	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW03-1014	0.1	0	0.5	0	0.11	1	0.5	0
LDCA-MW04-1014	0.92	1	0.84	1	2.6	1	0.16	1
LDCA-MW05D-1014	0.091	0	0.5	0	0.5	0	0.5	0
LDCA-MW05S-1014	3.2	1	0.5	0	1.1	1	0.14	1
LDCA-MW06-1014	0.2	1	0.5	0	1.6	1	0.16	1
LDCA-MW07D-1014	0.1	0	0.22	1	3.8	1	0.33	1
LDCA-MW07S-1014	0.017	1	0.5	0	2	1	0.11	1
LDCA-MW09-1014	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW11-1014	3.3	1	0.94	1	4.3	1	0.52	1
LDCA-MW12-1014	1.2	1	1	1	2	1	0.44	1
LDCA-MW20D-1014-AVG	0.013	1	0.5	0	0.5	0	0.505	1
LDCA-MW20I-1014	0.0064	1	0.5	0	0.5	0	0.11	1
LDCA-MW20S-1014	0.016	1	0.5	0	0.5	0	3	1
LDCA-MW34D-1014	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW34S-1014	0.32	1	0.2	1	4.8	1	0.3	1
LDCA-MW36-1014	0.091	0	0.5	0	0.22	1	0.5	0
LDCA-MW37-1014	1.6	1	0.5	0	0.53	1	0.19	1

PROUCL DATA - INSIDE LANDFILL - EVENT 2

Samples	CHLOROBENZENE	d_CHLOROBENZENE	PENTADECAFLUOROOCTANOIC ACID	d_PENTADECAFLUOROOCTANOIC ACID	PERFLUOROOCTANE SULFONIC ACID	d_PERFLUOROOCTANE SULFONIC ACID
LDCA-MW01D-1014	0.69	1	0.14	1	0.02	1
LDCA-MW01S-1014	0.5	0	0.37	1	1.2	1
LDCA-MW02-1014	3	1	0.17	1	0.25	1
LDCA-MW03-1014	1.1	1	0.22	1	0.11	1
LDCA-MW04-1014	34	1	0.55	1	0.96	1
LDCA-MW05D-1014	0.5	0	0.19	1	0.42	0
LDCA-MW05S-1014	21	1	0.56	1	0.16	1
LDCA-MW06-1014	5.9	1	0.28	1	0.17	1
LDCA-MW07D-1014	26	1	0.22	1	0.13	1
LDCA-MW07S-1014	13	1	0.16	1	0.07	1
LDCA-MW09-1014	0.5	0	0.046	1	0.04	0
LDCA-MW11-1014	12	1	0.35	1	0.064	1
LDCA-MW12-1014	93	1	0.47	1	0.24	1
LDCA-MW20D-1014-AVG	1.4	1	0.046	1	0.041	0
LDCA-MW20I-1014	0.34	1	0.02	0	0.04	0
LDCA-MW20S-1014	5.3	1	0.074	1	0.04	0
LDCA-MW34D-1014	0.24	1	0.026	1	0.04	0
LDCA-MW34S-1014	43	1	0.16	1	0.15	1
LDCA-MW36-1014	3.5	1	0.17	1	0.26	1
LDCA-MW37-1014	14	1	0.34	1	0.21	1

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 8:30:18 AM
From File	ProUCL Data Inside-Event 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BARIUM

General Statistics

Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	70.9	Mean	789
Maximum	2560	Median	561.5
SD	740.5	Std. Error of Mean	165.6
Coefficient of Variation	0.939	Skewness	1.192

Normal GOF Test

Shapiro Wilk Test Statistic	0.849	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	1075	95% Adjusted-CLT UCL (Chen-1995)	1109
		95% Modified-t UCL (Johnson-1978)	1083

Gamma GOF Test

A-D Test Statistic	0.348	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.199	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.172	k star (bias corrected MLE)	1.03
Theta hat (MLE)	673.1	Theta star (bias corrected MLE)	766.2
nu hat (MLE)	46.89	nu star (bias corrected)	41.19
MLE Mean (bias corrected)	789	MLE Sd (bias corrected)	777.5
		Approximate Chi Square Value (0.05)	27.48
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	26.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1183	95% Adjusted Gamma UCL (use when n<50)	1222

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.155	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	4.261	Mean of logged Data	6.187
Maximum of Logged Data	7.848	SD of logged Data	1.083
Assuming Lognormal Distribution			
95% H-UCL	1736	90% Chebyshev (MVUE) UCL	1528
95% Chebyshev (MVUE) UCL	1840	97.5% Chebyshev (MVUE) UCL	2274
99% Chebyshev (MVUE) UCL	3126		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1061	95% Jackknife UCL	1075
95% Standard Bootstrap UCL	1061	95% Bootstrap-t UCL	1129
95% Hall's Bootstrap UCL	1142	95% Percentile Bootstrap UCL	1065
95% BCA Bootstrap UCL	1099		
90% Chebyshev(Mean, Sd) UCL	1286	95% Chebyshev(Mean, Sd) UCL	1511
97.5% Chebyshev(Mean, Sd) UCL	1823	99% Chebyshev(Mean, Sd) UCL	2437
Suggested UCL to Use			
95% Adjusted Gamma UCL	1222		
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.			

MANGANESE

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	4.3	Mean	1840
Maximum	12700	Median	641
SD	2987	Std. Error of Mean	667.8
Coefficient of Variation	1.624	Skewness	2.902

Normal GOF Test		
Shapiro Wilk Test Statistic	0.61	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.308	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	2994	95% Adjusted-CLT UCL (Chen-1995)	3401
		95% Modified-t UCL (Johnson-1978)	3067

Gamma GOF Test		
A-D Test Statistic	0.614	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.793	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.203	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.608	k star (bias corrected MLE)	0.55
Theta hat (MLE)	3028	Theta star (bias corrected MLE)	3346
nu hat (MLE)	24.3	nu star (bias corrected)	21.99
MLE Mean (bias corrected)	1840	MLE Sd (bias corrected)	2481
		Approximate Chi Square Value (0.05)	12.33
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	11.76

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	3281	95% Adjusted Gamma UCL (use when n<50)	3440

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	1.459	Mean of logged Data	6.502
Maximum of Logged Data	9.449	SD of logged Data	1.697

Assuming Lognormal Distribution			
95% H-UCL	12189	90% Chebyshev (MVUE) UCL	5779
95% Chebyshev (MVUE) UCL	7298	97.5% Chebyshev (MVUE) UCL	9408
99% Chebyshev (MVUE) UCL	13551		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2938	95% Jackknife UCL	2994
95% Standard Bootstrap UCL	2932	95% Bootstrap-t UCL	4401
95% Hall's Bootstrap UCL	7098	95% Percentile Bootstrap UCL	2938
95% BCA Bootstrap UCL	3504		
90% Chebyshev(Mean, Sd) UCL	3843	95% Chebyshev(Mean, Sd) UCL	4751
97.5% Chebyshev(Mean, Sd) UCL	6010	99% Chebyshev(Mean, Sd) UCL	8484
Suggested UCL to Use			
95% Adjusted Gamma UCL	3440		
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.			

NICKEL

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	0.64	Mean	15.66
Maximum	152	Median	7.9
SD	32.69	Std. Error of Mean	7.31
Coefficient of Variation	2.087	Skewness	4.21

Normal GOF Test		
Shapiro Wilk Test Statistic	0.4	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	28.3	95% Adjusted-CLT UCL (Chen-1995)	35.04
		95% Modified-t UCL (Johnson-1978)	29.45

Gamma GOF Test		
A-D Test Statistic	1.181	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.782	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.211	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.202	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.724	k star (bias corrected MLE)	0.649
Theta hat (MLE)	21.62	Theta star (bias corrected MLE)	24.13
nu hat (MLE)	28.97	nu star (bias corrected)	25.96
MLE Mean (bias corrected)	15.66	MLE Sd (bias corrected)	19.44
		Approximate Chi Square Value (0.05)	15.35
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	14.7

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	26.49	95% Adjusted Gamma UCL (use when n<50)	27.65

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	-0.446	Mean of logged Data	1.921
Maximum of Logged Data	5.024	SD of logged Data	1.247

Assuming Lognormal Distribution			
95% H-UCL	35.12	90% Chebyshev (MVUE) UCL	27.48
95% Chebyshev (MVUE) UCL	33.61	97.5% Chebyshev (MVUE) UCL	42.11
99% Chebyshev (MVUE) UCL	58.83		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	27.68	95% Jackknife UCL	28.3
95% Standard Bootstrap UCL	27.03	95% Bootstrap-t UCL	72.26
95% Hall's Bootstrap UCL	76.47	95% Percentile Bootstrap UCL	29.28
95% BCA Bootstrap UCL	37.39		
90% Chebyshev(Mean, Sd) UCL	37.59	95% Chebyshev(Mean, Sd) UCL	47.52
97.5% Chebyshev(Mean, Sd) UCL	61.31	99% Chebyshev(Mean, Sd) UCL	88.39
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	47.52		
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.			

VANADIUM

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	19
		Number of Missing Observations	0
Minimum	0.36	Mean	15.03
Maximum	186	Median	5
SD	40.66	Std. Error of Mean	9.092
Coefficient of Variation	2.705	Skewness	4.325

Normal GOF Test		
Shapiro Wilk Test Statistic	0.344	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.407	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	30.75	95% Adjusted-CLT UCL (Chen-1995)	39.38
		95% Modified-t UCL (Johnson-1978)	32.22

Gamma GOF Test		
A-D Test Statistic	1.837	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.8	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.288	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.205	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.527	k star (bias corrected MLE)	0.481
Theta hat (MLE)	28.54	Theta star (bias corrected MLE)	31.25
nu hat (MLE)	21.07	nu star (bias corrected)	19.24
MLE Mean (bias corrected)	15.03	MLE Sd (bias corrected)	21.67
		Approximate Chi Square Value (0.05)	10.29
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	9.776

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	28.1	95% Adjusted Gamma UCL (use when n<50)	29.58

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	-1.022	Mean of logged Data	1.514
Maximum of Logged Data	5.226	SD of logged Data	1.374

Assuming Lognormal Distribution			
95% H-UCL	32.15	90% Chebyshev (MVUE) UCL	22.44
95% Chebyshev (MVUE) UCL	27.73	97.5% Chebyshev (MVUE) UCL	35.08
99% Chebyshev (MVUE) UCL	49.51		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	29.98	95% Jackknife UCL	30.75
95% Standard Bootstrap UCL	29.42	95% Bootstrap-t UCL	113.3
95% Hall's Bootstrap UCL	82.32	95% Percentile Bootstrap UCL	33.35
95% BCA Bootstrap UCL	43.49		
90% Chebyshev(Mean, Sd) UCL	42.31	95% Chebyshev(Mean, Sd) UCL	54.66
97.5% Chebyshev(Mean, Sd) UCL	71.81	99% Chebyshev(Mean, Sd) UCL	105.5
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	54.66		
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.			

NON-DIOXIN-LIKE PCBS

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	5
Minimum	472.6	Mean	1677887
Maximum	18753600	Median	58981
SD	4811284	Std. Error of Mean	1242268
Coefficient of Variation	2.867	Skewness	3.656

Normal GOF Test

Shapiro Wilk Test Statistic	0.393	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	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	3865906	95% Adjusted-CLT UCL (Chen-1995)	4974386
		95% Modified-t UCL (Johnson-1978)	4061372

Gamma GOF Test

A-D Test Statistic	0.832	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.863	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.243	k star (bias corrected MLE)	0.239
Theta hat (MLE)	6899081	Theta star (bias corrected MLE)	7020213
nu hat (MLE)	7.296	nu star (bias corrected)	7.17
MLE Mean (bias corrected)	1677887	MLE Sd (bias corrected)	3432072
		Approximate Chi Square Value (0.05)	2.264
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1.94

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5312916	95% Adjusted Gamma UCL (use when n<50)	6200327

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.158	Mean of logged Data	11.4
Maximum of Logged Data	16.75	SD of logged Data	2.906

Assuming Lognormal Distribution

95% H-UCL	8.614E+8	90% Chebyshev (MVUE) UCL	8269375
95% Chebyshev (MVUE) UCL	10917618	97.5% Chebyshev (MVUE) UCL	14593276
99% Chebyshev (MVUE) UCL	21813394		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3721236	95% Jackknife UCL	3865906
95% Standard Bootstrap UCL	3630290	95% Bootstrap-t UCL	26134953
95% Hall's Bootstrap UCL	14532975	95% Percentile Bootstrap UCL	4011573
95% BCA Bootstrap UCL	5794100		
90% Chebyshev(Mean, Sd) UCL	5404691	95% Chebyshev(Mean, Sd) UCL	7092808
97.5% Chebyshev(Mean, Sd) UCL	9435849	99% Chebyshev(Mean, Sd) UCL	14038299
Suggested UCL to Use			
95% Adjusted Gamma UCL	6200327		
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.			

4,4'-DDE

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	1.7000E-4	Mean	0.0041
Maximum	0.063	Median	5.9500E-4
SD	0.0139	Std. Error of Mean	0.00311
Coefficient of Variation	3.39	Skewness	4.441

Normal GOF Test		
Shapiro Wilk Test Statistic	0.285	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.479	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	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	0.00947	95% Adjusted-CLT UCL (Chen-1995)	0.0125
		95% Modified-t UCL (Johnson-1978)	0.00998

Gamma GOF Test		
A-D Test Statistic	3.186	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.82	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.312	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.207	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.417	k star (bias corrected MLE)	0.388
Theta hat (MLE)	0.00983	Theta star (bias corrected MLE)	0.0106
nu hat (MLE)	16.68	nu star (bias corrected)	15.51
MLE Mean (bias corrected)	0.0041	MLE Sd (bias corrected)	0.00658
		Approximate Chi Square Value (0.05)	7.621
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	7.186

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	0.00834	95% Adjusted Gamma UCL (use when n<50)	0.00885

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level
Data appear Approximate Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	-8.68	Mean of logged Data	-7.064
Maximum of Logged Data	-2.765	SD of logged Data	1.332

Assuming Lognormal Distribution			
95% H-UCL	0.00543	90% Chebyshev (MVUE) UCL	0.00394
95% Chebyshev (MVUE) UCL	0.00486	97.5% Chebyshev (MVUE) UCL	0.00613
99% Chebyshev (MVUE) UCL	0.00862		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.00921	95% Jackknife UCL	0.00947
95% Standard Bootstrap UCL	0.0091	95% Bootstrap-t UCL	0.0674
95% Hall's Bootstrap UCL	0.0382	95% Percentile Bootstrap UCL	0.0103
95% BCA Bootstrap UCL	0.0134		
90% Chebyshev(Mean, Sd) UCL	0.0134	95% Chebyshev(Mean, Sd) UCL	0.0176
97.5% Chebyshev(Mean, Sd) UCL	0.0235	99% Chebyshev(Mean, Sd) UCL	0.035
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	0.0176		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 8:26:14 AM
From File	ProUCL Data Inside-Event 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TCDD-TEQ

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
		Number of Missing Observations	1
Number of Detects	16	Number of Non-Detects	3
Number of Distinct Detects	16	Number of Distinct Non-Detects	3
Minimum Detect	0.039	Minimum Non-Detect	0.364
Maximum Detect	1655	Maximum Non-Detect	0.811
Variance Detects	171020	Percent Non-Detects	15.79%
Mean Detects	103.9	SD Detects	413.5
Median Detects	0.535	CV Detects	3.981
Skewness Detects	4	Kurtosis Detects	16
Mean of Logged Detects	-0.617	SD of Logged Detects	2.39

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.273	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.535	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	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	87.51	KM Standard Error of Mean	87.52
KM SD	369.4	95% KM (BCA) UCL	261.7
95% KM (t) UCL	239.3	95% KM (Percentile Bootstrap) UCL	261.6
95% KM (z) UCL	231.5	95% KM Bootstrap t UCL	105475
90% KM Chebyshev UCL	350.1	95% KM Chebyshev UCL	469
97.5% KM Chebyshev UCL	634.1	99% KM Chebyshev UCL	958.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.323	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.933	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.515	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.243	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)	0.147	k star (bias corrected MLE)	0.161
Theta hat (MLE)	708.6	Theta star (bias corrected MLE)	646.1
nu hat (MLE)	4.691	nu star (bias corrected)	5.145
Mean (detects)	103.9		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	87.48
Maximum	1655	Median	0.298
SD	379.5	CV	4.338
k hat (MLE)	0.136	k star (bias corrected MLE)	0.15
Theta hat (MLE)	641.9	Theta star (bias corrected MLE)	583.8
nu hat (MLE)	5.178	nu star (bias corrected)	5.694
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (5.69, α)	1.486	Adjusted Chi Square Value (5.69, β)	1.307
95% Gamma Approximate UCL (use when n>=50)	335.3	95% Gamma Adjusted UCL (use when n<50)	381

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	87.51	SD (KM)	369.4
Variance (KM)	136445	SE of Mean (KM)	87.52
k hat (KM)	0.0561	k star (KM)	0.0823
nu hat (KM)	2.133	nu star (KM)	3.129
theta hat (KM)	1559	theta star (KM)	1063
80% gamma percentile (KM)	44.02	90% gamma percentile (KM)	211.2
95% gamma percentile (KM)	509.4	99% gamma percentile (KM)	1529

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.13, α)	0.412	Adjusted Chi Square Value (3.13, β)	0.342
95% Gamma Approximate KM-UCL (use when n>=50)	665.1	95% Gamma Adjusted KM-UCL (use when n<50)	801
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.704	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Detected Data Not Lognormal at 5% Significance Level
Detected Data Not Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	87.5	Mean in Log Scale	-0.82
SD in Original Scale	379.5	SD in Log Scale	2.239
95% t UCL (assumes normality of ROS data)	238.5	95% Percentile Bootstrap UCL	261.6
95% BCA Bootstrap UCL	348.8	95% Bootstrap t UCL	108764
95% H-UCL (Log ROS)	63.73		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.819	KM Geo Mean	0.441
KM SD (logged)	2.2	95% Critical H Value (KM-Log)	4.608
KM Standard Error of Mean (logged)	0.528	95% H-UCL (KM -Log)	54.08
KM SD (logged)	2.2	95% Critical H Value (KM-Log)	4.608
KM Standard Error of Mean (logged)	0.528		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	87.52	Mean in Log Scale	-0.73
SD in Original Scale	379.5	SD in Log Scale	2.202
95% t UCL (Assumes normality)	238.5	95% H-Stat UCL	59.7
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	958.3		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

ALUMINUM

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	12
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	29.3	Minimum Non-Detect	20
Maximum Detect	23650	Maximum Non-Detect	1000
Variance Detects	68068496	Percent Non-Detects	60%
Mean Detects	5594	SD Detects	8250
Median Detects	2570	CV Detects	1.475
Skewness Detects	1.863	Kurtosis Detects	3.29
Mean of Logged Detects	6.908	SD of Logged Detects	2.567

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.741	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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	2251	KM Standard Error of Mean	1337
KM SD	5592	95% KM (BCA) UCL	4572
95% KM (t) UCL	4563	95% KM (Percentile Bootstrap) UCL	4462
95% KM (z) UCL	4450	95% KM Bootstrap t UCL	10120
90% KM Chebyshev UCL	6262	95% KM Chebyshev UCL	8078
97.5% KM Chebyshev UCL	10600	99% KM Chebyshev UCL	15553

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.269	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.783	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.174	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.385	k star (bias corrected MLE)	0.324
Theta hat (MLE)	14546	Theta star (bias corrected MLE)	17282
nu hat (MLE)	6.153	nu star (bias corrected)	5.179
Mean (detects)	5594		

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	2238
Maximum	23650	Median	0.01
SD	5743	CV	2.567
k hat (MLE)	0.105	k star (bias corrected MLE)	0.122
Theta hat (MLE)	21377	Theta star (bias corrected MLE)	18296
nu hat (MLE)	4.187	nu star (bias corrected)	4.892
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (4.89, α)	1.103	Adjusted Chi Square Value (4.89, β)	0.97
95% Gamma Approximate UCL (use when n>=50)	9927	95% Gamma Adjusted UCL (use when n<50)	11287

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2251	SD (KM)	5592
Variance (KM)	31275724	SE of Mean (KM)	1337
k hat (KM)	0.162	k star (KM)	0.171
nu hat (KM)	6.481	nu star (KM)	6.842
theta hat (KM)	13894	theta star (KM)	13160
80% gamma percentile (KM)	2702	90% gamma percentile (KM)	6768
95% gamma percentile (KM)	12051	99% gamma percentile (KM)	26995
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.84, α)	2.084	Adjusted Chi Square Value (6.84, β)	1.883
95% Gamma Approximate KM-UCL (use when n>=50)	7390	95% Gamma Adjusted KM-UCL (use when n<50)	8178
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.206	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2240	Mean in Log Scale	2.403
SD in Original Scale	5742	SD in Log Scale	4.541
95% t UCL (assumes normality of ROS data)	4460	95% Percentile Bootstrap UCL	4548
95% BCA Bootstrap UCL	5977	95% Bootstrap t UCL	10468
95% H-UCL (Log ROS)	4.549E+9		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	4.585	KM Geo Mean	98
KM SD (logged)	2.438	95% Critical H Value (KM-Log)	5.107
KM Standard Error of Mean (logged)	0.585	95% H-UCL (KM -Log)	33247
KM SD (logged)	2.438	95% Critical H Value (KM-Log)	5.107
KM Standard Error of Mean (logged)	0.585		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2293	Mean in Log Scale	4.536
SD in Original Scale	5723	SD in Log Scale	2.778
95% t UCL (Assumes normality)	4505	95% H-Stat UCL	172113
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	8178		
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.			

ANTIMONY

General Statistics

Total Number of Observations	20	Number of Distinct Observations	6
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	0.19	Minimum Non-Detect	2
Maximum Detect	12.8	Maximum Non-Detect	60
Variance Detects	52.42	Percent Non-Detects	85%
Mean Detects	4.44	SD Detects	7.24
Median Detects	0.33	CV Detects	1.631
Skewness Detects	1.731	Kurtosis Detects	N/A
Mean of Logged Detects	-0.0733	SD of Logged Detects	2.288

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	1.044	KM Standard Error of Mean	0.931
KM SD	3.036	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.654	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.575	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.837	95% KM Chebyshev UCL	5.103
97.5% KM Chebyshev UCL	6.859	99% KM Chebyshev UCL	10.31

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.418	k star (bias corrected MLE)	N/A
Theta hat (MLE)	10.63	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.507	nu star (bias corrected)	N/A
Mean (detects)	4.44		

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	1.552
Maximum	12.8	Median	0.221
SD	3.044	CV	1.962
k hat (MLE)	0.32	k star (bias corrected MLE)	0.305
Theta hat (MLE)	4.856	Theta star (bias corrected MLE)	5.088
nu hat (MLE)	12.78	nu star (bias corrected)	12.2
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (12.20, α)	5.357	Adjusted Chi Square Value (12.20, β)	5.002
95% Gamma Approximate UCL (use when n>=50)	3.533	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.044	SD (KM)	3.036
Variance (KM)	9.219	SE of Mean (KM)	0.931
k hat (KM)	0.118	k star (KM)	0.134
nu hat (KM)	4.727	nu star (KM)	5.351
theta hat (KM)	8.832	theta star (KM)	7.802
80% gamma percentile (KM)	1.026	90% gamma percentile (KM)	3.035
95% gamma percentile (KM)	5.863	99% gamma percentile (KM)	14.27
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.35, α)	1.318	Adjusted Chi Square Value (5.35, β)	1.168
95% Gamma Approximate KM-UCL (use when n>=50)	4.238	95% Gamma Adjusted KM-UCL (use when n<50)	4.781
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.151	Mean in Log Scale	-1.101
SD in Original Scale	2.818	SD in Log Scale	1.505
95% t UCL (assumes normality of ROS data)	2.241	95% Percentile Bootstrap UCL	2.351
95% BCA Bootstrap UCL	3.162	95% Bootstrap t UCL	6.324
95% H-UCL (Log ROS)	3.383		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.139	KM Geo Mean	0.32
KM SD (logged)	0.989	95% Critical H Value (KM-Log)	2.618
KM Standard Error of Mean (logged)	0.368	95% H-UCL (KM -Log)	0.946
KM SD (logged)	0.989	95% Critical H Value (KM-Log)	2.618
KM Standard Error of Mean (logged)	0.368		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.591	Mean in Log Scale	0.636
SD in Original Scale	10.88	SD in Log Scale	1.532
95% t UCL (Assumes normality)	10.8	95% H-Stat UCL	20.78
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.654		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

ARSENIC

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	16
Number of Detects	17	Number of Non-Detects	3
Number of Distinct Detects	16	Number of Distinct Non-Detects	1
Minimum Detect	0.91	Minimum Non-Detect	10
Maximum Detect	72.1	Maximum Non-Detect	10
Variance Detects	345.5	Percent Non-Detects	15%
Mean Detects	15.39	SD Detects	18.59
Median Detects	9.9	CV Detects	1.207
Skewness Detects	1.973	Kurtosis Detects	4.606
Mean of Logged Detects	1.961	SD of Logged Detects	1.406

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.768	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.207	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	13.6	KM Standard Error of Mean	3.977
KM SD	17.2	95% KM (BCA) UCL	20.44
95% KM (t) UCL	20.48	95% KM (Percentile Bootstrap) UCL	20.3
95% KM (z) UCL	20.14	95% KM Bootstrap t UCL	24.47
90% KM Chebyshev UCL	25.53	95% KM Chebyshev UCL	30.94
97.5% KM Chebyshev UCL	38.44	99% KM Chebyshev UCL	53.17

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.391	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.776	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.145	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.772	k star (bias corrected MLE)	0.675
Theta hat (MLE)	19.95	Theta star (bias corrected MLE)	22.82
nu hat (MLE)	26.23	nu star (bias corrected)	22.94
Mean (detects)	15.39		

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	13.44
Maximum	72.1	Median	6.137
SD	17.74	CV	1.319
k hat (MLE)	0.586	k star (bias corrected MLE)	0.531
Theta hat (MLE)	22.94	Theta star (bias corrected MLE)	25.3
nu hat (MLE)	23.44	nu star (bias corrected)	21.26
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (21.26, α)	11.78	Adjusted Chi Square Value (21.26, β)	11.23
95% Gamma Approximate UCL (use when n>=50)	24.25	95% Gamma Adjusted UCL (use when n<50)	25.45

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	13.6	SD (KM)	17.2
Variance (KM)	296	SE of Mean (KM)	3.977
k hat (KM)	0.625	k star (KM)	0.565
nu hat (KM)	25	nu star (KM)	22.58
theta hat (KM)	21.76	theta star (KM)	24.09
80% gamma percentile (KM)	22.41	90% gamma percentile (KM)	35.86
95% gamma percentile (KM)	50.02	99% gamma percentile (KM)	84.48
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (22.58, α)	12.78	Adjusted Chi Square Value (22.58, β)	12.19
95% Gamma Approximate KM-UCL (use when n>=50)	24.04	95% Gamma Adjusted KM-UCL (use when n<50)	25.19
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.15	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	13.53	Mean in Log Scale	1.809
SD in Original Scale	17.66	SD in Log Scale	1.361
95% t UCL (assumes normality of ROS data)	20.36	95% Percentile Bootstrap UCL	20.38
95% BCA Bootstrap UCL	21.15	95% Bootstrap t UCL	24.25
95% H-UCL (Log ROS)	41.78		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.798	KM Geo Mean	6.038
KM SD (logged)	1.355	95% Critical H Value (KM-Log)	3.184
KM Standard Error of Mean (logged)	0.324	95% H-UCL (KM -Log)	40.69
KM SD (logged)	1.355	95% Critical H Value (KM-Log)	3.184
KM Standard Error of Mean (logged)	0.324		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	13.84	Mean in Log Scale	1.908
SD in Original Scale	17.48	SD in Log Scale	1.297
95% t UCL (Assumes normality)	20.59	95% H-Stat UCL	39.17
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	25.19		

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.

BERYLLIUM

General Statistics

Total Number of Observations	20	Number of Distinct Observations	5
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.49	Minimum Non-Detect	1
Maximum Detect	6.75	Maximum Non-Detect	5
Variance Detects	12.92	Percent Non-Detects	85%
Mean Detects	2.6	SD Detects	3.594
Median Detects	0.56	CV Detects	1.382
Skewness Detects	1.731	Kurtosis Detects	N/A
Mean of Logged Detects	0.205	SD of Logged Detects	1.477

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.836	KM Standard Error of Mean	0.373
KM SD	1.357	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.481	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.449	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.954	95% KM Chebyshev UCL	2.461
97.5% KM Chebyshev UCL	3.164	99% KM Chebyshev UCL	4.544

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.792	k star (bias corrected MLE)	N/A
Theta hat (MLE)	3.282	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.754	nu star (bias corrected)	N/A
Mean (detects)	2.6		

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	1.135
Maximum	6.75	Median	0.525
SD	1.651	CV	1.454
k hat (MLE)	0.428	k star (bias corrected MLE)	0.397
Theta hat (MLE)	2.651	Theta star (bias corrected MLE)	2.858
nu hat (MLE)	17.13	nu star (bias corrected)	15.89
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (15.89, α)	7.885	Adjusted Chi Square Value (15.89, β)	7.441
95% Gamma Approximate UCL (use when n>=50)	2.288	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.836	SD (KM)	1.357
Variance (KM)	1.842	SE of Mean (KM)	0.373
k hat (KM)	0.38	k star (KM)	0.356
nu hat (KM)	15.19	nu star (KM)	14.24
theta hat (KM)	2.202	theta star (KM)	2.349
80% gamma percentile (KM)	1.328	90% gamma percentile (KM)	2.408
95% gamma percentile (KM)	3.615	99% gamma percentile (KM)	6.689
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (14.24, α)	6.738	Adjusted Chi Square Value (14.24, β)	6.332
95% Gamma Approximate KM-UCL (use when n>=50)	1.768	95% Gamma Adjusted KM-UCL (use when n<50)	1.881
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.369	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.049	Mean in Log Scale	-0.469
SD in Original Scale	1.471	SD in Log Scale	0.979
95% t UCL (assumes normality of ROS data)	1.617	95% Percentile Bootstrap UCL	1.66
95% BCA Bootstrap UCL	1.902	95% Bootstrap t UCL	2.522
95% H-UCL (Log ROS)	1.813		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.519	KM Geo Mean	0.595
KM SD (logged)	0.561	95% Critical H Value (KM-Log)	2.08
KM Standard Error of Mean (logged)	0.162	95% H-UCL (KM -Log)	0.91
KM SD (logged)	0.561	95% Critical H Value (KM-Log)	2.08
KM Standard Error of Mean (logged)	0.162		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.015	Mean in Log Scale	-0.397
SD in Original Scale	1.483	SD in Log Scale	0.733
95% t UCL (Assumes normality)	1.588	95% H-Stat UCL	1.29
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.481		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BORON			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	18
Number of Detects	17	Number of Non-Detects	3
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	20.5	Minimum Non-Detect	100
Maximum Detect	3920	Maximum Non-Detect	100
Variance Detects	1976700	Percent Non-Detects	15%
Mean Detects	2079	SD Detects	1406
Median Detects	1700	CV Detects	0.676
Skewness Detects	-0.0514	Kurtosis Detects	-1.556
Mean of Logged Detects	7.133	SD of Logged Detects	1.417
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1770	KM Standard Error of Mean	335.7
KM SD	1457	95% KM (BCA) UCL	2281
95% KM (t) UCL	2351	95% KM (Percentile Bootstrap) UCL	2319
95% KM (z) UCL	2323	95% KM Bootstrap t UCL	2339
90% KM Chebyshev UCL	2778	95% KM Chebyshev UCL	3234
97.5% KM Chebyshev UCL	3867	99% KM Chebyshev UCL	5111
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.941	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.763	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.227	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.215	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)	1.125	k star (bias corrected MLE)	0.966
Theta hat (MLE)	1848	Theta star (bias corrected MLE)	2153
nu hat (MLE)	38.25	nu star (bias corrected)	32.84
Mean (detects)	2079		
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	20.5	Mean	1841
Maximum	3920	Median	1475
SD	1416	CV	0.769
k hat (MLE)	1.084	k star (bias corrected MLE)	0.955
Theta hat (MLE)	1698	Theta star (bias corrected MLE)	1928
nu hat (MLE)	43.36	nu star (bias corrected)	38.19
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (38.19, α)	25.04	Adjusted Chi Square Value (38.19, β)	24.2
95% Gamma Approximate UCL (use when n>=50)	2808	95% Gamma Adjusted UCL (use when n<50)	2905

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1770	SD (KM)	1457
Variance (KM)	2121693	SE of Mean (KM)	335.7
k hat (KM)	1.477	k star (KM)	1.289
nu hat (KM)	59.09	nu star (KM)	51.56
theta hat (KM)	1198	theta star (KM)	1374
80% gamma percentile (KM)	2783	90% gamma percentile (KM)	3829
95% gamma percentile (KM)	4855	99% gamma percentile (KM)	7194
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (51.56, α)	36.07	Adjusted Chi Square Value (51.56, β)	35.04
95% Gamma Approximate KM-UCL (use when n>=50)	2531	95% Gamma Adjusted KM-UCL (use when n<50)	2605
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1784	Mean in Log Scale	6.761
SD in Original Scale	1478	SD in Log Scale	1.596
95% t UCL (assumes normality of ROS data)	2356	95% Percentile Bootstrap UCL	2311
95% BCA Bootstrap UCL	2371	95% Bootstrap t UCL	2383
95% H-UCL (Log ROS)	11474		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	6.517	KM Geo Mean	676.2
KM SD (logged)	1.94	95% Critical H Value (KM-Log)	4.197
KM Standard Error of Mean (logged)	0.447	95% H-UCL (KM -Log)	28753
KM SD (logged)	1.94	95% Critical H Value (KM-Log)	4.197
KM Standard Error of Mean (logged)	0.447		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1775	Mean in Log Scale	6.65
SD in Original Scale	1489	SD in Log Scale	1.756
95% t UCL (Assumes normality)	2350	95% H-Stat UCL	17177
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2351		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

CADMIUM

General Statistics

Total Number of Observations	20	Number of Distinct Observations	6
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	0.024	Minimum Non-Detect	1
Maximum Detect	8.4	Maximum Non-Detect	5
Variance Detects	23.35	Percent Non-Detects	85%
Mean Detects	2.821	SD Detects	4.832
Median Detects	0.038	CV Detects	1.713
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-1.624	SD of Logged Detects	3.258

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.751	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.384	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.449	KM Standard Error of Mean	0.5
KM SD	1.824	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.313	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.271	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.948	95% KM Chebyshev UCL	2.627
97.5% KM Chebyshev UCL	3.569	99% KM Chebyshev UCL	5.42

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.265	k star (bias corrected MLE)	N/A
Theta hat (MLE)	10.66	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.587	nu star (bias corrected)	N/A
Mean (detects)	2.821		

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	0.807
Maximum	8.4	Median	0.017
SD	1.951	CV	2.416
k hat (MLE)	0.278	k star (bias corrected MLE)	0.27
Theta hat (MLE)	2.903	Theta star (bias corrected MLE)	2.993
nu hat (MLE)	11.12	nu star (bias corrected)	10.79
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (10.79, α)	4.441	Adjusted Chi Square Value (10.79, β)	4.123
95% Gamma Approximate UCL (use when n>=50)	1.961	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.449	SD (KM)	1.824
Variance (KM)	3.327	SE of Mean (KM)	0.5
k hat (KM)	0.0607	k star (KM)	0.0849
nu hat (KM)	2.429	nu star (KM)	3.398
theta hat (KM)	7.402	theta star (KM)	5.291
80% gamma percentile (KM)	0.239	90% gamma percentile (KM)	1.105
95% gamma percentile (KM)	2.618	99% gamma percentile (KM)	7.735
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.40, α)	0.499	Adjusted Chi Square Value (3.40, β)	0.425
95% Gamma Approximate KM-UCL (use when n>=50)	3.058	95% Gamma Adjusted KM-UCL (use when n<50)	3.595
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.529	Mean in Log Scale	-3.114
SD in Original Scale	1.864	SD in Log Scale	2.089
95% t UCL (assumes normality of ROS data)	1.249	95% Percentile Bootstrap UCL	1.345
95% BCA Bootstrap UCL	1.828	95% Bootstrap t UCL	9.579
95% H-UCL (Log ROS)	3.354		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.219	KM Geo Mean	0.04
KM SD (logged)	1.247	95% Critical H Value (KM-Log)	3.01
KM Standard Error of Mean (logged)	0.385	95% H-UCL (KM -Log)	0.206
KM SD (logged)	1.247	95% Critical H Value (KM-Log)	3.01
KM Standard Error of Mean (logged)	0.385		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.198	Mean in Log Scale	-0.536
SD in Original Scale	1.865	SD in Log Scale	1.304
95% t UCL (Assumes normality)	1.919	95% H-Stat UCL	3.461
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.313		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

CHROMIUM			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	19
Number of Detects	18	Number of Non-Detects	2
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	0.51	Minimum Non-Detect	2
Maximum Detect	183	Maximum Non-Detect	2
Variance Detects	1715	Percent Non-Detects	10%
Mean Detects	19.51	SD Detects	41.41
Median Detects	9.55	CV Detects	2.122
Skewness Detects	4.039	Kurtosis Detects	16.77
Mean of Logged Detects	2.095	SD of Logged Detects	1.284
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.404	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	17.65	KM Standard Error of Mean	8.878
KM SD	38.58	95% KM (BCA) UCL	36.15
95% KM (t) UCL	33	95% KM (Percentile Bootstrap) UCL	34.42
95% KM (z) UCL	32.25	95% KM Bootstrap t UCL	80.73
90% KM Chebyshev UCL	44.28	95% KM Chebyshev UCL	56.35
97.5% KM Chebyshev UCL	73.09	99% KM Chebyshev UCL	106
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.088	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.783	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.22	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.212	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)	0.691	k star (bias corrected MLE)	0.613
Theta hat (MLE)	28.24	Theta star (bias corrected MLE)	31.84
nu hat (MLE)	24.87	nu star (bias corrected)	22.06
Mean (detects)	19.51		
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	17.56
Maximum	183	Median	7.8
SD	39.63	CV	2.256
k hat (MLE)	0.448	k star (bias corrected MLE)	0.414
Theta hat (MLE)	39.17	Theta star (bias corrected MLE)	42.37
nu hat (MLE)	17.93	nu star (bias corrected)	16.58
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (16.58, α)	8.372	Adjusted Chi Square Value (16.58, β)	7.913
95% Gamma Approximate UCL (use when n>=50)	34.78	95% Gamma Adjusted UCL (use when n<50)	36.79

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	17.65	SD (KM)	38.58
Variance (KM)	1489	SE of Mean (KM)	8.878
k hat (KM)	0.209	k star (KM)	0.211
nu hat (KM)	8.372	nu star (KM)	8.449
theta hat (KM)	84.34	theta star (KM)	83.56
80% gamma percentile (KM)	23.9	90% gamma percentile (KM)	53.37
95% gamma percentile (KM)	89.64	99% gamma percentile (KM)	188.6
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (8.45, α)	2.998	Adjusted Chi Square Value (8.45, β)	2.746
95% Gamma Approximate KM-UCL (use when n>=50)	49.75	95% Gamma Adjusted KM-UCL (use when n<50)	54.3
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	17.66	Mean in Log Scale	1.879
SD in Original Scale	39.58	SD in Log Scale	1.388
95% t UCL (assumes normality of ROS data)	32.96	95% Percentile Bootstrap UCL	35.29
95% BCA Bootstrap UCL	44.59	95% Bootstrap t UCL	82.98
95% H-UCL (Log ROS)	48.04		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.865	KM Geo Mean	6.453
KM SD (logged)	1.378	95% Critical H Value (KM-Log)	3.222
KM Standard Error of Mean (logged)	0.321	95% H-UCL (KM -Log)	46.22
KM SD (logged)	1.378	95% Critical H Value (KM-Log)	3.222
KM Standard Error of Mean (logged)	0.321		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	17.66	Mean in Log Scale	1.885
SD in Original Scale	39.58	SD in Log Scale	1.375
95% t UCL (Assumes normality)	32.96	95% H-Stat UCL	46.79
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	56.35		

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.

COBALT

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	13
Number of Detects	11	Number of Non-Detects	9
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	0.14	Minimum Non-Detect	1
Maximum Detect	21.7	Maximum Non-Detect	50
Variance Detects	37.32	Percent Non-Detects	45%
Mean Detects	6.649	SD Detects	6.109
Median Detects	4.2	CV Detects	0.919
Skewness Detects	1.604	Kurtosis Detects	3.072
Mean of Logged Detects	1.37	SD of Logged Detects	1.345

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.201	**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	5.648	KM Standard Error of Mean	1.702
KM SD	5.85	95% KM (BCA) UCL	8.391
95% KM (t) UCL	8.59	95% KM (Percentile Bootstrap) UCL	8.506
95% KM (z) UCL	8.447	95% KM Bootstrap t UCL	10.49
90% KM Chebyshev UCL	10.75	95% KM Chebyshev UCL	13.06
97.5% KM Chebyshev UCL	16.27	99% KM Chebyshev UCL	22.58

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.193	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.113	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.262	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	1.09	k star (bias corrected MLE)	0.853
Theta hat (MLE)	6.099	Theta star (bias corrected MLE)	7.791
nu hat (MLE)	23.98	nu star (bias corrected)	18.78
Mean (detects)	6.649		

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	5.485
Maximum	21.7	Median	3.871
SD	5.694	CV	1.038
k hat (MLE)	0.514	k star (bias corrected MLE)	0.471
Theta hat (MLE)	10.66	Theta star (bias corrected MLE)	11.65
nu hat (MLE)	20.58	nu star (bias corrected)	18.82
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (18.82, α)	9.989	Adjusted Chi Square Value (18.82, β)	9.482
95% Gamma Approximate UCL (use when n>=50)	10.34	95% Gamma Adjusted UCL (use when n<50)	10.89

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.648	SD (KM)	5.85
Variance (KM)	34.22	SE of Mean (KM)	1.702
k hat (KM)	0.932	k star (KM)	0.826
nu hat (KM)	37.28	nu star (KM)	33.02
theta hat (KM)	6.059	theta star (KM)	6.841
80% gamma percentile (KM)	9.213	90% gamma percentile (KM)	13.63
95% gamma percentile (KM)	18.11	99% gamma percentile (KM)	28.68
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (33.02, α)	20.89	Adjusted Chi Square Value (33.02, β)	20.12
95% Gamma Approximate KM-UCL (use when n>=50)	8.93	95% Gamma Adjusted KM-UCL (use when n<50)	9.268
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	5.568	Mean in Log Scale	1.006
SD in Original Scale	6.036	SD in Log Scale	1.422
95% t UCL (assumes normality of ROS data)	7.902	95% Percentile Bootstrap UCL	7.747
95% BCA Bootstrap UCL	8.188	95% Bootstrap t UCL	8.848
95% H-UCL (Log ROS)	22		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.857	KM Geo Mean	2.356
KM SD (logged)	1.686	95% Critical H Value (KM-Log)	3.745
KM Standard Error of Mean (logged)	0.49	95% H-UCL (KM -Log)	41.51
KM SD (logged)	1.686	95% Critical H Value (KM-Log)	3.745
KM Standard Error of Mean (logged)	0.49		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	12.46	Mean in Log Scale	1.811
SD in Original Scale	10.59	SD in Log Scale	1.567
95% t UCL (Assumes normality)	16.55	95% H-Stat UCL	74.54
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	8.59		
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.			

COPPER			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	13
Number of Detects	11	Number of Non-Detects	9
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	0.33	Minimum Non-Detect	2
Maximum Detect	245	Maximum Non-Detect	25
Variance Detects	5317	Percent Non-Detects	45%
Mean Detects	25.5	SD Detects	72.92
Median Detects	1.7	CV Detects	2.859
Skewness Detects	3.298	Kurtosis Detects	10.91
Mean of Logged Detects	1.037	SD of Logged Detects	1.89
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.389	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.482	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	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	14.77	KM Standard Error of Mean	12.42
KM SD	52.93	95% KM (BCA) UCL	39.62
95% KM (t) UCL	36.25	95% KM (Percentile Bootstrap) UCL	38.68
95% KM (z) UCL	35.2	95% KM Bootstrap t UCL	271.2
90% KM Chebyshev UCL	52.04	95% KM Chebyshev UCL	68.92
97.5% KM Chebyshev UCL	92.34	99% KM Chebyshev UCL	138.4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.554	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.818	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.314	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.275	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)	0.311	k star (bias corrected MLE)	0.287
Theta hat (MLE)	81.9	Theta star (bias corrected MLE)	88.84
nu hat (MLE)	6.85	nu star (bias corrected)	6.315
Mean (detects)	25.5		
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	15.1
Maximum	245	Median	0.655
SD	54.4	CV	3.602
k hat (MLE)	0.193	k star (bias corrected MLE)	0.197
Theta hat (MLE)	78.23	Theta star (bias corrected MLE)	76.5
nu hat (MLE)	7.722	nu star (bias corrected)	7.897
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (7.90, α)	2.676	Adjusted Chi Square Value (7.90, β)	2.441
95% Gamma Approximate UCL (use when n>=50)	44.58	95% Gamma Adjusted UCL (use when n<50)	48.86

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	14.77	SD (KM)	52.93
Variance (KM)	2802	SE of Mean (KM)	12.42
k hat (KM)	0.0779	k star (KM)	0.0995
nu hat (KM)	3.115	nu star (KM)	3.981
theta hat (KM)	189.7	theta star (KM)	148.4
80% gamma percentile (KM)	10.18	90% gamma percentile (KM)	39.24
95% gamma percentile (KM)	85.76	99% gamma percentile (KM)	235.2
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.98, α)	0.714	Adjusted Chi Square Value (3.98, β)	0.616
95% Gamma Approximate KM-UCL (use when n>=50)	82.34	95% Gamma Adjusted KM-UCL (use when n<50)	95.43
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	14.78	Mean in Log Scale	0.58
SD in Original Scale	54.29	SD in Log Scale	1.626
95% t UCL (assumes normality of ROS data)	35.77	95% Percentile Bootstrap UCL	38.88
95% BCA Bootstrap UCL	51.66	95% Bootstrap t UCL	298.4
95% H-UCL (Log ROS)	26.09		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.564	KM Geo Mean	1.758
KM SD (logged)	1.546	95% Critical H Value (KM-Log)	3.504
KM Standard Error of Mean (logged)	0.397	95% H-UCL (KM -Log)	20.12
KM SD (logged)	1.546	95% Critical H Value (KM-Log)	3.504
KM Standard Error of Mean (logged)	0.397		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	16.78	Mean in Log Scale	1.076
SD in Original Scale	53.96	SD in Log Scale	1.621
95% t UCL (Assumes normality)	37.64	95% H-Stat UCL	42.1
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	68.92		
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.			

CYANIDE

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	10
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	1.6	Minimum Non-Detect	10
Maximum Detect	227	Maximum Non-Detect	10
Variance Detects	6684	Percent Non-Detects	50%
Mean Detects	49.15	SD Detects	81.75
Median Detects	10.15	CV Detects	1.663
Skewness Detects	1.814	Kurtosis Detects	1.927
Mean of Logged Detects	2.616	SD of Logged Detects	1.693

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.63	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.391	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	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	26.67	KM Standard Error of Mean	13.99
KM SD	59.29	95% KM (BCA) UCL	54.7
95% KM (t) UCL	50.86	95% KM (Percentile Bootstrap) UCL	49.95
95% KM (z) UCL	49.68	95% KM Bootstrap t UCL	176.3
90% KM Chebyshev UCL	68.63	95% KM Chebyshev UCL	87.65
97.5% KM Chebyshev UCL	114	99% KM Chebyshev UCL	165.9

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.743	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.778	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.497	k star (bias corrected MLE)	0.415
Theta hat (MLE)	98.87	Theta star (bias corrected MLE)	118.5
nu hat (MLE)	9.943	nu star (bias corrected)	8.293
Mean (detects)	49.15		

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	26.59
Maximum	227	Median	3.135
SD	61.11	CV	2.298
k hat (MLE)	0.223	k star (bias corrected MLE)	0.223
Theta hat (MLE)	119.4	Theta star (bias corrected MLE)	119.4
nu hat (MLE)	8.911	nu star (bias corrected)	8.908
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (8.91, α)	3.271	Adjusted Chi Square Value (8.91, β)	3.006
95% Gamma Approximate UCL (use when n>=50)	72.42	95% Gamma Adjusted UCL (use when n<50)	78.8

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	26.67	SD (KM)	59.29
Variance (KM)	3516	SE of Mean (KM)	13.99
k hat (KM)	0.202	k star (KM)	0.205
nu hat (KM)	8.09	nu star (KM)	8.21
theta hat (KM)	131.8	theta star (KM)	129.9
80% gamma percentile (KM)	35.61	90% gamma percentile (KM)	80.65
95% gamma percentile (KM)	136.5	99% gamma percentile (KM)	289.5
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (8.21, α)	2.857	Adjusted Chi Square Value (8.21, β)	2.613
95% Gamma Approximate KM-UCL (use when n>=50)	76.62	95% Gamma Adjusted KM-UCL (use when n<50)	83.78
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	27.25	Mean in Log Scale	1.931
SD in Original Scale	60.67	SD in Log Scale	1.546
95% t UCL (assumes normality of ROS data)	50.71	95% Percentile Bootstrap UCL	50.27
95% BCA Bootstrap UCL	59.07	95% Bootstrap t UCL	184.8
95% H-UCL (Log ROS)	78.95		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.95	KM Geo Mean	7.03
KM SD (logged)	1.373	95% Critical H Value (KM-Log)	3.213
KM Standard Error of Mean (logged)	0.361	95% H-UCL (KM -Log)	49.63
KM SD (logged)	1.373	95% Critical H Value (KM-Log)	3.213
KM Standard Error of Mean (logged)	0.361		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	27.08	Mean in Log Scale	2.113
SD in Original Scale	60.65	SD in Log Scale	1.275
95% t UCL (Assumes normality)	50.53	95% H-Stat UCL	45.51
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	83.78		
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.			

IRON

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
Number of Detects	19	Number of Non-Detects	1
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	4980	Minimum Non-Detect	200
Maximum Detect	96100	Maximum Non-Detect	200
Variance Detects	7.366E+8	Percent Non-Detects	5%
Mean Detects	38333	SD Detects	27140
Median Detects	32000	CV Detects	0.708
Skewness Detects	1.025	Kurtosis Detects	0.209
Mean of Logged Detects	10.29	SD of Logged Detects	0.79

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.201	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.197	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	36426	KM Standard Error of Mean	6216
KM SD	27056	95% KM (BCA) UCL	47378
95% KM (t) UCL	47174	95% KM (Percentile Bootstrap) UCL	46850
95% KM (z) UCL	46650	95% KM Bootstrap t UCL	49923
90% KM Chebyshev UCL	55073	95% KM Chebyshev UCL	63519
97.5% KM Chebyshev UCL	75243	99% KM Chebyshev UCL	98271

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.241	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.108	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.201	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)	2.071	k star (bias corrected MLE)	1.779
Theta hat (MLE)	18514	Theta star (bias corrected MLE)	21551
nu hat (MLE)	78.68	nu star (bias corrected)	67.59
Mean (detects)	38333		

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	36416
Maximum	96100	Median	31550
SD	27772	CV	0.763
k hat (MLE)	0.641	k star (bias corrected MLE)	0.578
Theta hat (MLE)	56784	Theta star (bias corrected MLE)	62955
nu hat (MLE)	25.65	nu star (bias corrected)	23.14
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (23.14, α)	13.19	Adjusted Chi Square Value (23.14, β)	12.6
95% Gamma Approximate UCL (use when n>=50)	63857	95% Gamma Adjusted UCL (use when n<50)	66858

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	36426	SD (KM)	27056
Variance (KM)	7.320E+8	SE of Mean (KM)	6216
k hat (KM)	1.813	k star (KM)	1.574
nu hat (KM)	72.5	nu star (KM)	62.96
theta hat (KM)	20096	theta star (KM)	23142
80% gamma percentile (KM)	56059	90% gamma percentile (KM)	75020
95% gamma percentile (KM)	93376	99% gamma percentile (KM)	134696
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (62.96, α)	45.71	Adjusted Chi Square Value (62.96, β)	44.55
95% Gamma Approximate KM-UCL (use when n>=50)	50175	95% Gamma Adjusted KM-UCL (use when n<50)	51483
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	36631	Mean in Log Scale	10.2
SD in Original Scale	27491	SD in Log Scale	0.881
95% t UCL (assumes normality of ROS data)	47260	95% Percentile Bootstrap UCL	46819
95% BCA Bootstrap UCL	46854	95% Bootstrap t UCL	49202
95% H-UCL (Log ROS)	65146		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	10.04	KM Geo Mean	23012
KM SD (logged)	1.322	95% Critical H Value (KM-Log)	3.129
KM Standard Error of Mean (logged)	0.304	95% H-UCL (KM -Log)	142343
KM SD (logged)	1.322	95% Critical H Value (KM-Log)	3.129
KM Standard Error of Mean (logged)	0.304		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	36421	Mean in Log Scale	10.01
SD in Original Scale	27765	SD in Log Scale	1.486
95% t UCL (Assumes normality)	47156	95% H-Stat UCL	214045
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Adjusted Gamma UCL	51483	95% GROS Adjusted Gamma UCL	66858

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.

LEAD			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	14
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	1.5	Minimum Non-Detect	1
Maximum Detect	2330	Maximum Non-Detect	10
Variance Detects	894509	Percent Non-Detects	70%
Mean Detects	400	SD Detects	945.8
Median Detects	3.75	CV Detects	2.365
Skewness Detects	2.446	Kurtosis Detects	5.988
Mean of Logged Detects	2.535	SD of Logged Detects	2.899
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.512	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.474	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	120.8	KM Standard Error of Mean	124.2
KM SD	507	95% KM (BCA) UCL	353.6
95% KM (t) UCL	335.5	95% KM (Percentile Bootstrap) UCL	350.9
95% KM (z) UCL	325	95% KM Bootstrap t UCL	51521
90% KM Chebyshev UCL	493.3	95% KM Chebyshev UCL	662.1
97.5% KM Chebyshev UCL	896.3	99% KM Chebyshev UCL	1356
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.954	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.798	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.358	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.363	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.211	k star (bias corrected MLE)	0.217
Theta hat (MLE)	1895	Theta star (bias corrected MLE)	1846
nu hat (MLE)	2.533	nu star (bias corrected)	2.6
Mean (detects)	400		
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	120
Maximum	2330	Median	0.01
SD	520.3	CV	4.336
k hat (MLE)	0.111	k star (bias corrected MLE)	0.127
Theta hat (MLE)	1085	Theta star (bias corrected MLE)	942.5
nu hat (MLE)	4.423	nu star (bias corrected)	5.093
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (5.09, α)	1.195	Adjusted Chi Square Value (5.09, β)	1.055
95% Gamma Approximate UCL (use when n>=50)	511.3	95% Gamma Adjusted UCL (use when n<50)	579.3

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	120.8	SD (KM)	507
Variance (KM)	257041	SE of Mean (KM)	124.2
k hat (KM)	0.0567	k star (KM)	0.0816
nu hat (KM)	2.269	nu star (KM)	3.262
theta hat (KM)	2129	theta star (KM)	1481
80% gamma percentile (KM)	59.65	90% gamma percentile (KM)	289.8
95% gamma percentile (KM)	702.8	99% gamma percentile (KM)	2119
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.26, α)	0.454	Adjusted Chi Square Value (3.26, β)	0.385
95% Gamma Approximate KM-UCL (use when n>=50)	867.4	95% Gamma Adjusted KM-UCL (use when n<50)	1023
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.803	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	120	Mean in Log Scale	-3.435
SD in Original Scale	520.3	SD in Log Scale	5.076
95% t UCL (assumes normality of ROS data)	321.2	95% Percentile Bootstrap UCL	352.6
95% BCA Bootstrap UCL	472.3	95% Bootstrap t UCL	54716
95% H-UCL (Log ROS)	1.757E+9		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.794	KM Geo Mean	2.213
KM SD (logged)	1.854	95% Critical H Value (KM-Log)	4.042
KM Standard Error of Mean (logged)	0.456	95% H-UCL (KM -Log)	68.78
KM SD (logged)	1.854	95% Critical H Value (KM-Log)	4.042
KM Standard Error of Mean (logged)	0.456		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	121	Mean in Log Scale	0.621
SD in Original Scale	520.1	SD in Log Scale	2.127
95% t UCL (Assumes normality)	322.1	95% H-Stat UCL	163.1
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1023		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

MERCURY			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	15
Number of Detects	14	Number of Non-Detects	6
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	0.016	Minimum Non-Detect	0.2
Maximum Detect	3.7	Maximum Non-Detect	0.2
Variance Detects	0.945	Percent Non-Detects	30%
Mean Detects	0.328	SD Detects	0.972
Median Detects	0.0575	CV Detects	2.966
Skewness Detects	3.721	Kurtosis Detects	13.89
Mean of Logged Detects	-2.642	SD of Logged Detects	1.345
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.34	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.469	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	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	0.246	KM Standard Error of Mean	0.184
KM SD	0.794	95% KM (BCA) UCL	0.607
95% KM (t) UCL	0.564	95% KM (Percentile Bootstrap) UCL	0.603
95% KM (z) UCL	0.549	95% KM Bootstrap t UCL	4.761
90% KM Chebyshev UCL	0.799	95% KM Chebyshev UCL	1.049
97.5% KM Chebyshev UCL	1.397	99% KM Chebyshev UCL	2.079
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.534	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.807	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.385	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.244	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)	0.427	k star (bias corrected MLE)	0.383
Theta hat (MLE)	0.768	Theta star (bias corrected MLE)	0.856
nu hat (MLE)	11.95	nu star (bias corrected)	10.72
Mean (detects)	0.328		
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	0.267
Maximum	3.7	Median	0.0495
SD	0.817	CV	3.062
k hat (MLE)	0.418	k star (bias corrected MLE)	0.388
Theta hat (MLE)	0.639	Theta star (bias corrected MLE)	0.687
nu hat (MLE)	16.7	nu star (bias corrected)	15.53
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (15.53, α)	7.632	Adjusted Chi Square Value (15.53, β)	7.197
95% Gamma Approximate UCL (use when n>=50)	0.543	95% Gamma Adjusted UCL (use when n<50)	0.576

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.246	SD (KM)	0.794
Variance (KM)	0.63	SE of Mean (KM)	0.184
k hat (KM)	0.0959	k star (KM)	0.115
nu hat (KM)	3.836	nu star (KM)	4.594
theta hat (KM)	2.563	theta star (KM)	2.14
80% gamma percentile (KM)	0.205	90% gamma percentile (KM)	0.688
95% gamma percentile (KM)	1.41	99% gamma percentile (KM)	3.64
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.59, α)	0.97	Adjusted Chi Square Value (4.59, β)	0.848
95% Gamma Approximate KM-UCL (use when n>=50)	1.165	95% Gamma Adjusted KM-UCL (use when n<50)	1.332
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.25	Mean in Log Scale	-2.736
SD in Original Scale	0.814	SD in Log Scale	1.206
95% t UCL (assumes normality of ROS data)	0.565	95% Percentile Bootstrap UCL	0.614
95% BCA Bootstrap UCL	0.801	95% Bootstrap t UCL	4.522
95% H-UCL (Log ROS)	0.303		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.77	KM Geo Mean	0.0627
KM SD (logged)	1.15	95% Critical H Value (KM-Log)	2.858
KM Standard Error of Mean (logged)	0.283	95% H-UCL (KM -Log)	0.258
KM SD (logged)	1.15	95% Critical H Value (KM-Log)	2.858
KM Standard Error of Mean (logged)	0.283		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.259	Mean in Log Scale	-2.54
SD in Original Scale	0.811	SD in Log Scale	1.124
95% t UCL (Assumes normality)	0.573	95% H-Stat UCL	0.307
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.049		
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.			

SILVER

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	5
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	3
Minimum Detect	0.011	Minimum Non-Detect	1
Maximum Detect	10.2	Maximum Non-Detect	10
Variance Detects	51.91	Percent Non-Detects	90%
Mean Detects	5.106	SD Detects	7.205
Median Detects	5.106	CV Detects	1.411
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.094	SD of Logged Detects	4.831

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.52	KM Standard Error of Mean	0.702
KM SD	2.221	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.735	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.676	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.627	95% KM Chebyshev UCL	3.581
97.5% KM Chebyshev UCL	4.906	99% KM Chebyshev UCL	7.508

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.259	k star (bias corrected MLE)	N/A
Theta hat (MLE)	19.7	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.037	nu star (bias corrected)	N/A
Mean (detects)	5.106		

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.52	SD (KM)	2.221
Variance (KM)	4.931	SE of Mean (KM)	0.702
k hat (KM)	0.0549	k star (KM)	0.08
nu hat (KM)	2.197	nu star (KM)	3.201
theta hat (KM)	9.475	theta star (KM)	6.504
80% gamma percentile (KM)	0.248	90% gamma percentile (KM)	1.234
95% gamma percentile (KM)	3.026	99% gamma percentile (KM)	9.216

Gamma Kaplan-Meier (KM) Statistics			
		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (3.20, α)	0.434	Adjusted Chi Square Value (3.20, β)	0.368
95% Gamma Approximate KM-UCL (use when n>=50)	3.835	95% Gamma Adjusted KM-UCL (use when n<50)	4.53

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

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.588	Mean in Log Scale	-4.235
SD in Original Scale	2.27	SD in Log Scale	2.804
95% t UCL (assumes normality of ROS data)	1.466	95% Percentile Bootstrap UCL	1.586
95% BCA Bootstrap UCL	2.19	95% Bootstrap t UCL	17.85
95% H-UCL (Log ROS)	30.69		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.168	KM Geo Mean	0.0155
KM SD (logged)	1.489	95% Critical H Value (KM-Log)	3.408
KM Standard Error of Mean (logged)	0.471	95% H-UCL (KM -Log)	0.15
KM SD (logged)	1.489	95% Critical H Value (KM-Log)	3.408
KM Standard Error of Mean (logged)	0.471		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.748	Mean in Log Scale	-0.303
SD in Original Scale	2.606	SD in Log Scale	1.44
95% t UCL (Assumes normality)	2.755	95% H-Stat UCL	6.257
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	7.508		
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.			

THALLIUM

General Statistics

Total Number of Observations	20	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable THALLIUM was not processed!

ZINC

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	14
Number of Detects	12	Number of Non-Detects	8
Number of Distinct Detects	12	Number of Distinct Non-Detects	2
Minimum Detect	2.3	Minimum Non-Detect	2
Maximum Detect	2720	Maximum Non-Detect	60
Variance Detects	609414	Percent Non-Detects	40%
Mean Detects	242.3	SD Detects	780.6
Median Detects	6.25	CV Detects	3.222
Skewness Detects	3.458	Kurtosis Detects	11.97
Mean of Logged Detects	2.597	SD of Logged Detects	1.991

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.348	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.499	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	147.1	KM Standard Error of Mean	137.9
KM SD	590.6	95% KM (BCA) UCL	418.7
95% KM (t) UCL	385.6	95% KM (Percentile Bootstrap) UCL	415.4
95% KM (z) UCL	374	95% KM Bootstrap t UCL	6560
90% KM Chebyshev UCL	560.9	95% KM Chebyshev UCL	748.4
97.5% KM Chebyshev UCL	1009	99% KM Chebyshev UCL	1520

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	2.41	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.85	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.381	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.269	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)	0.246	k star (bias corrected MLE)	0.24
Theta hat (MLE)	984.5	Theta star (bias corrected MLE)	1009
nu hat (MLE)	5.907	nu star (bias corrected)	5.764
Mean (detects)	242.3		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	145.4
Maximum	2720	Median	3.5
SD	606.3	CV	4.17
k hat (MLE)	0.147	k star (bias corrected MLE)	0.158
Theta hat (MLE)	992.3	Theta star (bias corrected MLE)	920.9
nu hat (MLE)	5.861	nu star (bias corrected)	6.315
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (6.32, α)	1.803	Adjusted Chi Square Value (6.32, β)	1.62
95% Gamma Approximate UCL (use when n>=50)	509.3	95% Gamma Adjusted UCL (use when n<50)	566.9

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	147.1	SD (KM)	590.6
Variance (KM)	348813	SE of Mean (KM)	137.9
k hat (KM)	0.062	k star (KM)	0.086
nu hat (KM)	2.481	nu star (KM)	3.442
theta hat (KM)	2372	theta star (KM)	1709
80% gamma percentile (KM)	80.16	90% gamma percentile (KM)	364.1
95% gamma percentile (KM)	857	99% gamma percentile (KM)	2516
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.44, α)	0.515	Adjusted Chi Square Value (3.44, β)	0.438
95% Gamma Approximate KM-UCL (use when n>=50)	983.8	95% Gamma Adjusted KM-UCL (use when n<50)	1155
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	146.2	Mean in Log Scale	1.256
SD in Original Scale	606.2	SD in Log Scale	2.505
95% t UCL (assumes normality of ROS data)	380.5	95% Percentile Bootstrap UCL	415.5
95% BCA Bootstrap UCL	562.1	95% Bootstrap t UCL	7116
95% H-UCL (Log ROS)	1640		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.955	KM Geo Mean	7.065
KM SD (logged)	1.725	95% Critical H Value (KM-Log)	3.815
KM Standard Error of Mean (logged)	0.413	95% H-UCL (KM -Log)	141.7
KM SD (logged)	1.725	95% Critical H Value (KM-Log)	3.815
KM Standard Error of Mean (logged)	0.413		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	150.1	Mean in Log Scale	2.069
SD in Original Scale	605.2	SD in Log Scale	1.969
95% t UCL (Assumes normality)	384.2	95% H-Stat UCL	374.9
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	748.4		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

DIOXIN-LIKE PCB TEQ			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	5
Number of Detects	13	Number of Non-Detects	2
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.306	Minimum Non-Detect	20
Maximum Detect	73.84	Maximum Non-Detect	20
Variance Detects	412.7	Percent Non-Detects	13.33%
Mean Detects	6.26	SD Detects	20.32
Median Detects	0.336	CV Detects	3.245
Skewness Detects	3.598	Kurtosis Detects	12.96
Mean of Logged Detects	-0.409	SD of Logged Detects	1.576
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.332	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.493	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	5.51	KM Standard Error of Mean	4.911
KM SD	18.27	95% KM (BCA) UCL	15.35
95% KM (t) UCL	14.16	95% KM (Percentile Bootstrap) UCL	15.21
95% KM (z) UCL	13.59	95% KM Bootstrap t UCL	273.7
90% KM Chebyshev UCL	20.24	95% KM Chebyshev UCL	26.92
97.5% KM Chebyshev UCL	36.18	99% KM Chebyshev UCL	54.38
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.365	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.829	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.424	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.256	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)	0.306	k star (bias corrected MLE)	0.287
Theta hat (MLE)	20.44	Theta star (bias corrected MLE)	21.82
nu hat (MLE)	7.965	nu star (bias corrected)	7.46
Mean (detects)	6.26		

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	5.559
Maximum	73.84	Median	0.336
SD	18.9	CV	3.401
k hat (MLE)	0.296	k star (bias corrected MLE)	0.282
Theta hat (MLE)	18.76	Theta star (bias corrected MLE)	19.74
nu hat (MLE)	8.891	nu star (bias corrected)	8.446
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (8.45, α)	2.996	Adjusted Chi Square Value (8.45, β)	2.61
95% Gamma Approximate UCL (use when n>=50)	15.67	95% Gamma Adjusted UCL (use when n<50)	17.99

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.51	SD (KM)	18.27
Variance (KM)	333.9	SE of Mean (KM)	4.911
k hat (KM)	0.0909	k star (KM)	0.117
nu hat (KM)	2.727	nu star (KM)	3.515
theta hat (KM)	60.61	theta star (KM)	47.02
80% gamma percentile (KM)	4.702	90% gamma percentile (KM)	15.5
95% gamma percentile (KM)	31.53	99% gamma percentile (KM)	80.75

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.52, α)	0.54	Adjusted Chi Square Value (3.52, β)	0.421
95% Gamma Approximate KM-UCL (use when n>=50)	35.86	95% Gamma Adjusted KM-UCL (use when n<50)	46.03

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.575	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Lognormal at 5% Significance Level
Detected Data Not Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	5.512	Mean in Log Scale	-0.432
SD in Original Scale	18.91	SD in Log Scale	1.475
95% t UCL (assumes normality of ROS data)	14.11	95% Percentile Bootstrap UCL	15.3
95% BCA Bootstrap UCL	20.21	95% Bootstrap t UCL	286.8
95% H-UCL (Log ROS)	7.848		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.461	KM Geo Mean	0.63
KM SD (logged)	1.438	95% Critical H Value (KM-Log)	3.498
KM Standard Error of Mean (logged)	0.393	95% H-UCL (KM -Log)	6.8
KM SD (logged)	1.438	95% Critical H Value (KM-Log)	3.498
KM Standard Error of Mean (logged)	0.393		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.759	Mean in Log Scale	-0.0475
SD in Original Scale	18.85	SD in Log Scale	1.743
95% t UCL (Assumes normality)	15.33	95% H-Stat UCL	28.99
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
975% KM (Chebyshev) UCL	36.18		
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.			

ALDRIN			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
Number of Detects	18	Number of Non-Detects	2
Number of Distinct Detects	18	Number of Distinct Non-Detects	2
Minimum Detect	1.8000E-4	Minimum Non-Detect	0.0049
Maximum Detect	0.0047	Maximum Non-Detect	0.005
Variance Detects	2.1532E-6	Percent Non-Detects	10%
Mean Detects	0.00149	SD Detects	0.00147
Median Detects	6.7500E-4	CV Detects	0.985
Skewness Detects	1.245	Kurtosis Detects	0.508
Mean of Logged Detects	-6.994	SD of Logged Detects	1.048
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	0.00149	KM Standard Error of Mean	3.4586E-4
KM SD	0.00143	95% KM (BCA) UCL	0.00215
95% KM (t) UCL	0.00209	95% KM (Percentile Bootstrap) UCL	0.00208
95% KM (z) UCL	0.00206	95% KM Bootstrap t UCL	0.00231
90% KM Chebyshev UCL	0.00253	95% KM Chebyshev UCL	0.003
97.5% KM Chebyshev UCL	0.00365	99% KM Chebyshev UCL	0.00493
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.6	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.211	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.209	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.171	k star (bias corrected MLE)	1.013
Theta hat (MLE)	0.00127	Theta star (bias corrected MLE)	0.00147
nu hat (MLE)	42.16	nu star (bias corrected)	36.47
Mean (detects)	0.00149		
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	1.8000E-4	Mean	0.00234
Maximum	0.01	Median	8.5000E-4
SD	0.00296	CV	1.267
k hat (MLE)	0.845	k star (bias corrected MLE)	0.752
Theta hat (MLE)	0.00277	Theta star (bias corrected MLE)	0.00311
nu hat (MLE)	33.8	nu star (bias corrected)	30.07
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (30.07, α)	18.54	Adjusted Chi Square Value (30.07, β)	17.83
95% Gamma Approximate UCL (use when n>=50)	0.00379	95% Gamma Adjusted UCL (use when n<50)	0.00395

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00149	SD (KM)	0.00143
Variance (KM)	2.0336E-6	SE of Mean (KM)	3.4586E-4
k hat (KM)	1.091	k star (KM)	0.961
nu hat (KM)	43.64	nu star (KM)	38.42
theta hat (KM)	0.00137	theta star (KM)	0.00155
80% gamma percentile (KM)	0.0024	90% gamma percentile (KM)	0.00346
95% gamma percentile (KM)	0.00453	99% gamma percentile (KM)	0.007
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (38.42, α)	25.23	Adjusted Chi Square Value (38.42, β)	24.38
95% Gamma Approximate KM-UCL (use when n>=50)	0.00227	95% Gamma Adjusted KM-UCL (use when n<50)	0.00235
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00143	Mean in Log Scale	-6.994
SD in Original Scale	0.0014	SD in Log Scale	0.992
95% t UCL (assumes normality of ROS data)	0.00197	95% Percentile Bootstrap UCL	0.00199
95% BCA Bootstrap UCL	0.00197	95% Bootstrap t UCL	0.00215
95% H-UCL (Log ROS)	0.00272		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.994	KM Geo Mean	9.1779E-4
KM SD (logged)	1.019	95% Critical H Value (KM-Log)	2.662
KM Standard Error of Mean (logged)	0.247	95% H-UCL (KM -Log)	0.00287
KM SD (logged)	1.019	95% Critical H Value (KM-Log)	2.662
KM Standard Error of Mean (logged)	0.247		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00159	Mean in Log Scale	-6.894
SD in Original Scale	0.00142	SD in Log Scale	1.038
95% t UCL (Assumes normality)	0.00214	95% H-Stat UCL	0.00329
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Adjusted Gamma UCL	0.00235	95% GROS Adjusted Gamma UCL	0.00395
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

DELTA-BHC			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	17
Number of Detects	17	Number of Non-Detects	3
Number of Distinct Detects	16	Number of Distinct Non-Detects	1
Minimum Detect	2.0000E-4	Minimum Non-Detect	0.005
Maximum Detect	0.016	Maximum Non-Detect	0.005
Variance Detects	2.6530E-5	Percent Non-Detects	15%
Mean Detects	0.00376	SD Detects	0.00515
Median Detects	6.3000E-4	CV Detects	1.37
Skewness Detects	1.463	Kurtosis Detects	1.026
Mean of Logged Detects	-6.628	SD of Logged Detects	1.531
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	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	0.00332	KM Standard Error of Mean	0.0011
KM SD	0.00474	95% KM (BCA) UCL	0.00536
95% KM (t) UCL	0.00522	95% KM (Percentile Bootstrap) UCL	0.00523
95% KM (z) UCL	0.00513	95% KM Bootstrap t UCL	0.00618
90% KM Chebyshev UCL	0.00661	95% KM Chebyshev UCL	0.0081
97.5% KM Chebyshev UCL	0.0102	99% KM Chebyshev UCL	0.0142
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.363	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.79	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.309	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.22	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)	0.593	k star (bias corrected MLE)	0.527
Theta hat (MLE)	0.00634	Theta star (bias corrected MLE)	0.00713
nu hat (MLE)	20.16	nu star (bias corrected)	17.93
Mean (detects)	0.00376		
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	2.0000E-4	Mean	0.00469
Maximum	0.016	Median	0.00158
SD	0.00525	CV	1.118
k hat (MLE)	0.636	k star (bias corrected MLE)	0.574
Theta hat (MLE)	0.00738	Theta star (bias corrected MLE)	0.00818
nu hat (MLE)	25.44	nu star (bias corrected)	22.96
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (22.96, α)	13.06	Adjusted Chi Square Value (22.96, β)	12.47
95% Gamma Approximate UCL (use when n>=50)	0.00825	95% Gamma Adjusted UCL (use when n<50)	0.00864

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00332	SD (KM)	0.00474
Variance (KM)	2.2444E-5	SE of Mean (KM)	0.0011
k hat (KM)	0.493	k star (KM)	0.452
nu hat (KM)	19.7	nu star (KM)	18.08
theta hat (KM)	0.00675	theta star (KM)	0.00736
80% gamma percentile (KM)	0.00543	90% gamma percentile (KM)	0.00918
95% gamma percentile (KM)	0.0132	99% gamma percentile (KM)	0.0233
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (18.08, α)	9.448	Adjusted Chi Square Value (18.08, β)	8.956
95% Gamma Approximate KM-UCL (use when n>=50)	0.00636	95% Gamma Adjusted KM-UCL (use when n<50)	0.00671
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.852	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00332	Mean in Log Scale	-6.728
SD in Original Scale	0.00485	SD in Log Scale	1.45
95% t UCL (assumes normality of ROS data)	0.00519	95% Percentile Bootstrap UCL	0.00509
95% BCA Bootstrap UCL	0.00541	95% Bootstrap t UCL	0.0061
95% H-UCL (Log ROS)	0.0104		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.754	KM Geo Mean	0.00117
KM SD (logged)	1.436	95% Critical H Value (KM-Log)	3.318
KM Standard Error of Mean (logged)	0.341	95% H-UCL (KM -Log)	0.00976
KM SD (logged)	1.436	95% Critical H Value (KM-Log)	3.318
KM Standard Error of Mean (logged)	0.341		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00357	Mean in Log Scale	-6.532
SD in Original Scale	0.00475	SD in Log Scale	1.424
95% t UCL (Assumes normality)	0.00541	95% H-Stat UCL	0.0118
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0081		
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.			

DIELDRIN			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	15
Number of Detects	14	Number of Non-Detects	6
Number of Distinct Detects	13	Number of Distinct Non-Detects	2
Minimum Detect	1.0000E-4	Minimum Non-Detect	0.0019
Maximum Detect	0.053	Maximum Non-Detect	0.002
Variance Detects	1.9311E-4	Percent Non-Detects	30%
Mean Detects	0.00478	SD Detects	0.0139
Median Detects	0.001	CV Detects	2.909
Skewness Detects	3.726	Kurtosis Detects	13.92
Mean of Logged Detects	-6.832	SD of Logged Detects	1.415
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.341	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.499	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	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	0.0036	KM Standard Error of Mean	0.00263
KM SD	0.0114	95% KM (BCA) UCL	0.00884
95% KM (t) UCL	0.00816	95% KM (Percentile Bootstrap) UCL	0.00877
95% KM (z) UCL	0.00793	95% KM Bootstrap t UCL	0.0542
90% KM Chebyshev UCL	0.0115	95% KM Chebyshev UCL	0.0151
97.5% KM Chebyshev UCL	0.0201	99% KM Chebyshev UCL	0.0298
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.218	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.806	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.391	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.244	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)	0.436	k star (bias corrected MLE)	0.39
Theta hat (MLE)	0.011	Theta star (bias corrected MLE)	0.0122
nu hat (MLE)	12.21	nu star (bias corrected)	10.93
Mean (detects)	0.00478		
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	1.0000E-4	Mean	0.00634
Maximum	0.053	Median	0.00155
SD	0.0118	CV	1.853
k hat (MLE)	0.565	k star (bias corrected MLE)	0.514
Theta hat (MLE)	0.0112	Theta star (bias corrected MLE)	0.0124
nu hat (MLE)	22.6	nu star (bias corrected)	20.54
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (20.54, α)	11.25	Adjusted Chi Square Value (20.54, β)	10.71
95% Gamma Approximate UCL (use when n>=50)	0.0116	95% Gamma Adjusted UCL (use when n<50)	0.0122

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0036	SD (KM)	0.0114
Variance (KM)	1.2883E-4	SE of Mean (KM)	0.00263
k hat (KM)	0.101	k star (KM)	0.119
nu hat (KM)	4.023	nu star (KM)	4.753
theta hat (KM)	0.0358	theta star (KM)	0.0303
80% gamma percentile (KM)	0.00312	90% gamma percentile (KM)	0.0102
95% gamma percentile (KM)	0.0206	99% gamma percentile (KM)	0.0524
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.75, α)	1.04	Adjusted Chi Square Value (4.75, β)	0.912
95% Gamma Approximate KM-UCL (use when n>=50)	0.0165	95% Gamma Adjusted KM-UCL (use when n<50)	0.0188
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00359	Mean in Log Scale	-6.967
SD in Original Scale	0.0116	SD in Log Scale	1.242
95% t UCL (assumes normality of ROS data)	0.0081	95% Percentile Bootstrap UCL	0.0088
95% BCA Bootstrap UCL	0.0116	95% Bootstrap t UCL	0.0603
95% H-UCL (Log ROS)	0.0048		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.978	KM Geo Mean	9.3226E-4
KM SD (logged)	1.244	95% Critical H Value (KM-Log)	3.005
KM Standard Error of Mean (logged)	0.316	95% H-UCL (KM -Log)	0.00477
KM SD (logged)	1.244	95% Critical H Value (KM-Log)	3.005
KM Standard Error of Mean (logged)	0.316		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00364	Mean in Log Scale	-6.86
SD in Original Scale	0.0116	SD in Log Scale	1.172
95% t UCL (Assumes normality)	0.00814	95% H-Stat UCL	0.00454
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0151		
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.			

HEPTACHLOR			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	18
Number of Detects	18	Number of Non-Detects	2
Number of Distinct Detects	17	Number of Distinct Non-Detects	2
Minimum Detect	2.3000E-4	Minimum Non-Detect	9.7000E-4
Maximum Detect	0.01	Maximum Non-Detect	0.001
Variance Detects	8.9111E-6	Percent Non-Detects	10%
Mean Detects	0.00225	SD Detects	0.00299
Median Detects	8.0000E-4	CV Detects	1.325
Skewness Detects	1.699	Kurtosis Detects	1.669
Mean of Logged Detects	-6.775	SD of Logged Detects	1.135
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.668	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	0.00209	KM Standard Error of Mean	6.4377E-4
KM SD	0.0028	95% KM (BCA) UCL	0.00312
95% KM (t) UCL	0.0032	95% KM (Percentile Bootstrap) UCL	0.00319
95% KM (z) UCL	0.00315	95% KM Bootstrap t UCL	0.00392
90% KM Chebyshev UCL	0.00402	95% KM Chebyshev UCL	0.00489
97.5% KM Chebyshev UCL	0.00611	99% KM Chebyshev UCL	0.00849
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.625	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.773	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.283	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.211	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)	0.865	k star (bias corrected MLE)	0.757
Theta hat (MLE)	0.00261	Theta star (bias corrected MLE)	0.00298
nu hat (MLE)	31.12	nu star (bias corrected)	27.27
Mean (detects)	0.00225		
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	2.3000E-4	Mean	0.00303
Maximum	0.01	Median	8.2750E-4
SD	0.0037	CV	1.22
k hat (MLE)	0.785	k star (bias corrected MLE)	0.7
Theta hat (MLE)	0.00386	Theta star (bias corrected MLE)	0.00432
nu hat (MLE)	31.39	nu star (bias corrected)	28.02
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (28.02, α)	16.94	Adjusted Chi Square Value (28.02, β)	16.26
95% Gamma Approximate UCL (use when n>=50)	0.00501	95% Gamma Adjusted UCL (use when n<50)	0.00522

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00209	SD (KM)	0.0028
Variance (KM)	7.8231E-6	SE of Mean (KM)	6.4377E-4
k hat (KM)	0.558	k star (KM)	0.507
nu hat (KM)	22.31	nu star (KM)	20.3
theta hat (KM)	0.00375	theta star (KM)	0.00412
80% gamma percentile (KM)	0.00343	90% gamma percentile (KM)	0.00563
95% gamma percentile (KM)	0.00798	99% gamma percentile (KM)	0.0137
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (20.30, α)	11.07	Adjusted Chi Square Value (20.30, β)	10.53
95% Gamma Approximate KM-UCL (use when n>=50)	0.00383	95% Gamma Adjusted KM-UCL (use when n<50)	0.00403
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00209	Mean in Log Scale	-6.835
SD in Original Scale	0.00287	SD in Log Scale	1.089
95% t UCL (assumes normality of ROS data)	0.0032	95% Percentile Bootstrap UCL	0.00319
95% BCA Bootstrap UCL	0.00336	95% Bootstrap t UCL	0.00403
95% H-UCL (Log ROS)	0.00389		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.846	KM Geo Mean	0.00106
KM SD (logged)	1.077	95% Critical H Value (KM-Log)	2.748
KM Standard Error of Mean (logged)	0.25	95% H-UCL (KM -Log)	0.00374
KM SD (logged)	1.077	95% Critical H Value (KM-Log)	2.748
KM Standard Error of Mean (logged)	0.25		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00208	Mean in Log Scale	-6.859
SD in Original Scale	0.00288	SD in Log Scale	1.104
95% t UCL (Assumes normality)	0.00319	95% H-Stat UCL	0.00392
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.00489		
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.			

HEPTACHLOR EPOXIDE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	14
Number of Detects	12	Number of Non-Detects	8
Number of Distinct Detects	11	Number of Distinct Non-Detects	3
Minimum Detect	1.8000E-4	Minimum Non-Detect	0.0018
Maximum Detect	0.0023	Maximum Non-Detect	0.002
Variance Detects	3.2626E-7	Percent Non-Detects	40%
Mean Detects	7.0417E-4	SD Detects	5.7119E-4
Median Detects	6.1000E-4	CV Detects	0.811
Skewness Detects	2.253	Kurtosis Detects	5.88
Mean of Logged Detects	-7.486	SD of Logged Detects	0.682
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.746	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	6.4614E-4	KM Standard Error of Mean	1.2020E-4
KM SD	4.6257E-4	95% KM (BCA) UCL	8.4796E-4
95% KM (t) UCL	8.5398E-4	95% KM (Percentile Bootstrap) UCL	8.4839E-4
95% KM (z) UCL	8.4385E-4	95% KM Bootstrap t UCL	0.00101
90% KM Chebyshev UCL	0.00101	95% KM Chebyshev UCL	0.00117
97.5% KM Chebyshev UCL	0.0014	99% KM Chebyshev UCL	0.00184
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.449	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.248	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)	2.353	k star (bias corrected MLE)	1.82
Theta hat (MLE)	2.9924E-4	Theta star (bias corrected MLE)	3.8680E-4
nu hat (MLE)	56.48	nu star (bias corrected)	43.69
Mean (detects)	7.0417E-4		
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	1.8000E-4	Mean	0.00442
Maximum	0.01	Median	9.6000E-4
SD	0.00469	CV	1.061
k hat (MLE)	0.667	k star (bias corrected MLE)	0.6
Theta hat (MLE)	0.00663	Theta star (bias corrected MLE)	0.00737
nu hat (MLE)	26.67	nu star (bias corrected)	24.01
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (24.01, α)	13.85	Adjusted Chi Square Value (24.01, β)	13.24
95% Gamma Approximate UCL (use when n>=50)	0.00766	95% Gamma Adjusted UCL (use when n<50)	0.00802

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	6.4614E-4	SD (KM)	4.6257E-4
Variance (KM)	2.1398E-7	SE of Mean (KM)	1.2020E-4
k hat (KM)	1.951	k star (KM)	1.692
nu hat (KM)	78.04	nu star (KM)	67.67
theta hat (KM)	3.3116E-4	theta star (KM)	3.8193E-4
80% gamma percentile (KM)	9.8635E-4	90% gamma percentile (KM)	0.00131
95% gamma percentile (KM)	0.00162	99% gamma percentile (KM)	0.00231
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (67.67, α)	49.74	Adjusted Chi Square Value (67.67, β)	48.52
95% Gamma Approximate KM-UCL (use when n>=50)	8.7910E-4	95% Gamma Adjusted KM-UCL (use when n<50)	9.0111E-4
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	6.3800E-4	Mean in Log Scale	-7.53
SD in Original Scale	4.6148E-4	SD in Log Scale	0.577
95% t UCL (assumes normality of ROS data)	8.1643E-4	95% Percentile Bootstrap UCL	8.1428E-4
95% BCA Bootstrap UCL	8.4940E-4	95% Bootstrap t UCL	9.4047E-4
95% H-UCL (Log ROS)	8.3662E-4		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-7.537	KM Geo Mean	5.3296E-4
KM SD (logged)	0.606	95% Critical H Value (KM-Log)	2.128
KM Standard Error of Mean (logged)	0.173	95% H-UCL (KM -Log)	8.6044E-4
KM SD (logged)	0.606	95% Critical H Value (KM-Log)	2.128
KM Standard Error of Mean (logged)	0.173		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.1250E-4	Mean in Log Scale	-7.265
SD in Original Scale	4.5601E-4	SD in Log Scale	0.589
95% t UCL (Assumes normality)	9.8881E-4	95% H-Stat UCL	0.00111
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Adjusted Gamma UCL	9.0111E-4	95% GROS Adjusted Gamma UCL	0.00802
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

1,4-DIOXANE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	20
Number of Detects	19	Number of Non-Detects	1
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	1.7	Minimum Non-Detect	0.5
Maximum Detect	220	Maximum Non-Detect	0.5
Variance Detects	3840	Percent Non-Detects	5%
Mean Detects	56.31	SD Detects	61.97
Median Detects	32	CV Detects	1.1
Skewness Detects	1.419	Kurtosis Detects	1.344
Mean of Logged Detects	3.358	SD of Logged Detects	1.314
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.812	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	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	53.52	KM Standard Error of Mean	13.79
KM SD	60.03	95% KM (BCA) UCL	79.07
95% KM (t) UCL	77.37	95% KM (Percentile Bootstrap) UCL	77.49
95% KM (z) UCL	76.2	95% KM Bootstrap t UCL	84.17
90% KM Chebyshev UCL	94.89	95% KM Chebyshev UCL	113.6
97.5% KM Chebyshev UCL	139.6	99% KM Chebyshev UCL	190.7
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.31	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.774	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.134	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.205	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.872	k star (bias corrected MLE)	0.769
Theta hat (MLE)	64.57	Theta star (bias corrected MLE)	73.18
nu hat (MLE)	33.14	nu star (bias corrected)	29.24
Mean (detects)	56.31		
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	53.5
Maximum	220	Median	29.5
SD	61.61	CV	1.152
k hat (MLE)	0.605	k star (bias corrected MLE)	0.548
Theta hat (MLE)	88.41	Theta star (bias corrected MLE)	97.68
nu hat (MLE)	24.2	nu star (bias corrected)	21.91
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (21.91, α)	12.27	Adjusted Chi Square Value (21.91, β)	11.7
95% Gamma Approximate UCL (use when n>=50)	95.52	95% Gamma Adjusted UCL (use when n<50)	100.2

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	53.52	SD (KM)	60.03
Variance (KM)	3604	SE of Mean (KM)	13.79
k hat (KM)	0.795	k star (KM)	0.709
nu hat (KM)	31.79	nu star (KM)	28.36
theta hat (KM)	67.34	theta star (KM)	75.49
80% gamma percentile (KM)	87.94	90% gamma percentile (KM)	133.9
95% gamma percentile (KM)	181.3	99% gamma percentile (KM)	294.4
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (28.36, α)	17.21	Adjusted Chi Square Value (28.36, β)	16.52
95% Gamma Approximate KM-UCL (use when n>=50)	88.2	95% Gamma Adjusted KM-UCL (use when n<50)	91.87
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.114	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	53.55	Mean in Log Scale	3.196
SD in Original Scale	61.56	SD in Log Scale	1.469
95% t UCL (assumes normality of ROS data)	77.35	95% Percentile Bootstrap UCL	75.64
95% BCA Bootstrap UCL	78.2	95% Bootstrap t UCL	85.36
95% H-UCL (Log ROS)	224.2		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	3.155	KM Geo Mean	23.46
KM SD (logged)	1.527	95% Critical H Value (KM-Log)	3.473
KM Standard Error of Mean (logged)	0.351	95% H-UCL (KM -Log)	254.2
KM SD (logged)	1.527	95% Critical H Value (KM-Log)	3.473
KM Standard Error of Mean (logged)	0.351		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	53.51	Mean in Log Scale	3.121
SD in Original Scale	61.6	SD in Log Scale	1.661
95% t UCL (Assumes normality)	77.33	95% H-Stat UCL	369.5
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	91.87		
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.			

BENZO(A)ANTHRACENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	12
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.015	Minimum Non-Detect	0.091
Maximum Detect	0.23	Maximum Non-Detect	0.1
Variance Detects	0.00472	Percent Non-Detects	60%
Mean Detects	0.069	SD Detects	0.0687
Median Detects	0.0425	CV Detects	0.995
Skewness Detects	2.305	Kurtosis Detects	5.639
Mean of Logged Detects	-2.982	SD of Logged Detects	0.795
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.695	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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	0.0536	KM Standard Error of Mean	0.0121
KM SD	0.0452	95% KM (BCA) UCL	0.0748
95% KM (t) UCL	0.0746	95% KM (Percentile Bootstrap) UCL	0.0749
95% KM (z) UCL	0.0735	95% KM Bootstrap t UCL	0.0965
90% KM Chebyshev UCL	0.09	95% KM Chebyshev UCL	0.106
97.5% KM Chebyshev UCL	0.129	99% KM Chebyshev UCL	0.174
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.593	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.254	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.298	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.767	k star (bias corrected MLE)	1.188
Theta hat (MLE)	0.039	Theta star (bias corrected MLE)	0.0581
nu hat (MLE)	28.28	nu star (bias corrected)	19.01
Mean (detects)	0.069		
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	0.0553
Maximum	0.23	Median	0.0425
SD	0.0499	CV	0.903
k hat (MLE)	1.793	k star (bias corrected MLE)	1.557
Theta hat (MLE)	0.0308	Theta star (bias corrected MLE)	0.0355
nu hat (MLE)	71.72	nu star (bias corrected)	62.3
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (62.30, α)	45.14	Adjusted Chi Square Value (62.30, β)	43.99
95% Gamma Approximate UCL (use when n>=50)	0.0763	95% Gamma Adjusted UCL (use when n<50)	0.0783

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0536	SD (KM)	0.0452
Variance (KM)	0.00204	SE of Mean (KM)	0.0121
k hat (KM)	1.408	k star (KM)	1.23
nu hat (KM)	56.33	nu star (KM)	49.21
theta hat (KM)	0.0381	theta star (KM)	0.0436
80% gamma percentile (KM)	0.0846	90% gamma percentile (KM)	0.117
95% gamma percentile (KM)	0.149	99% gamma percentile (KM)	0.223
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (49.21, α)	34.11	Adjusted Chi Square Value (49.21, β)	33.11
95% Gamma Approximate KM-UCL (use when n>=50)	0.0773	95% Gamma Adjusted KM-UCL (use when n<50)	0.0796
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0546	Mean in Log Scale	-3.131
SD in Original Scale	0.0471	SD in Log Scale	0.644
95% t UCL (assumes normality of ROS data)	0.0728	95% Percentile Bootstrap UCL	0.0736
95% BCA Bootstrap UCL	0.0809	95% Bootstrap t UCL	0.0902
95% H-UCL (Log ROS)	0.074		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.141	KM Geo Mean	0.0433
KM SD (logged)	0.615	95% Critical H Value (KM-Log)	2.139
KM Standard Error of Mean (logged)	0.205	95% H-UCL (KM -Log)	0.0706
KM SD (logged)	0.615	95% Critical H Value (KM-Log)	2.139
KM Standard Error of Mean (logged)	0.205		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0572	Mean in Log Scale	-3
SD in Original Scale	0.0429	SD in Log Scale	0.484
95% t UCL (Assumes normality)	0.0737	95% H-Stat UCL	0.0699
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Adjusted Gamma UCL	0.0796	95% GROS Adjusted Gamma UCL	0.0783
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.			

BENZO(A)PYRENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	6
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.022	Minimum Non-Detect	0.091
Maximum Detect	0.12	Maximum Non-Detect	5
Variance Detects	0.0048	Percent Non-Detects	90%
Mean Detects	0.071	SD Detects	0.0693
Median Detects	0.071	CV Detects	0.976
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.968	SD of Logged Detects	1.2
Warning: Data set has only 2 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Not Enough Data to Perform GOF Test			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0272	KM Standard Error of Mean	0.0071
KM SD	0.0219	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0394	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0388	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0485	95% KM Chebyshev UCL	0.0581
97.5% KM Chebyshev UCL	0.0715	99% KM Chebyshev UCL	0.0978
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.694	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0419	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	6.774	nu star (bias corrected)	N/A
Mean (detects)	0.071		
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0272	SD (KM)	0.0219
Variance (KM)	4.7887E-4	SE of Mean (KM)	0.0071
k hat (KM)	1.54	k star (KM)	1.342
nu hat (KM)	61.61	nu star (KM)	53.7
theta hat (KM)	0.0176	theta star (KM)	0.0202
80% gamma percentile (KM)	0.0425	90% gamma percentile (KM)	0.0581
95% gamma percentile (KM)	0.0734	99% gamma percentile (KM)	0.108
Gamma Kaplan-Meier (KM) Statistics			
		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (53.70, α)	37.86	Adjusted Chi Square Value (53.70, β)	36.81
95% Gamma Approximate KM-UCL (use when n>=50)	0.0385	95% Gamma Adjusted KM-UCL (use when n<50)	0.0396
Lognormal GOF Test on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.03	Mean in Log Scale	-3.745

SD in Original Scale	0.0254	SD in Log Scale	0.679
95% t UCL (assumes normality of ROS data)	0.0398	95% Percentile Bootstrap UCL	0.0398
95% BCA Bootstrap UCL	0.0434	95% Bootstrap t UCL	0.0483
95% H-UCL (Log ROS)	0.042		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.727	KM Geo Mean	0.0241
KM SD (logged)	0.379	95% Critical H Value (KM-Log)	1.911
KM Standard Error of Mean (logged)	0.123	95% H-UCL (KM -Log)	0.0305
KM SD (logged)	0.379	95% Critical H Value (KM-Log)	1.911
KM Standard Error of Mean (logged)	0.123		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.174	Mean in Log Scale	-2.813
SD in Original Scale	0.548	SD in Log Scale	0.921
95% t UCL (Assumes normality)	0.386	95% H-Stat UCL	0.156
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0581		
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.			

BENZO(B)FLUORANTHENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	8
Number of Detects	4	Number of Non-Detects	16
Number of Distinct Detects	4	Number of Distinct Non-Detects	4
Minimum Detect	0.0064	Minimum Non-Detect	0.091
Maximum Detect	0.17	Maximum Non-Detect	5
Variance Detects	0.00604	Percent Non-Detects	80%
Mean Detects	0.0552	SD Detects	0.0777
Median Detects	0.0223	CV Detects	1.407
Skewness Detects	1.829	Kurtosis Detects	3.342
Mean of Logged Detects	-3.729	SD of Logged Detects	1.508
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.025	KM Standard Error of Mean	0.0124
KM SD	0.0366	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0465	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0455	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0623	95% KM Chebyshev UCL	0.0792
97.5% KM Chebyshev UCL	0.103	99% KM Chebyshev UCL	0.149
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.399	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.671	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.286	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.406	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.723	k star (bias corrected MLE)	0.347
Theta hat (MLE)	0.0764	Theta star (bias corrected MLE)	0.159
nu hat (MLE)	5.782	nu star (bias corrected)	2.779
Mean (detects)	0.0552		
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	0.0064	Mean	0.0304
Maximum	0.17	Median	0.0133
SD	0.0383	CV	1.258
k hat (MLE)	1.256	k star (bias corrected MLE)	1.101
Theta hat (MLE)	0.0242	Theta star (bias corrected MLE)	0.0276
nu hat (MLE)	50.26	nu star (bias corrected)	44.05
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (44.05, α)	29.83	Adjusted Chi Square Value (44.05, β)	28.91
95% Gamma Approximate UCL (use when n>=50)	0.045	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.025	SD (KM)	0.0366
Variance (KM)	0.00134	SE of Mean (KM)	0.0124
k hat (KM)	0.467	k star (KM)	0.43
nu hat (KM)	18.69	nu star (KM)	17.22
theta hat (KM)	0.0536	theta star (KM)	0.0581
80% gamma percentile (KM)	0.0407	90% gamma percentile (KM)	0.0697
95% gamma percentile (KM)	0.101	99% gamma percentile (KM)	0.18
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (17.22, α)	8.828	Adjusted Chi Square Value (17.22, β)	8.355
95% Gamma Approximate KM-UCL (use when n>=50)	0.0488	95% Gamma Adjusted KM-UCL (use when n<50)	0.0516
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.025	Mean in Log Scale	-4.26
SD in Original Scale	0.0371	SD in Log Scale	1.026
95% t UCL (assumes normality of ROS data)	0.0393	95% Percentile Bootstrap UCL	0.0394
95% BCA Bootstrap UCL	0.0473	95% Bootstrap t UCL	0.0627
95% H-UCL (Log ROS)	0.0448		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.244	KM Geo Mean	0.0144
KM SD (logged)	0.939	95% Critical H Value (KM-Log)	2.546
KM Standard Error of Mean (logged)	0.502	95% H-UCL (KM -Log)	0.0386
KM SD (logged)	0.939	95% Critical H Value (KM-Log)	2.546
KM Standard Error of Mean (logged)	0.502		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.173	Mean in Log Scale	-2.962
SD in Original Scale	0.549	SD in Log Scale	1.13
95% t UCL (Assumes normality)	0.385	95% H-Stat UCL	0.204
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0465		
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.			

BIS(2-ETHYLHEXYL)PHTHALATE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	5
Number of Detects	2	Number of Non-Detects	18
Number of Distinct Detects	2	Number of Distinct Non-Detects	3
Minimum Detect	0.28	Minimum Non-Detect	4.5
Maximum Detect	4.1	Maximum Non-Detect	5
Variance Detects	7.296	Percent Non-Detects	90%
Mean Detects	2.19	SD Detects	2.701
Median Detects	2.19	CV Detects	1.233
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.069	SD of Logged Detects	1.898

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	2.19	KM Standard Error of Mean	1.91
KM SD	1.91	95% KM (BCA) UCL	N/A
95% KM (t) UCL	5.493	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	5.332	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	7.92	95% KM Chebyshev UCL	10.52
97.5% KM Chebyshev UCL	14.12	99% KM Chebyshev UCL	21.19

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.827	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.649	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.307	nu star (bias corrected)	N/A
Mean (detects)	2.19		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.19	SD (KM)	1.91
Variance (KM)	3.648	SE of Mean (KM)	1.91
k hat (KM)	1.315	k star (KM)	1.151
nu hat (KM)	52.59	nu star (KM)	46.03
theta hat (KM)	1.666	theta star (KM)	1.903
80% gamma percentile (KM)	3.482	90% gamma percentile (KM)	4.871
95% gamma percentile (KM)	6.245	99% gamma percentile (KM)	9.405

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (46.03, α)	31.47	Adjusted Chi Square Value (46.03, β)	30.51
95% Gamma Approximate KM-UCL (use when n>=50)	3.204	95% Gamma Adjusted KM-UCL (use when n<50)	3.304

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	10.7	Mean in Log Scale	0.069
SD in Original Scale	28.94	SD in Log Scale	2.404
95% t UCL (assumes normality of ROS data)	21.89	95% Percentile Bootstrap UCL	22.73
95% BCA Bootstrap UCL	30.06	95% Bootstrap t UCL	71.35
95% H-UCL (Log ROS)	311		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.069	KM Geo Mean	1.071
KM SD (logged)	1.342	95% Critical H Value (KM-Log)	3.162
KM Standard Error of Mean (logged)	1.342	95% H-UCL (KM -Log)	6.98
KM SD (logged)	1.342	95% Critical H Value (KM-Log)	3.162
KM Standard Error of Mean (logged)	1.342		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.442	Mean in Log Scale	0.82
SD in Original Scale	0.63	SD in Log Scale	0.507
95% t UCL (Assumes normality)	2.685	95% H-Stat UCL	3.266
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	10.52		
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

DIBENZO(A,H)ANTHRACENE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	5
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	4

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!

DIBENZOFURAN			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	6
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	0.41	Minimum Non-Detect	4.5
Maximum Detect	5.1	Maximum Non-Detect	5
Variance Detects	6.948	Percent Non-Detects	85%
Mean Detects	2.06	SD Detects	2.636
Median Detects	0.67	CV Detects	1.28
Skewness Detects	1.713	Kurtosis Detects	N/A
Mean of Logged Detects	0.112	SD of Logged Detects	1.336
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.791	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.368	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.768	KM Standard Error of Mean	0.292
KM SD	1.002	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.274	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.249	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.645	95% KM Chebyshev UCL	2.043
97.5% KM Chebyshev UCL	2.594	99% KM Chebyshev UCL	3.678
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.951	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.165	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.708	nu star (bias corrected)	N/A
Mean (detects)	2.06		
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	0.946
Maximum	5.1	Median	0.546
SD	1.234	CV	1.305
k hat (MLE)	0.56	k star (bias corrected MLE)	0.509
Theta hat (MLE)	1.69	Theta star (bias corrected MLE)	1.858
nu hat (MLE)	22.38	nu star (bias corrected)	20.36
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (20.36, α)	11.12	Adjusted Chi Square Value (20.36, β)	10.58
95% Gamma Approximate UCL (use when n>=50)	1.732	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.768	SD (KM)	1.002
Variance (KM)	1.004	SE of Mean (KM)	0.292
k hat (KM)	0.588	k star (KM)	0.533
nu hat (KM)	23.5	nu star (KM)	21.31
theta hat (KM)	1.307	theta star (KM)	1.441
80% gamma percentile (KM)	1.264	90% gamma percentile (KM)	2.05
95% gamma percentile (KM)	2.884	99% gamma percentile (KM)	4.922
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (21.31, α)	11.82	Adjusted Chi Square Value (21.31, β)	11.27
95% Gamma Approximate KM-UCL (use when n>=50)	1.384	95% Gamma Adjusted KM-UCL (use when n<50)	1.453
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.905	Mean in Log Scale	-0.515
SD in Original Scale	1.106	SD in Log Scale	0.882
95% t UCL (assumes normality of ROS data)	1.333	95% Percentile Bootstrap UCL	1.361
95% BCA Bootstrap UCL	1.559	95% Bootstrap t UCL	1.978
95% H-UCL (Log ROS)	1.452		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.532	KM Geo Mean	0.587
KM SD (logged)	0.551	95% Critical H Value (KM-Log)	2.07
KM Standard Error of Mean (logged)	0.243	95% H-UCL (KM -Log)	0.888
KM SD (logged)	0.551	95% Critical H Value (KM-Log)	2.07
KM Standard Error of Mean (logged)	0.243		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.407	Mean in Log Scale	0.784
SD in Original Scale	0.871	SD in Log Scale	0.522
95% t UCL (Assumes normality)	2.743	95% H-Stat UCL	3.206
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.274		
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.			

NAPHTHALENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	10
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.019	Minimum Non-Detect	0.1
Maximum Detect	0.47	Maximum Non-Detect	0.1
Variance Detects	0.025	Percent Non-Detects	50%
Mean Detects	0.138	SD Detects	0.158
Median Detects	0.0805	CV Detects	1.149
Skewness Detects	1.455	Kurtosis Detects	1.032
Mean of Logged Detects	-2.597	SD of Logged Detects	1.19
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	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	0.0935	KM Standard Error of Mean	0.0287
KM SD	0.117	95% KM (BCA) UCL	0.144
95% KM (t) UCL	0.143	95% KM (Percentile Bootstrap) UCL	0.144
95% KM (z) UCL	0.141	95% KM Bootstrap t UCL	0.179
90% KM Chebyshev UCL	0.18	95% KM Chebyshev UCL	0.219
97.5% KM Chebyshev UCL	0.273	99% KM Chebyshev UCL	0.379
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.519	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.204	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.274	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.947	k star (bias corrected MLE)	0.729
Theta hat (MLE)	0.145	Theta star (bias corrected MLE)	0.189
nu hat (MLE)	18.93	nu star (bias corrected)	14.59
Mean (detects)	0.138		
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	0.0982
Maximum	0.47	Median	0.0598
SD	0.122	CV	1.247
k hat (MLE)	0.902	k star (bias corrected MLE)	0.8
Theta hat (MLE)	0.109	Theta star (bias corrected MLE)	0.123
nu hat (MLE)	36.1	nu star (bias corrected)	32.02
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (32.02, α)	20.09	Adjusted Chi Square Value (32.02, β)	19.34
95% Gamma Approximate UCL (use when n>=50)	0.157	95% Gamma Adjusted UCL (use when n<50)	0.163

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0935	SD (KM)	0.117
Variance (KM)	0.0137	SE of Mean (KM)	0.0287
k hat (KM)	0.639	k star (KM)	0.576
nu hat (KM)	25.56	nu star (KM)	23.06
theta hat (KM)	0.146	theta star (KM)	0.162
80% gamma percentile (KM)	0.154	90% gamma percentile (KM)	0.245
95% gamma percentile (KM)	0.341	99% gamma percentile (KM)	0.574
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (23.06, α)	13.13	Adjusted Chi Square Value (23.06, β)	12.54
95% Gamma Approximate KM-UCL (use when n>=50)	0.164	95% Gamma Adjusted KM-UCL (use when n<50)	0.172
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0952	Mean in Log Scale	-2.9
SD in Original Scale	0.12	SD in Log Scale	1.037
95% t UCL (assumes normality of ROS data)	0.142	95% Percentile Bootstrap UCL	0.142
95% BCA Bootstrap UCL	0.161	95% Bootstrap t UCL	0.2
95% H-UCL (Log ROS)	0.178		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.912	KM Geo Mean	0.0544
KM SD (logged)	0.98	95% Critical H Value (KM-Log)	2.605
KM Standard Error of Mean (logged)	0.289	95% H-UCL (KM -Log)	0.158
KM SD (logged)	0.98	95% Critical H Value (KM-Log)	2.605
KM Standard Error of Mean (logged)	0.289		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0938	Mean in Log Scale	-2.796
SD in Original Scale	0.118	SD in Log Scale	0.844
95% t UCL (Assumes normality)	0.139	95% H-Stat UCL	0.139
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.172		
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.			

PHENANTHRENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	14
Number of Detects	12	Number of Non-Detects	8
Number of Distinct Detects	12	Number of Distinct Non-Detects	2
Minimum Detect	0.0064	Minimum Non-Detect	0.091
Maximum Detect	3.3	Maximum Non-Detect	0.1
Variance Detects	1.46	Percent Non-Detects	40%
Mean Detects	0.918	SD Detects	1.208
Median Detects	0.27	CV Detects	1.317
Skewness Detects	1.352	Kurtosis Detects	0.613
Mean of Logged Detects	-1.578	SD of Logged Detects	2.284
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.556	KM Standard Error of Mean	0.233
KM SD	1	95% KM (BCA) UCL	0.954
95% KM (t) UCL	0.96	95% KM (Percentile Bootstrap) UCL	0.947
95% KM (z) UCL	0.94	95% KM Bootstrap t UCL	1.306
90% KM Chebyshev UCL	1.256	95% KM Chebyshev UCL	1.574
97.5% KM Chebyshev UCL	2.014	99% KM Chebyshev UCL	2.879
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.417	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.798	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.195	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.261	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.435	k star (bias corrected MLE)	0.382
Theta hat (MLE)	2.11	Theta star (bias corrected MLE)	2.404
nu hat (MLE)	10.44	nu star (bias corrected)	9.163
Mean (detects)	0.918		
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	0.0064	Mean	0.558
Maximum	3.3	Median	0.0165
SD	1.025	CV	1.836
k hat (MLE)	0.324	k star (bias corrected MLE)	0.309
Theta hat (MLE)	1.723	Theta star (bias corrected MLE)	1.808
nu hat (MLE)	12.96	nu star (bias corrected)	12.35
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (12.35, α)	5.458	Adjusted Chi Square Value (12.35, β)	5.099
95% Gamma Approximate UCL (use when n>=50)	1.263	95% Gamma Adjusted UCL (use when n<50)	1.352

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.556	SD (KM)	1
Variance (KM)	0.999	SE of Mean (KM)	0.233
k hat (KM)	0.309	k star (KM)	0.296
nu hat (KM)	12.37	nu star (KM)	11.84
theta hat (KM)	1.798	theta star (KM)	1.877
80% gamma percentile (KM)	0.85	90% gamma percentile (KM)	1.642
95% gamma percentile (KM)	2.553	99% gamma percentile (KM)	4.926
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.84, α)	5.124	Adjusted Chi Square Value (11.84, β)	4.778
95% Gamma Approximate KM-UCL (use when n>=50)	1.285	95% Gamma Adjusted KM-UCL (use when n<50)	1.378
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.561	Mean in Log Scale	-2.611
SD in Original Scale	1.023	SD in Log Scale	2.288
95% t UCL (assumes normality of ROS data)	0.957	95% Percentile Bootstrap UCL	0.954
95% BCA Bootstrap UCL	1.037	95% Bootstrap t UCL	1.339
95% H-UCL (Log ROS)	12.73		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.707	KM Geo Mean	0.0667
KM SD (logged)	2.201	95% Critical H Value (KM-Log)	4.67
KM Standard Error of Mean (logged)	0.523	95% H-UCL (KM -Log)	7.938
KM SD (logged)	2.201	95% Critical H Value (KM-Log)	4.67
KM Standard Error of Mean (logged)	0.523		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.57	Mean in Log Scale	-2.155
SD in Original Scale	1.018	SD in Log Scale	1.883
95% t UCL (Assumes normality)	0.964	95% H-Stat UCL	4.005
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.378		

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.

1,3-DICHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	15
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.2	Minimum Non-Detect	0.5
Maximum Detect	1	Maximum Non-Detect	0.5
Variance Detects	0.157	Percent Non-Detects	75%
Mean Detects	0.64	SD Detects	0.397
Median Detects	0.84	CV Detects	0.62
Skewness Detects	-0.518	Kurtosis Detects	-3.202
Mean of Logged Detects	-0.672	SD of Logged Detects	0.815
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.79	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.318	KM Standard Error of Mean	0.0646
KM SD	0.257	95% KM (BCA) UCL	0.594
95% KM (t) UCL	0.429	95% KM (Percentile Bootstrap) UCL	0.583
95% KM (z) UCL	0.424	95% KM Bootstrap t UCL	0.432
90% KM Chebyshev UCL	0.511	95% KM Chebyshev UCL	0.599
97.5% KM Chebyshev UCL	0.721	99% KM Chebyshev UCL	0.961
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.718	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.684	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.343	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.36	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	2.369	k star (bias corrected MLE)	1.081
Theta hat (MLE)	0.27	Theta star (bias corrected MLE)	0.592
nu hat (MLE)	23.69	nu star (bias corrected)	10.81
Mean (detects)	0.64		
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	0.351
Maximum	1	Median	0.255
SD	0.296	CV	0.842
k hat (MLE)	1.161	k star (bias corrected MLE)	1.02
Theta hat (MLE)	0.302	Theta star (bias corrected MLE)	0.344
nu hat (MLE)	46.42	nu star (bias corrected)	40.79
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (40.79, α)	27.16	Adjusted Chi Square Value (40.79, β)	26.28
95% Gamma Approximate UCL (use when n>=50)	0.527	95% Gamma Adjusted UCL (use when n<50)	0.545

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.318	SD (KM)	0.257
Variance (KM)	0.0662	SE of Mean (KM)	0.0646
k hat (KM)	1.522	k star (KM)	1.327
nu hat (KM)	60.89	nu star (KM)	53.09
theta hat (KM)	0.209	theta star (KM)	0.239
80% gamma percentile (KM)	0.498	90% gamma percentile (KM)	0.682
95% gamma percentile (KM)	0.862	99% gamma percentile (KM)	1.272
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (53.09, α)	37.35	Adjusted Chi Square Value (53.09, β)	36.31
95% Gamma Approximate KM-UCL (use when n>=50)	0.451	95% Gamma Adjusted KM-UCL (use when n<50)	0.464
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.35	Mean in Log Scale	-1.306
SD in Original Scale	0.275	SD in Log Scale	0.725
95% t UCL (assumes normality of ROS data)	0.456	95% Percentile Bootstrap UCL	0.45
95% BCA Bootstrap UCL	0.465	95% Bootstrap t UCL	0.493
95% H-UCL (Log ROS)	0.513		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.339	KM Geo Mean	0.262
KM SD (logged)	0.532	95% Critical H Value (KM-Log)	2.051
KM Standard Error of Mean (logged)	0.136	95% H-UCL (KM -Log)	0.388
KM SD (logged)	0.532	95% Critical H Value (KM-Log)	2.051
KM Standard Error of Mean (logged)	0.136		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.348	Mean in Log Scale	-1.208
SD in Original Scale	0.251	SD in Log Scale	0.491
95% t UCL (Assumes normality)	0.445	95% H-Stat UCL	0.423
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.429		
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.			

1,4-DICHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	11
Number of Detects	11	Number of Non-Detects	9
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	0.5
Maximum Detect	4.8	Maximum Non-Detect	0.5
Variance Detects	2.65	Percent Non-Detects	45%
Mean Detects	2.096	SD Detects	1.628
Median Detects	2	CV Detects	0.777
Skewness Detects	0.457	Kurtosis Detects	-1.02
Mean of Logged Detects	0.265	SD of Logged Detects	1.236
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.16	**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	1.227	KM Standard Error of Mean	0.352
KM SD	1.5	95% KM (BCA) UCL	1.915
95% KM (t) UCL	1.836	95% KM (Percentile Bootstrap) UCL	1.79
95% KM (z) UCL	1.807	95% KM Bootstrap t UCL	1.969
90% KM Chebyshev UCL	2.284	95% KM Chebyshev UCL	2.763
97.5% KM Chebyshev UCL	3.428	99% KM Chebyshev UCL	4.733
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.31	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.149	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.261	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.191	k star (bias corrected MLE)	0.927
Theta hat (MLE)	1.76	Theta star (bias corrected MLE)	2.262
nu hat (MLE)	26.2	nu star (bias corrected)	20.39
Mean (detects)	2.096		
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	1.236
Maximum	4.8	Median	0.51
SD	1.541	CV	1.246
k hat (MLE)	0.45	k star (bias corrected MLE)	0.416
Theta hat (MLE)	2.745	Theta star (bias corrected MLE)	2.971
nu hat (MLE)	18.01	nu star (bias corrected)	16.64
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (16.64, α)	8.419	Adjusted Chi Square Value (16.64, β)	7.959
95% Gamma Approximate UCL (use when n>=50)	2.444	95% Gamma Adjusted UCL (use when n<50)	2.586

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.227	SD (KM)	1.5
Variance (KM)	2.25	SE of Mean (KM)	0.352
k hat (KM)	0.67	k star (KM)	0.602
nu hat (KM)	26.78	nu star (KM)	24.1
theta hat (KM)	1.833	theta star (KM)	2.037
80% gamma percentile (KM)	2.023	90% gamma percentile (KM)	3.189
95% gamma percentile (KM)	4.41	99% gamma percentile (KM)	7.361
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (24.10, α)	13.92	Adjusted Chi Square Value (24.10, β)	13.31
95% Gamma Approximate KM-UCL (use when n>=50)	2.124	95% Gamma Adjusted KM-UCL (use when n<50)	2.221
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.255	Mean in Log Scale	-0.644
SD in Original Scale	1.522	SD in Log Scale	1.472
95% t UCL (assumes normality of ROS data)	1.844	95% Percentile Bootstrap UCL	1.823
95% BCA Bootstrap UCL	1.969	95% Bootstrap t UCL	2.071
95% H-UCL (Log ROS)	4.864		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.692	KM Geo Mean	0.501
KM SD (logged)	1.391	95% Critical H Value (KM-Log)	3.243
KM Standard Error of Mean (logged)	0.35	95% H-UCL (KM -Log)	3.712
KM SD (logged)	1.391	95% Critical H Value (KM-Log)	3.243
KM Standard Error of Mean (logged)	0.35		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.266	Mean in Log Scale	-0.478
SD in Original Scale	1.511	SD in Log Scale	1.23
95% t UCL (Assumes normality)	1.85	95% H-Stat UCL	3.068
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.836		
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.			

BENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	12
Number of Detects	13	Number of Non-Detects	7
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	0.5
Maximum Detect	3	Maximum Non-Detect	0.5
Variance Detects	0.595	Percent Non-Detects	35%
Mean Detects	0.478	SD Detects	0.771
Median Detects	0.25	CV Detects	1.614
Skewness Detects	3.389	Kurtosis Detects	11.86
Mean of Logged Detects	-1.267	SD of Logged Detects	0.895
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.477	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.401	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.387	KM Standard Error of Mean	0.144
KM SD	0.613	95% KM (BCA) UCL	0.672
95% KM (t) UCL	0.636	95% KM (Percentile Bootstrap) UCL	0.653
95% KM (z) UCL	0.624	95% KM Bootstrap t UCL	1.257
90% KM Chebyshev UCL	0.819	95% KM Chebyshev UCL	1.015
97.5% KM Chebyshev UCL	1.286	99% KM Chebyshev UCL	1.819
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.278	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.264	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.243	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)	1.082	k star (bias corrected MLE)	0.884
Theta hat (MLE)	0.442	Theta star (bias corrected MLE)	0.541
nu hat (MLE)	28.14	nu star (bias corrected)	22.98
Mean (detects)	0.478		
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	0.388
Maximum	3	Median	0.22
SD	0.64	CV	1.647
k hat (MLE)	0.827	k star (bias corrected MLE)	0.736
Theta hat (MLE)	0.47	Theta star (bias corrected MLE)	0.528
nu hat (MLE)	33.06	nu star (bias corrected)	29.44
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (29.44, α)	18.05	Adjusted Chi Square Value (29.44, β)	17.35
95% Gamma Approximate UCL (use when n>=50)	0.633	95% Gamma Adjusted UCL (use when n<50)	0.659

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.387	SD (KM)	0.613
Variance (KM)	0.376	SE of Mean (KM)	0.144
k hat (KM)	0.399	k star (KM)	0.373
nu hat (KM)	15.97	nu star (KM)	14.9
theta hat (KM)	0.971	theta star (KM)	1.04
80% gamma percentile (KM)	0.619	90% gamma percentile (KM)	1.108
95% gamma percentile (KM)	1.649	99% gamma percentile (KM)	3.022
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (14.90, α)	7.195	Adjusted Chi Square Value (14.90, β)	6.774
95% Gamma Approximate KM-UCL (use when n>=50)	0.802	95% Gamma Adjusted KM-UCL (use when n<50)	0.852
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.391	Mean in Log Scale	-1.381
SD in Original Scale	0.629	SD in Log Scale	0.794
95% t UCL (assumes normality of ROS data)	0.634	95% Percentile Bootstrap UCL	0.655
95% BCA Bootstrap UCL	0.825	95% Bootstrap t UCL	1.311
95% H-UCL (Log ROS)	0.528		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.391	KM Geo Mean	0.249
KM SD (logged)	0.762	95% Critical H Value (KM-Log)	2.311
KM Standard Error of Mean (logged)	0.195	95% H-UCL (KM -Log)	0.498
KM SD (logged)	0.762	95% Critical H Value (KM-Log)	2.311
KM Standard Error of Mean (logged)	0.195		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.398	Mean in Log Scale	-1.308
SD in Original Scale	0.623	SD in Log Scale	0.713
95% t UCL (Assumes normality)	0.639	95% H-Stat UCL	0.504
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.498		
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.			

CHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	18
Number of Detects	17	Number of Non-Detects	3
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	0.24	Minimum Non-Detect	0.5
Maximum Detect	93	Maximum Non-Detect	0.5
Variance Detects	552.4	Percent Non-Detects	15%
Mean Detects	16.32	SD Detects	23.5
Median Detects	5.9	CV Detects	1.44
Skewness Detects	2.457	Kurtosis Detects	6.955
Mean of Logged Detects	1.715	SD of Logged Detects	1.748
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.699	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	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	13.92	KM Standard Error of Mean	5.022
KM SD	21.79	95% KM (BCA) UCL	23.83
95% KM (t) UCL	22.6	95% KM (Percentile Bootstrap) UCL	22.9
95% KM (z) UCL	22.18	95% KM Bootstrap t UCL	30.1
90% KM Chebyshev UCL	28.98	95% KM Chebyshev UCL	35.81
97.5% KM Chebyshev UCL	45.28	99% KM Chebyshev UCL	63.88
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.206	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.791	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.108	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.22	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.577	k star (bias corrected MLE)	0.514
Theta hat (MLE)	28.29	Theta star (bias corrected MLE)	31.73
nu hat (MLE)	19.62	nu star (bias corrected)	17.49
Mean (detects)	16.32		
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	13.88
Maximum	93	Median	4.4
SD	22.38	CV	1.613
k hat (MLE)	0.359	k star (bias corrected MLE)	0.339
Theta hat (MLE)	38.6	Theta star (bias corrected MLE)	40.95
nu hat (MLE)	14.38	nu star (bias corrected)	13.55
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (13.55, α)	6.267	Adjusted Chi Square Value (13.55, β)	5.878
95% Gamma Approximate UCL (use when n>=50)	30.01	95% Gamma Adjusted UCL (use when n<50)	31.99

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	13.92	SD (KM)	21.79
Variance (KM)	474.7	SE of Mean (KM)	5.022
k hat (KM)	0.408	k star (KM)	0.38
nu hat (KM)	16.32	nu star (KM)	15.2
theta hat (KM)	34.11	theta star (KM)	36.61
80% gamma percentile (KM)	22.32	90% gamma percentile (KM)	39.66
95% gamma percentile (KM)	58.85	99% gamma percentile (KM)	107.4
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.20, α)	7.404	Adjusted Chi Square Value (15.20, β)	6.976
95% Gamma Approximate KM-UCL (use when n>=50)	28.58	95% Gamma Adjusted KM-UCL (use when n<50)	30.33
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	13.92	Mean in Log Scale	1.266
SD in Original Scale	22.35	SD in Log Scale	1.956
95% t UCL (assumes normality of ROS data)	22.56	95% Percentile Bootstrap UCL	22.59
95% BCA Bootstrap UCL	26.24	95% Bootstrap t UCL	30.7
95% H-UCL (Log ROS)	160.3		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.27	KM Geo Mean	3.561
KM SD (logged)	1.89	95% Critical H Value (KM-Log)	4.107
KM Standard Error of Mean (logged)	0.436	95% H-UCL (KM -Log)	126.1
KM SD (logged)	1.89	95% Critical H Value (KM-Log)	4.107
KM Standard Error of Mean (logged)	0.436		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	13.91	Mean in Log Scale	1.25
SD in Original Scale	22.36	SD in Log Scale	1.966
95% t UCL (Assumes normality)	22.56	95% H-Stat UCL	163.3
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	30.33		
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.			

PENTADECAFLUOROOCTANOIC ACID			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	16
Number of Detects	19	Number of Non-Detects	1
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	0.026	Minimum Non-Detect	0.02
Maximum Detect	0.56	Maximum Non-Detect	0.02
Variance Detects	0.0265	Percent Non-Detects	5%
Mean Detects	0.239	SD Detects	0.163
Median Detects	0.19	CV Detects	0.681
Skewness Detects	0.704	Kurtosis Detects	-0.344
Mean of Logged Detects	-1.716	SD of Logged Detects	0.865
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.228	KM Standard Error of Mean	0.0371
KM SD	0.162	95% KM (BCA) UCL	0.292
95% KM (t) UCL	0.292	95% KM (Percentile Bootstrap) UCL	0.288
95% KM (z) UCL	0.289	95% KM Bootstrap t UCL	0.31
90% KM Chebyshev UCL	0.339	95% KM Chebyshev UCL	0.39
97.5% KM Chebyshev UCL	0.46	99% KM Chebyshev UCL	0.597
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.316	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.131	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.201	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.905	k star (bias corrected MLE)	1.639
Theta hat (MLE)	0.126	Theta star (bias corrected MLE)	0.146
nu hat (MLE)	72.37	nu star (bias corrected)	62.28
Mean (detects)	0.239		
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	0.228
Maximum	0.56	Median	0.18
SD	0.166	CV	0.731
k hat (MLE)	1.459	k star (bias corrected MLE)	1.273
Theta hat (MLE)	0.156	Theta star (bias corrected MLE)	0.179
nu hat (MLE)	58.36	nu star (bias corrected)	50.94
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (50.94, α)	35.55	Adjusted Chi Square Value (50.94, β)	34.53
95% Gamma Approximate UCL (use when n>=50)	0.326	95% Gamma Adjusted UCL (use when n<50)	0.336

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.228	SD (KM)	0.162
Variance (KM)	0.0261	SE of Mean (KM)	0.0371
k hat (KM)	1.993	k star (KM)	1.727
nu hat (KM)	79.72	nu star (KM)	69.1
theta hat (KM)	0.114	theta star (KM)	0.132
80% gamma percentile (KM)	0.347	90% gamma percentile (KM)	0.459
95% gamma percentile (KM)	0.567	99% gamma percentile (KM)	0.808

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (69.10, α)	50.96	Adjusted Chi Square Value (69.10, β)	49.73
95% Gamma Approximate KM-UCL (use when n>=50)	0.309	95% Gamma Adjusted KM-UCL (use when n<50)	0.317

Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.228	Mean in Log Scale	-1.819
SD in Original Scale	0.166	SD in Log Scale	0.96
95% t UCL (assumes normality of ROS data)	0.292	95% Percentile Bootstrap UCL	0.287
95% BCA Bootstrap UCL	0.297	95% Bootstrap t UCL	0.301
95% H-UCL (Log ROS)	0.453		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.826	KM Geo Mean	0.161
KM SD (logged)	0.95	95% Critical H Value (KM-Log)	2.562
KM Standard Error of Mean (logged)	0.218	95% H-UCL (KM -Log)	0.442
KM SD (logged)	0.95	95% Critical H Value (KM-Log)	2.562
KM Standard Error of Mean (logged)	0.218		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.228	Mean in Log Scale	-1.86
SD in Original Scale	0.166	SD in Log Scale	1.061
95% t UCL (Assumes normality)	0.292	95% H-Stat UCL	0.53
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			

Suggested UCL to Use			
95% KM (t) UCL	0.292		

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.

PERFLUOROOCTANE SULFONIC ACID			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	17
Number of Detects	14	Number of Non-Detects	6
Number of Distinct Detects	14	Number of Distinct Non-Detects	3
Minimum Detect	0.02	Minimum Non-Detect	0.04
Maximum Detect	1.2	Maximum Non-Detect	0.42
Variance Detects	0.121	Percent Non-Detects	30%
Mean Detects	0.285	SD Detects	0.347
Median Detects	0.165	CV Detects	1.218
Skewness Detects	2.177	Kurtosis Detects	3.877
Mean of Logged Detects	-1.761	SD of Logged Detects	1.034
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.646	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.386	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	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	0.21	KM Standard Error of Mean	0.0707
KM SD	0.304	95% KM (BCA) UCL	0.351
95% KM (t) UCL	0.333	95% KM (Percentile Bootstrap) UCL	0.333
95% KM (z) UCL	0.327	95% KM Bootstrap t UCL	0.565
90% KM Chebyshev UCL	0.422	95% KM Chebyshev UCL	0.518
97.5% KM Chebyshev UCL	0.652	99% KM Chebyshev UCL	0.913
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.823	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.758	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.269	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.235	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)	1.125	k star (bias corrected MLE)	0.931
Theta hat (MLE)	0.254	Theta star (bias corrected MLE)	0.306
nu hat (MLE)	31.49	nu star (bias corrected)	26.08
Mean (detects)	0.285		
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	0.205
Maximum	1.2	Median	0.12
SD	0.314	CV	1.535
k hat (MLE)	0.644	k star (bias corrected MLE)	0.581
Theta hat (MLE)	0.318	Theta star (bias corrected MLE)	0.352
nu hat (MLE)	25.77	nu star (bias corrected)	23.24
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (23.24, α)	13.27	Adjusted Chi Square Value (23.24, β)	12.68
95% Gamma Approximate UCL (use when n>=50)	0.358	95% Gamma Adjusted UCL (use when n<50)	0.375

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.21	SD (KM)	0.304
Variance (KM)	0.0923	SE of Mean (KM)	0.0707
k hat (KM)	0.48	k star (KM)	0.441
nu hat (KM)	19.18	nu star (KM)	17.64
theta hat (KM)	0.439	theta star (KM)	0.477
80% gamma percentile (KM)	0.343	90% gamma percentile (KM)	0.584
95% gamma percentile (KM)	0.845	99% gamma percentile (KM)	1.495
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (17.64, α)	9.13	Adjusted Chi Square Value (17.64, β)	8.648
95% Gamma Approximate KM-UCL (use when n>=50)	0.406	95% Gamma Adjusted KM-UCL (use when n<50)	0.429
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.21	Mean in Log Scale	-2.285
SD in Original Scale	0.311	SD in Log Scale	1.23
95% t UCL (assumes normality of ROS data)	0.331	95% Percentile Bootstrap UCL	0.328
95% BCA Bootstrap UCL	0.382	95% Bootstrap t UCL	0.603
95% H-UCL (Log ROS)	0.504		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.341	KM Geo Mean	0.0962
KM SD (logged)	1.267	95% Critical H Value (KM-Log)	3.041
KM Standard Error of Mean (logged)	0.299	95% H-UCL (KM -Log)	0.52
KM SD (logged)	1.267	95% Critical H Value (KM-Log)	3.041
KM Standard Error of Mean (logged)	0.299		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.215	Mean in Log Scale	-2.287
SD in Original Scale	0.31	SD in Log Scale	1.286
95% t UCL (Assumes normality)	0.335	95% H-Stat UCL	0.575
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.518		
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.			

PCB-105			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	10
Number of Detects	7	Number of Non-Detects	8
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	4.6	Minimum Non-Detect	20
Maximum Detect	58000	Maximum Non-Detect	230
Variance Detects	4.796E+8	Percent Non-Detects	53.33%
Mean Detects	8337	SD Detects	21899
Median Detects	62	CV Detects	2.627
Skewness Detects	2.646	Kurtosis Detects	7
Mean of Logged Detects	4.576	SD of Logged Detects	3.08
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.455	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.503	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	3896	KM Standard Error of Mean	4033
KM SD	14460	95% KM (BCA) UCL	11632
95% KM (t) UCL	10999	95% KM (Percentile Bootstrap) UCL	11615
95% KM (z) UCL	10529	95% KM Bootstrap t UCL	2322742
90% KM Chebyshev UCL	15994	95% KM Chebyshev UCL	21474
97.5% KM Chebyshev UCL	29080	99% KM Chebyshev UCL	44021
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.335	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.849	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.445	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.346	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)	0.17	k star (bias corrected MLE)	0.192
Theta hat (MLE)	49181	Theta star (bias corrected MLE)	43399
nu hat (MLE)	2.373	nu star (bias corrected)	2.69
Mean (detects)	8337		
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	3891
Maximum	58000	Median	0.01
SD	14969	CV	3.847
k hat (MLE)	0.0952	k star (bias corrected MLE)	0.121
Theta hat (MLE)	40886	Theta star (bias corrected MLE)	32269
nu hat (MLE)	2.855	nu star (bias corrected)	3.617
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (3.62, α)	0.577	Adjusted Chi Square Value (3.62, β)	0.451
95% Gamma Approximate UCL (use when n>=50)	24409	95% Gamma Adjusted UCL (use when n<50)	31214

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3896	SD (KM)	14460
Variance (KM)	2.091E+8	SE of Mean (KM)	4033
k hat (KM)	0.0726	k star (KM)	0.103
nu hat (KM)	2.178	nu star (KM)	3.076
theta hat (KM)	53667	theta star (KM)	38002
80% gamma percentile (KM)	2801	90% gamma percentile (KM)	10474
95% gamma percentile (KM)	22578	99% gamma percentile (KM)	61119
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.08, α)	0.395	Adjusted Chi Square Value (3.08, β)	0.303
95% Gamma Approximate KM-UCL (use when n>=50)	30323	95% Gamma Adjusted KM-UCL (use when n<50)	39508
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3894	Mean in Log Scale	2.795
SD in Original Scale	14968	SD in Log Scale	2.862
95% t UCL (assumes normality of ROS data)	10701	95% Percentile Bootstrap UCL	11619
95% BCA Bootstrap UCL	15494	95% Bootstrap t UCL	2561280
95% H-UCL (Log ROS)	120501		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	3.185	KM Geo Mean	24.16
KM SD (logged)	2.382	95% Critical H Value (KM-Log)	5.32
KM Standard Error of Mean (logged)	0.687	95% H-UCL (KM -Log)	12198
KM SD (logged)	2.382	95% Critical H Value (KM-Log)	5.32
KM Standard Error of Mean (logged)	0.687		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3903	Mean in Log Scale	3.538
SD in Original Scale	14966	SD in Log Scale	2.333
95% t UCL (Assumes normality)	10709	95% H-Stat UCL	13563
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	44021		
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.			

PCB-118

General Statistics			
Total Number of Observations	15	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	3
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	3.1	Minimum Non-Detect	20
Maximum Detect	140000	Maximum Non-Detect	20
Variance Detects	1.627E+9	Percent Non-Detects	20%
Mean Detects	11932	SD Detects	40334
Median Detects	142.5	CV Detects	3.38
Skewness Detects	3.463	Kurtosis Detects	12
Mean of Logged Detects	4.91	SD of Logged Detects	2.909

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.335	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.518	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	9548	KM Standard Error of Mean	9403
KM SD	34867	95% KM (BCA) UCL	28147
95% KM (t) UCL	26109	95% KM (Percentile Bootstrap) UCL	28145
95% KM (z) UCL	25014	95% KM Bootstrap t UCL	1917981
90% KM Chebyshev UCL	37757	95% KM Chebyshev UCL	50534
97.5% KM Chebyshev UCL	68269	99% KM Chebyshev UCL	103106

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.881	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.899	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.349	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.275	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)	0.169	k star (bias corrected MLE)	0.182
Theta hat (MLE)	70718	Theta star (bias corrected MLE)	65524
nu hat (MLE)	4.049	nu star (bias corrected)	4.37
Mean (detects)	11932		

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	9546
Maximum	140000	Median	46
SD	36092	CV	3.781
k hat (MLE)	0.128	k star (bias corrected MLE)	0.147
Theta hat (MLE)	74740	Theta star (bias corrected MLE)	65105
nu hat (MLE)	3.831	nu star (bias corrected)	4.399
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (4.40, α)	0.885	Adjusted Chi Square Value (4.40, β)	0.712
95% Gamma Approximate UCL (use when n>=50)	47433	95% Gamma Adjusted UCL (use when n<50)	58962

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	9548	SD (KM)	34867
Variance (KM)	1.216E+9	SE of Mean (KM)	9403
k hat (KM)	0.075	k star (KM)	0.104
nu hat (KM)	2.249	nu star (KM)	3.133
theta hat (KM)	127332	theta star (KM)	91426
80% gamma percentile (KM)	7042	90% gamma percentile (KM)	25853
95% gamma percentile (KM)	55258	99% gamma percentile (KM)	148393
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.13, α)	0.413	Adjusted Chi Square Value (3.13, β)	0.317
95% Gamma Approximate KM-UCL (use when n>=50)	72451	95% Gamma Adjusted KM-UCL (use when n<50)	94245
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	9547	Mean in Log Scale	4.292
SD in Original Scale	36091	SD in Log Scale	2.92
95% t UCL (assumes normality of ROS data)	25961	95% Percentile Bootstrap UCL	28168
95% BCA Bootstrap UCL	37511	95% Bootstrap t UCL	2052404
95% H-UCL (Log ROS)	771223		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	4.348	KM Geo Mean	77.31
KM SD (logged)	2.754	95% Critical H Value (KM-Log)	6.069
KM Standard Error of Mean (logged)	0.752	95% H-UCL (KM -Log)	298893
KM SD (logged)	2.754	95% Critical H Value (KM-Log)	6.069
KM Standard Error of Mean (logged)	0.752		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9548	Mean in Log Scale	4.389
SD in Original Scale	36091	SD in Log Scale	2.796
95% t UCL (Assumes normality)	25961	95% H-Stat UCL	398171
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	103106		
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.			

Inside Landfill

Event 3

PROUCL DATA - INSIDE LANDFILL - EVENT 3

Samples	TCDD-TEQ	d_TCDD_TEQ	ALUMINUM	d_ALUMINUM	ANTIMONY	d_ANTIMONY	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	CADMIUM	d_CADMIUM	CHROMIUM	d_CHROMIUM
LDCA-MW01D-0615			4.2	1	2	0	0.45	1	587	1	1	0	3.2	1
LDCA-MW01S-0615			1040	1	2	0	43.4	1	104	1	0.026	1	3	1
LDCA-MW02-0615			47.7	1	2	0	16.6	1	114	1	1	0	3.3	1
LDCA-MW03-0615														
LDCA-MW04-0615-AVG			52.6	1	0.74	1	0.645	1	1845	1	0.039	1	4	1
LDCA-MW05D-0615			20	0	2	0	3.4	1	593	1	1	0	4.7	1
LDCA-MW05S-0615			20	0	2	0	1.2	1	1250	1	1	0	6	1
LDCA-MW06-0615			23.1	1	2	0	1.5	1	530	1	1	0	11.7	1
LDCA-MW07D-0615			2.8	1	0.14	1	8.9	1	353	1	1	0	1.7	1
LDCA-MW07S-0615			7.5	1	0.14	1	32.7	1	307	1	1	0	3	1
LDCA-MW09-0615														
LDCA-MW11-0615			7510	1	11.3	1	15	1	2420	1	4.6	1	85.9	1
LDCA-MW12-0615			20	0	2	0	1.2	1	1700	1	0.014	1	8.6	1
LDCA-MW20D-0615-AVG			335	1	2	0	2.15	1	91.8	1	1	0	5.25	1
LDCA-MW20I-0615			146	1	2	0	2.4	1	48.7	1	1	0	2	0
LDCA-MW20S-0615			355	1	2	1	6.2	1	267	1	0.18	1	2	0
LDCA-MW34D-0615-AVG	0.937	1	550	1	2	0	2.15	1	316	1	0.014	1	2.8	1
LDCA-MW34S-0615	0.309	1	27.3	1	2	0	0.68	1	729	1	0.016	1	2.8	1
LDCA-MW36-0615			21.6	1	0.2	1	13	1	295	1	1	0	9.2	1
LDCA-MW37-0615			2090	1	0.36	1	4	1	681	1	0.035	1	17.3	1

PROUCL DATA - INSIDE LANDFILL - EVENT 3

Samples	COBALT	d_COBALT	COPPER	d_COPPER	CYANIDE	d_CYANIDE	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	NICKEL	d_NICKEL	VANADIUM	d_VANADIUM	ZINC	d_ZINC
LDCA-MW01D-0615	9.2	1	0.39	1			32200	1	0.084	1	1750	1	12.4	1	2.6	0	2.9	1
LDCA-MW01S-0615	0.73	1	2.3	1	5.6	1	20600	1	9.3	1	887	1	1.4	1	3	1	8.4	1
LDCA-MW02-0615	2.6	1	2	0	2.5	1	28800	1	0.055	1	814	1	2.5	1	2.9	1	1.1	1
LDCA-MW03-0615																		
LDCA-MW04-0615-AVG	0.96	1	1.9	1	10	0	28900	1	4.75	1	381	1	4.85	1	1.95	1	11.3	1
LDCA-MW05D-0615	6.9	1	2	0	62	1	78300	1	1	0	5450	1	4	1	2.4	1	2	0
LDCA-MW05S-0615	3.8	1	2	0	34.2	1	24700	1	1	0	156	1	2.2	1	4.8	1	9.9	1
LDCA-MW06-0615	6	1	2	0	21.6	1	18800	1	1	0	484	1	5.2	1	3.2	1	5.2	1
LDCA-MW07D-0615	8.7	1	0.41	1	18.3	1	13700	1	0.068	1	407	1	14.9	1	0.73	1	1.4	1
LDCA-MW07S-0615	7.2	1	2	0	11.6	1	45300	1	0.033	1	851	1	7.3	1	5.1	1	1.9	1
LDCA-MW09-0615																		
LDCA-MW11-0615	15	1	159	1	200	1	42500	1	1130	1	355	1	135	1	79	1	1440	1
LDCA-MW12-0615	3.1	1	2	0	10	0	9790	1	1	0	115	1	3	1	2.3	1	7.6	1
LDCA-MW20D-0615-AVG	0.8	1	2	0	10.8	1	6175	1	0.71	1	238	1	3.9	1	2.6	0	6.9	1
LDCA-MW20I-0615	1	0	2	0	11.1	1	3090	1	0.46	1	231	1	4.8	1	2.6	0	9.7	1
LDCA-MW20S-0615	1	0	5.4	1	11.2	1	1050	1	21.5	1	19.8	1	14	1	2.6	0	39.6	1
LDCA-MW34D-0615-AVG	1.75	1	2	0			90950	1	1	0	12850	1	1.05	1	2.6	1	4.35	1
LDCA-MW34S-0615	1.2	1	2	0			27900	1	1.8	1	402	1	1.1	1	1.2	1	6.4	1
LDCA-MW36-0615	3.5	1	2	0	22.9	1	33900	1	0.33	1	578	1	4.3	1	7.8	1	3.9	1
LDCA-MW37-0615	7.8	1	3.9	1	11.5	1	17300	1	7.6	1	294	1	8.3	1	10.3	1	45.1	1

PROUCL DATA - INSIDE LANDFILL - EVENT 3

Samples	4,4'-DDD	d_4,4'-DDD	4,4'-DDE	d_4,4'-DDE	1,4-DIOXANE	d_1,4-DIOXANE	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	BENZO(A)PYRENE	d_BENZO(A)PYRENE
LDCA-MW01D-0615	0.00097	0	0.00097	0	100	1	0.1	0	0.1	0
LDCA-MW01S-0615	0.0334	1	0.0025	1	2.9	1	2.3	1	0.1	0
LDCA-MW02-0615	0.001	0	0.001	0	27	1	0.1	0	0.1	0
LDCA-MW03-0615	0.001	0	0.001	0	23	1	0.1	0	0.1	0
LDCA-MW04-0615-AVG	0.00095	0	0.00095	0	24	1	0.1	0	0.1	0
LDCA-MW05D-0615	0.00094	0	0.00094	0	27	1	0.1	0	0.1	0
LDCA-MW05S-0615	0.00096	0	0.00096	0	30	1	0.1	0	0.1	0
LDCA-MW06-0615	0.00097	0	0.00097	0	77	1	0.1	0	0.1	0
LDCA-MW07D-0615	0.00097	0	0.00097	0	6.3	1	0.1	0	0.1	0
LDCA-MW07S-0615	0.00228	1	0.00099	0	18	1	0.096	1	0.1	0
LDCA-MW09-0615	0.00113	1	0.00097	0	0.5	0				
LDCA-MW11-0615	0.0018	1	0.0554	1	150	1	1.1	1	0.42	1
LDCA-MW12-0615	0.00102	1	0.00096	0	150	1	0.084	1	0.1	0
LDCA-MW20D-0615-AVG	0.00099	0	0.00099	0	14.6	1	0.1	0	0.1	0
LDCA-MW20I-0615	0.00095	0	0.00095	0	1.3	1	0.29	1	0.1	0
LDCA-MW20S-0615	0.00097	0	0.00097	0	7.4	1	0.1	0	0.1	0
LDCA-MW34D-0615-AVG	0.00096	0	0.00096	0	10	1				
LDCA-MW34S-0615	0.00542	1	0.0022	1	4.6	1				
LDCA-MW36-0615	0.00163	1	0.00095	0	22	1	0.1	0	0.1	0
LDCA-MW37-0615	0.00279	1	0.00094	0	140	1	0.1	0	0.1	0

PROUCL DATA - INSIDE LANDFILL - EVENT 3

Samples	BENZO(B)FLUORANTHENE	d_BENZO(B)FLUORANTHENE	BIS(2-ETHYLHEXYL)PHTHALATE	d_BIS(2-ETHYLHEXYL)PHTHALATE	DIBENZO(A,H)ANTHRACENE	d_DIBENZO(A,H)ANTHRACENE
LDCA-MW01D-0615	0.1	0	5	0	0.1	0
LDCA-MW01S-0615	1.4	1	5	0	0.1	0
LDCA-MW02-0615	0.1	0	5	0	0.1	0
LDCA-MW03-0615	0.1	0	5	0	0.1	0
LDCA-MW04-0615-AVG	0.1	0	1.45	1	0.1	0
LDCA-MW05D-0615	0.1	0	5	0	0.1	0
LDCA-MW05S-0615	0.1	0	5	0	0.1	0
LDCA-MW06-0615	0.1	0	5	0	0.1	0
LDCA-MW07D-0615	0.1	0	5	0	0.1	0
LDCA-MW07S-0615	0.1	0	5	0	0.1	0
LDCA-MW09-0615						
LDCA-MW11-0615	0.52	1	26	1	0.061	1
LDCA-MW12-0615	0.1	0	5	0	0.1	0
LDCA-MW20D-0615-AVG	0.1	0	1.5	1	0.1	0
LDCA-MW20I-0615	0.12	1	1.5	1	0.1	0
LDCA-MW20S-0615	0.1	0	1.2	1	0.1	0
LDCA-MW34D-0615-AVG						
LDCA-MW34S-0615						
LDCA-MW36-0615	0.1	0	0.63	1	0.1	0
LDCA-MW37-0615	0.1	0	0.75	1	0.1	0

PROUCL DATA - INSIDE LANDFILL - EVENT 3

Samples	DIBENZOFURAN	d_DIBENZOFURAN	INDENO(1,2,3-CD)PYRENE	d_INDENO(1,2,3-CD)PYRENE	NAPHTHALENE	d_NAPHTHALENE	PENTACHLOROPHENOL	d_PENTACHLOROPHENOL
LDCA-MW01D-0615	5	0	0.1	0	0.1	0	0.13	1
LDCA-MW01S-0615	4.2	1	0.1	0	3	1	0.11	1
LDCA-MW02-0615	5	0	0.1	0	0.1	0	0.11	1
LDCA-MW03-0615	5	0	0.1	0	0.1	0	0.2	0
LDCA-MW04-0615-AVG	5	0	0.1	0	0.255	1	0.2	0
LDCA-MW05D-0615	5	0	0.1	0	0.1	0	0.2	0
LDCA-MW05S-0615	5	0	0.1	0	0.096	1	0.2	0
LDCA-MW06-0615	5	0	0.1	0	0.14	1	0.2	0
LDCA-MW07D-0615	5	0	0.1	0	0.17	1	0.61	1
LDCA-MW07S-0615	5	0	0.1	0	0.1	0	0.19	1
LDCA-MW09-0615								
LDCA-MW11-0615	5	0	0.17	1	0.38	1	0.2	0
LDCA-MW12-0615	5	0	0.1	0	0.21	1	0.2	0
LDCA-MW20D-0615-AVG	5	0	0.1	0	0.1	0	0.2	0
LDCA-MW20I-0615	5	0	0.1	0	0.062	1	0.2	0
LDCA-MW20S-0615	5	0	0.1	0	0.48	1	0.13	1
LDCA-MW34D-0615-AVG								
LDCA-MW34S-0615								
LDCA-MW36-0615	5	0	0.1	0	0.1	0	0.2	0
LDCA-MW37-0615	7.4	1	0.1	0	0.14	1	0.2	0

PROUCL DATA - INSIDE LANDFILL - EVENT 3

Samples	PHENANTHRENE	d_PHENANTHRENE	1,3-DICHLOROBENZENE	d_1,3-DICHLOROBENZENE	1,4-DICHLOROBENZENE	d_1,4-DICHLOROBENZENE	BENZENE	d_BENZENE
LDCA-MW01D-0615	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW01S-0615	22	1	0.5	0	0.5	0	0.5	0
LDCA-MW02-0615	3.3	1	0.5	0	0.5	0	0.5	0
LDCA-MW03-0615	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW04-0615-AVG	0.695	1	1	1	2.6	1	0.34	1
LDCA-MW05D-0615	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW05S-0615	3.1	1	0.5	0	1.1	1	0.5	0
LDCA-MW06-0615	0.49	1	0.5	0	2	1	0.5	0
LDCA-MW07D-0615	0.1	0	0.5	0	2.9	1	0.27	1
LDCA-MW07S-0615	0.28	1	0.5	0	1.8	1	0.5	0
LDCA-MW09-0615			0.5	0	0.5	0	0.5	0
LDCA-MW11-0615	5.1	1	0.74	1	3.3	1	0.48	1
LDCA-MW12-0615	2.2	1	1	1	2	1	0.31	1
LDCA-MW20D-0615-AVG	0.1	0	0.5	0	0.5	0	0.5	0
LDCA-MW20I-0615	1.9	1	0.5	0	0.5	0	0.5	0
LDCA-MW20S-0615	0.1	0	0.5	0	0.5	0	1.6	1
LDCA-MW34D-0615-AVG			0.5	0	0.5	0	0.5	0
LDCA-MW34S-0615			0.5	0	3.3	1	0.5	0
LDCA-MW36-0615	0.1	0	0.5	0	0.35	1	0.5	0
LDCA-MW37-0615	2.4	1	0.26	1	1.1	1	0.36	1

Samples	CHLOROBENZENE	d_CHLOROBENZENE
LDCA-MW01D-0615	0.5	0
LDCA-MW01S-0615	0.5	0
LDCA-MW02-0615	1.5	1
LDCA-MW03-0615	0.83	1
LDCA-MW04-0615-AVG	47	1
LDCA-MW05D-0615	0.5	0
LDCA-MW05S-0615	13	1
LDCA-MW06-0615	8.4	1
LDCA-MW07D-0615	17	1
LDCA-MW07S-0615	9.6	1
LDCA-MW09-0615	0.5	0
LDCA-MW11-0615	8.9	1
LDCA-MW12-0615	51	1
LDCA-MW20D-0615-AVG	0.825	1
LDCA-MW20I-0615	0.5	0
LDCA-MW20S-0615	4	1
LDCA-MW34D-0615-AVG	0.5	0
LDCA-MW34S-0615	32	1
LDCA-MW36-0615	4.3	1
LDCA-MW37-0615	26	1

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.1 6/21/2016 8:34:00 AM
From File	ProUCL Data Inside-Event 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ARSENIC

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	2
Minimum	0.45	Mean	8.643
Maximum	43.4	Median	2.9
SD	11.99	Std. Error of Mean	2.826
Coefficient of Variation	1.387	Skewness	2.032

Normal GOF Test

Shapiro Wilk Test Statistic	0.704	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	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	13.56	95% Adjusted-CLT UCL (Chen-1995)	14.74
		95% Modified-t UCL (Johnson-1978)	13.79

Gamma GOF Test

A-D Test Statistic	0.627	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.782	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.212	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.709	k star (bias corrected MLE)	0.628
Theta hat (MLE)	12.18	Theta star (bias corrected MLE)	13.76
nu hat (MLE)	25.54	nu star (bias corrected)	22.61
MLE Mean (bias corrected)	8.643	MLE Sd (bias corrected)	10.91
		Approximate Chi Square Value (0.05)	12.8
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	12.09

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	15.27	95% Adjusted Gamma UCL (use when n<50)	16.16

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	-0.799	Mean of logged Data	1.306
Maximum of Logged Data	3.77	SD of logged Data	1.375
Assuming Lognormal Distribution			
95% H-UCL	27.85	90% Chebyshev (MVUE) UCL	18.5
95% Chebyshev (MVUE) UCL	22.94	97.5% Chebyshev (MVUE) UCL	29.11
99% Chebyshev (MVUE) UCL	41.23		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	13.29	95% Jackknife UCL	13.56
95% Standard Bootstrap UCL	13.15	95% Bootstrap-t UCL	18.11
95% Hall's Bootstrap UCL	31.42	95% Percentile Bootstrap UCL	13.62
95% BCA Bootstrap UCL	15.27		
90% Chebyshev(Mean, Sd) UCL	17.12	95% Chebyshev(Mean, Sd) UCL	20.96
97.5% Chebyshev(Mean, Sd) UCL	26.29	99% Chebyshev(Mean, Sd) UCL	36.76
Suggested UCL to Use			
95% Adjusted Gamma UCL	16.16		
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.			

BARIUM

General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	2
Minimum	48.7	Mean	679.5
Maximum	2420	Median	441.5
SD	681.1	Std. Error of Mean	160.5
Coefficient of Variation	1.002	Skewness	1.469

Normal GOF Test		
Shapiro Wilk Test Statistic	0.809	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.249	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	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	958.8	95% Adjusted-CLT UCL (Chen-1995)	1003
		95% Modified-t UCL (Johnson-1978)	968

Gamma GOF Test		
A-D Test Statistic	0.338	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.126	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	1.144	k star (bias corrected MLE)	0.99
Theta hat (MLE)	594.1	Theta star (bias corrected MLE)	686.3
nu hat (MLE)	41.17	nu star (bias corrected)	35.65
MLE Mean (bias corrected)	679.5	MLE Sd (bias corrected)	682.9
		Approximate Chi Square Value (0.05)	22.98
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	22.01

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	1054	95% Adjusted Gamma UCL (use when n<50)	1100

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	3.886	Mean of logged Data	6.024
Maximum of Logged Data	7.792	SD of logged Data	1.094

Assuming Lognormal Distribution			
95% H-UCL	1573	90% Chebyshev (MVUE) UCL	1340
95% Chebyshev (MVUE) UCL	1622	97.5% Chebyshev (MVUE) UCL	2014
99% Chebyshev (MVUE) UCL	2784		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	943.5	95% Jackknife UCL	958.8
95% Standard Bootstrap UCL	928.6	95% Bootstrap-t UCL	1077
95% Hall's Bootstrap UCL	980.3	95% Percentile Bootstrap UCL	942.5
95% BCA Bootstrap UCL	983.1		
90% Chebyshev(Mean, Sd) UCL	1161	95% Chebyshev(Mean, Sd) UCL	1379
97.5% Chebyshev(Mean, Sd) UCL	1682	99% Chebyshev(Mean, Sd) UCL	2277
Suggested UCL to Use			
95% Adjusted Gamma UCL	1100		
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.			

IRON			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	2
Minimum	1050	Mean	29109
Maximum	90950	Median	26300
SD	23835	Std. Error of Mean	5618
Coefficient of Variation	0.819	Skewness	1.448
Normal GOF Test			
Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	38882	95% Adjusted-CLT UCL (Chen-1995)	40398
		95% Modified-t UCL (Johnson-1978)	39201
Gamma GOF Test			
A-D Test Statistic	0.289	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.118	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.208	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.378	k star (bias corrected MLE)	1.186
Theta hat (MLE)	21116	Theta star (bias corrected MLE)	24548
nu hat (MLE)	49.63	nu star (bias corrected)	42.69
MLE Mean (bias corrected)	29109	MLE Sd (bias corrected)	26731
		Approximate Chi Square Value (0.05)	28.71
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	27.61
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	43283	95% Adjusted Gamma UCL (use when n<50)	45006
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.18	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	6.957	Mean of logged Data	9.874
Maximum of Logged Data	11.42	SD of logged Data	1.099
Assuming Lognormal Distribution			
95% H-UCL	74662	90% Chebyshev (MVUE) UCL	63385
95% Chebyshev (MVUE) UCL	76779	97.5% Chebyshev (MVUE) UCL	95369
99% Chebyshev (MVUE) UCL	131886		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	38349	95% Jackknife UCL	38882
95% Standard Bootstrap UCL	38427	95% Bootstrap-t UCL	43736
95% Hall's Bootstrap UCL	54549	95% Percentile Bootstrap UCL	38488
95% BCA Bootstrap UCL	40772		
90% Chebyshev(Mean, Sd) UCL	45963	95% Chebyshev(Mean, Sd) UCL	53597
97.5% Chebyshev(Mean, Sd) UCL	64193	99% Chebyshev(Mean, Sd) UCL	85008
Suggested UCL to Use			
95% Student's-t UCL	38882		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

MANGANESE			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	2
Minimum	19.8	Mean	1459
Maximum	12850	Median	404.5
SD	3098	Std. Error of Mean	730.2
Coefficient of Variation	2.123	Skewness	3.387
Normal GOF Test			
Shapiro Wilk Test Statistic	0.467	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.407	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	2729	95% Adjusted-CLT UCL (Chen-1995)	3283
		95% Modified-t UCL (Johnson-1978)	2826
Gamma GOF Test			
A-D Test Statistic	1.551	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.794	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.289	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.214	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.571	k star (bias corrected MLE)	0.513
Theta hat (MLE)	2556	Theta star (bias corrected MLE)	2846
nu hat (MLE)	20.55	nu star (bias corrected)	18.46
MLE Mean (bias corrected)	1459	MLE Sd (bias corrected)	2038
		Approximate Chi Square Value (0.05)	9.721
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	9.116
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	2770	95% Adjusted Gamma UCL (use when n<50)	2954
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.172	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.986	Mean of logged Data	6.195
Maximum of Logged Data	9.461	SD of logged Data	1.421
Assuming Lognormal Distribution			
95% H-UCL	4198	90% Chebyshev (MVUE) UCL	2650
95% Chebyshev (MVUE) UCL	3298	97.5% Chebyshev (MVUE) UCL	4197
99% Chebyshev (MVUE) UCL	5964		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2660	95% Jackknife UCL	2729
95% Standard Bootstrap UCL	2624	95% Bootstrap-t UCL	9309
95% Hall's Bootstrap UCL	7465	95% Percentile Bootstrap UCL	2739
95% BCA Bootstrap UCL	3396		
90% Chebyshev(Mean, Sd) UCL	3650	95% Chebyshev(Mean, Sd) UCL	4642
97.5% Chebyshev(Mean, Sd) UCL	6019	99% Chebyshev(Mean, Sd) UCL	8724
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	4642		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
UCL Statistics for Data Sets with Non-Detects			

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 8:31:48 AM
From File	ProUCL Data Inside-Event 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TCDD-TEQ

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	16
Minimum	0.309	Mean	0.623
Maximum	0.937	Median	0.623

Warning: This data set only has 2 observations!

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

The data set for variable TEQ (0) was not processed!

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

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

ALUMINUM			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	2
Number of Detects	15	Number of Non-Detects	3
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	2.8	Minimum Non-Detect	20
Maximum Detect	7510	Maximum Non-Detect	20
Variance Detects	3748290	Percent Non-Detects	16.67%
Mean Detects	814.1	SD Detects	1936
Median Detects	52.55	CV Detects	2.378
Skewness Detects	3.382	Kurtosis Detects	12
Mean of Logged Detects	4.555	SD of Logged Detects	2.332
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.474	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	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	679.2	KM Standard Error of Mean	423
KM SD	1734	95% KM (BCA) UCL	1452
95% KM (t) UCL	1415	95% KM (Percentile Bootstrap) UCL	1431
95% KM (z) UCL	1375	95% KM Bootstrap t UCL	4169
90% KM Chebyshev UCL	1948	95% KM Chebyshev UCL	2523
97.5% KM Chebyshev UCL	3321	99% KM Chebyshev UCL	4888
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.73	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.832	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.318	k star (bias corrected MLE)	0.299
Theta hat (MLE)	2560	Theta star (bias corrected MLE)	2724
nu hat (MLE)	9.542	nu star (bias corrected)	8.967
Mean (detects)	814.1		
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	678.4
Maximum	7510	Median	37.5
SD	1784	CV	2.63
k hat (MLE)	0.209	k star (bias corrected MLE)	0.211
Theta hat (MLE)	3242	Theta star (bias corrected MLE)	3209
nu hat (MLE)	7.534	nu star (bias corrected)	7.611
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (7.61, α)	2.512	Adjusted Chi Square Value (7.61, β)	2.24
95% Gamma Approximate UCL (use when n>=50)	2056	95% Gamma Adjusted UCL (use when n<50)	2306

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	679.2	SD (KM)	1734
Variance (KM)	3006301	SE of Mean (KM)	423
k hat (KM)	0.153	k star (KM)	0.165
nu hat (KM)	5.525	nu star (KM)	5.937
theta hat (KM)	4426	theta star (KM)	4118
80% gamma percentile (KM)	795	90% gamma percentile (KM)	2036
95% gamma percentile (KM)	3666	99% gamma percentile (KM)	8308
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.94, α)	1.608	Adjusted Chi Square Value (5.94, β)	1.403
95% Gamma Approximate KM-UCL (use when n>=50)	2508	95% Gamma Adjusted KM-UCL (use when n<50)	2875
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	679.2	Mean in Log Scale	3.995
SD in Original Scale	1784	SD in Log Scale	2.5
95% t UCL (assumes normality of ROS data)	1411	95% Percentile Bootstrap UCL	1452
95% BCA Bootstrap UCL	1962	95% Bootstrap t UCL	4491
95% H-UCL (Log ROS)	29554		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	4.044	KM Geo Mean	57.07
KM SD (logged)	2.358	95% Critical H Value (KM-Log)	4.97
KM Standard Error of Mean (logged)	0.578	95% H-UCL (KM -Log)	15764
KM SD (logged)	2.358	95% Critical H Value (KM-Log)	4.97
KM Standard Error of Mean (logged)	0.578		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	680.1	Mean in Log Scale	4.179
SD in Original Scale	1784	SD in Log Scale	2.286
95% t UCL (Assumes normality)	1412	95% H-Stat UCL	12996
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2875		

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.

ANTIMONY			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	7	Number of Non-Detects	11
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.14	Minimum Non-Detect	2
Maximum Detect	11.3	Maximum Non-Detect	2
Variance Detects	16.8	Percent Non-Detects	61.11%
Mean Detects	2.126	SD Detects	4.099
Median Detects	0.36	CV Detects	1.928
Skewness Detects	2.511	Kurtosis Detects	6.406
Mean of Logged Detects	-0.535	SD of Logged Detects	1.623
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.572	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.369	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1.02	KM Standard Error of Mean	0.65
KM SD	2.532	95% KM (BCA) UCL	2.232
95% KM (t) UCL	2.15	95% KM (Percentile Bootstrap) UCL	2.219
95% KM (z) UCL	2.088	95% KM Bootstrap t UCL	6.363
90% KM Chebyshev UCL	2.969	95% KM Chebyshev UCL	3.851
97.5% KM Chebyshev UCL	5.077	99% KM Chebyshev UCL	7.484
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.733	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.267	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.327	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.494	k star (bias corrected MLE)	0.377
Theta hat (MLE)	4.306	Theta star (bias corrected MLE)	5.634
nu hat (MLE)	6.911	nu star (bias corrected)	5.282
Mean (detects)	2.126		
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	1.184
Maximum	11.3	Median	0.18
SD	2.653	CV	2.241
k hat (MLE)	0.345	k star (bias corrected MLE)	0.325
Theta hat (MLE)	3.431	Theta star (bias corrected MLE)	3.647
nu hat (MLE)	12.43	nu star (bias corrected)	11.69
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (11.69, α)	5.022	Adjusted Chi Square Value (11.69, β)	4.608
95% Gamma Approximate UCL (use when n>=50)	2.756	95% Gamma Adjusted UCL (use when n<50)	3.003

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.02	SD (KM)	2.532
Variance (KM)	6.411	SE of Mean (KM)	0.65
k hat (KM)	0.162	k star (KM)	0.172
nu hat (KM)	5.84	nu star (KM)	6.2
theta hat (KM)	6.286	theta star (KM)	5.921
80% gamma percentile (KM)	1.23	90% gamma percentile (KM)	3.067
95% gamma percentile (KM)	5.451	99% gamma percentile (KM)	12.18
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.20, α)	1.743	Adjusted Chi Square Value (6.20, β)	1.527
95% Gamma Approximate KM-UCL (use when n>=50)	3.628	95% Gamma Adjusted KM-UCL (use when n<50)	4.142
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.087	Mean in Log Scale	-1.017
SD in Original Scale	2.599	SD in Log Scale	1.337
95% t UCL (assumes normality of ROS data)	2.153	95% Percentile Bootstrap UCL	2.253
95% BCA Bootstrap UCL	3.029	95% Bootstrap t UCL	6.752
95% H-UCL (Log ROS)	2.463		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.047	KM Geo Mean	0.351
KM SD (logged)	1.137	95% Critical H Value (KM-Log)	2.843
KM Standard Error of Mean (logged)	0.368	95% H-UCL (KM -Log)	1.468
KM SD (logged)	1.137	95% Critical H Value (KM-Log)	2.843
KM Standard Error of Mean (logged)	0.368		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.438	Mean in Log Scale	-0.208
SD in Original Scale	2.5	SD in Log Scale	1.001
95% t UCL (Assumes normality)	2.463	95% H-Stat UCL	2.544
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.142		
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.			

CADMIUM			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	8
		Number of Missing Observations	2
Number of Detects	8	Number of Non-Detects	10
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.014	Minimum Non-Detect	1
Maximum Detect	4.6	Maximum Non-Detect	1
Variance Detects	2.595	Percent Non-Detects	55.56%
Mean Detects	0.615	SD Detects	1.611
Median Detects	0.0305	CV Detects	2.618
Skewness Detects	2.822	Kurtosis Detects	7.971
Mean of Logged Detects	-2.89	SD of Logged Detects	1.97
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.442	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.482	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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	0.299	KM Standard Error of Mean	0.264
KM SD	1.044	95% KM (BCA) UCL	0.812
95% KM (t) UCL	0.758	95% KM (Percentile Bootstrap) UCL	0.8
95% KM (z) UCL	0.733	95% KM Bootstrap t UCL	19.58
90% KM Chebyshev UCL	1.09	95% KM Chebyshev UCL	1.449
97.5% KM Chebyshev UCL	1.946	99% KM Chebyshev UCL	2.923
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.565	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.802	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.402	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.318	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)	0.289	k star (bias corrected MLE)	0.264
Theta hat (MLE)	2.133	Theta star (bias corrected MLE)	2.334
nu hat (MLE)	4.617	nu star (bias corrected)	4.219
Mean (detects)	0.615		
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	0.412
Maximum	4.6	Median	0.021
SD	1.1	CV	2.672
k hat (MLE)	0.318	k star (bias corrected MLE)	0.302
Theta hat (MLE)	1.296	Theta star (bias corrected MLE)	1.365
nu hat (MLE)	11.44	nu star (bias corrected)	10.86
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (10.86, α)	4.489	Adjusted Chi Square Value (10.86, β)	4.102
95% Gamma Approximate UCL (use when n>=50)	0.997	95% Gamma Adjusted UCL (use when n<50)	1.091

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.299	SD (KM)	1.044
Variance (KM)	1.091	SE of Mean (KM)	0.264
k hat (KM)	0.0821	k star (KM)	0.105
nu hat (KM)	2.954	nu star (KM)	3.795
theta hat (KM)	3.646	theta star (KM)	2.838
80% gamma percentile (KM)	0.224	90% gamma percentile (KM)	0.813
95% gamma percentile (KM)	1.73	99% gamma percentile (KM)	4.628
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.80, α)	0.642	Adjusted Chi Square Value (3.80, β)	0.534
95% Gamma Approximate KM-UCL (use when n>=50)	1.767	95% Gamma Adjusted KM-UCL (use when n<50)	2.127
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.741	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.315	Mean in Log Scale	-3.15
SD in Original Scale	1.072	SD in Log Scale	1.645
95% t UCL (assumes normality of ROS data)	0.755	95% Percentile Bootstrap UCL	0.811
95% BCA Bootstrap UCL	1.084	95% Bootstrap t UCL	6.002
95% H-UCL (Log ROS)	0.72		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.241	KM Geo Mean	0.0391
KM SD (logged)	1.412	95% Critical H Value (KM-Log)	3.285
KM Standard Error of Mean (logged)	0.432	95% H-UCL (KM -Log)	0.327
KM SD (logged)	1.412	95% Critical H Value (KM-Log)	3.285
KM Standard Error of Mean (logged)	0.432		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.551	Mean in Log Scale	-1.67
SD in Original Scale	1.035	SD in Log Scale	1.691
95% t UCL (Assumes normality)	0.976	95% H-Stat UCL	3.682
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
975% KM (Chebyshev) UCL	1.946		
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.			

CHROMIUM			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	15
		Number of Missing Observations	2
Number of Detects	16	Number of Non-Detects	2
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	1.7	Minimum Non-Detect	2
Maximum Detect	85.9	Maximum Non-Detect	2
Variance Detects	418.3	Percent Non-Detects	11.11%
Mean Detects	10.78	SD Detects	20.45
Median Detects	4.35	CV Detects	1.898
Skewness Detects	3.739	Kurtosis Detects	14.45
Mean of Logged Detects	1.729	SD of Logged Detects	0.952
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.431	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.357	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	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	9.769	KM Standard Error of Mean	4.598
KM SD	18.89	95% KM (BCA) UCL	18.98
95% KM (t) UCL	17.77	95% KM (Percentile Bootstrap) UCL	18.44
95% KM (z) UCL	17.33	95% KM Bootstrap t UCL	50.51
90% KM Chebyshev UCL	23.56	95% KM Chebyshev UCL	29.81
97.5% KM Chebyshev UCL	38.48	99% KM Chebyshev UCL	55.52
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.777	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.768	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.243	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.222	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)	0.901	k star (bias corrected MLE)	0.774
Theta hat (MLE)	11.96	Theta star (bias corrected MLE)	13.93
nu hat (MLE)	28.84	nu star (bias corrected)	24.76
Mean (detects)	10.78		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	9.582
Maximum	85.9	Median	3.65
SD	19.52	CV	2.038
k hat (MLE)	0.512	k star (bias corrected MLE)	0.464
Theta hat (MLE)	18.7	Theta star (bias corrected MLE)	20.65
nu hat (MLE)	18.45	nu star (bias corrected)	16.71
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (16.71, α)	8.464	Adjusted Chi Square Value (16.71, β)	7.904
95% Gamma Approximate UCL (use when n>=50)	18.91	95% Gamma Adjusted UCL (use when n<50)	20.25

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	9.769	SD (KM)	18.89
Variance (KM)	356.7	SE of Mean (KM)	4.598
k hat (KM)	0.268	k star (KM)	0.26
nu hat (KM)	9.632	nu star (KM)	9.36
theta hat (KM)	36.51	theta star (KM)	37.57
80% gamma percentile (KM)	14.38	90% gamma percentile (KM)	29.24
95% gamma percentile (KM)	46.73	99% gamma percentile (KM)	93.06
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.36, α)	3.546	Adjusted Chi Square Value (9.36, β)	3.21
95% Gamma Approximate KM-UCL (use when n>=50)	25.79	95% Gamma Adjusted KM-UCL (use when n<50)	28.49
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.853	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	9.694	Mean in Log Scale	1.537
SD in Original Scale	19.47	SD in Log Scale	1.057
95% t UCL (assumes normality of ROS data)	17.68	95% Percentile Bootstrap UCL	18.6
95% BCA Bootstrap UCL	23.39	95% Bootstrap t UCL	46.86
95% H-UCL (Log ROS)	16.34		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.596	KM Geo Mean	4.932
KM SD (logged)	0.948	95% Critical H Value (KM-Log)	2.562
KM Standard Error of Mean (logged)	0.231	95% H-UCL (KM -Log)	13.92
KM SD (logged)	0.948	95% Critical H Value (KM-Log)	2.562
KM Standard Error of Mean (logged)	0.231		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.692	Mean in Log Scale	1.537
SD in Original Scale	19.47	SD in Log Scale	1.055
95% t UCL (Assumes normality)	17.67	95% H-Stat UCL	16.26
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	13.92		
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.			

COBALT			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	2
Number of Detects	16	Number of Non-Detects	2
Number of Distinct Detects	16	Number of Distinct Non-Detects	1
Minimum Detect	0.73	Minimum Non-Detect	1
Maximum Detect	15	Maximum Non-Detect	1
Variance Detects	15.92	Percent Non-Detects	11.11%
Mean Detects	4.953	SD Detects	3.99
Median Detects	3.65	CV Detects	0.806
Skewness Detects	1.039	Kurtosis Detects	1.024
Mean of Logged Detects	1.23	SD of Logged Detects	0.96
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	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	4.494	KM Standard Error of Mean	0.941
KM SD	3.866	95% KM (BCA) UCL	5.944
95% KM (t) UCL	6.132	95% KM (Percentile Bootstrap) UCL	6.043
95% KM (z) UCL	6.043	95% KM Bootstrap t UCL	6.53
90% KM Chebyshev UCL	7.318	95% KM Chebyshev UCL	8.597
97.5% KM Chebyshev UCL	10.37	99% KM Chebyshev UCL	13.86
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.338	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.134	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.219	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.497	k star (bias corrected MLE)	1.258
Theta hat (MLE)	3.309	Theta star (bias corrected MLE)	3.938
nu hat (MLE)	47.89	nu star (bias corrected)	40.24
Mean (detects)	4.953		
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	0.0168	Mean	4.446
Maximum	15	Median	3.3
SD	4.03	CV	0.906
k hat (MLE)	0.912	k star (bias corrected MLE)	0.797
Theta hat (MLE)	4.876	Theta star (bias corrected MLE)	5.579
nu hat (MLE)	32.82	nu star (bias corrected)	28.69
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (28.69, α)	17.46	Adjusted Chi Square Value (28.69, β)	16.62
95% Gamma Approximate UCL (use when n>=50)	7.303	95% Gamma Adjusted UCL (use when n<50)	7.672

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.494	SD (KM)	3.866
Variance (KM)	14.95	SE of Mean (KM)	0.941
k hat (KM)	1.351	k star (KM)	1.163
nu hat (KM)	48.65	nu star (KM)	41.87
theta hat (KM)	3.326	theta star (KM)	3.864
80% gamma percentile (KM)	7.138	90% gamma percentile (KM)	9.97
95% gamma percentile (KM)	12.77	99% gamma percentile (KM)	19.2
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (41.87, α)	28.04	Adjusted Chi Square Value (41.87, β)	26.95
95% Gamma Approximate KM-UCL (use when n>=50)	6.712	95% Gamma Adjusted KM-UCL (use when n<50)	6.982
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.501	Mean in Log Scale	1.077
SD in Original Scale	3.973	SD in Log Scale	1.009
95% t UCL (assumes normality of ROS data)	6.13	95% Percentile Bootstrap UCL	6.063
95% BCA Bootstrap UCL	6.248	95% Bootstrap t UCL	6.519
95% H-UCL (Log ROS)	9.346		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.072	KM Geo Mean	2.921
KM SD (logged)	0.985	95% Critical H Value (KM-Log)	2.616
KM Standard Error of Mean (logged)	0.24	95% H-UCL (KM -Log)	8.86
KM SD (logged)	0.985	95% Critical H Value (KM-Log)	2.616
KM Standard Error of Mean (logged)	0.24		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.458	Mean in Log Scale	1.016
SD in Original Scale	4.015	SD in Log Scale	1.096
95% t UCL (Assumes normality)	6.104	95% H-Stat UCL	10.54
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	6.132		
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.			

COPPER			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	8
		Number of Missing Observations	2
Number of Detects	7	Number of Non-Detects	11
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.39	Minimum Non-Detect	2
Maximum Detect	159	Maximum Non-Detect	2
Variance Detects	3507	Percent Non-Detects	61.11%
Mean Detects	24.76	SD Detects	59.22
Median Detects	2.3	CV Detects	2.392
Skewness Detects	2.641	Kurtosis Detects	6.979
Mean of Logged Detects	1.108	SD of Logged Detects	2.024
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.481	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.485	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	10.18	KM Standard Error of Mean	9.201
KM SD	36.12	95% KM (BCA) UCL	27.89
95% KM (t) UCL	26.18	95% KM (Percentile Bootstrap) UCL	27.58
95% KM (z) UCL	25.31	95% KM Bootstrap t UCL	290.9
90% KM Chebyshev UCL	37.78	95% KM Chebyshev UCL	50.28
97.5% KM Chebyshev UCL	67.64	99% KM Chebyshev UCL	101.7
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.022	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.78	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.391	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.334	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)	0.324	k star (bias corrected MLE)	0.28
Theta hat (MLE)	76.38	Theta star (bias corrected MLE)	88.28
nu hat (MLE)	4.538	nu star (bias corrected)	3.926
Mean (detects)	24.76		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	9.824
Maximum	159	Median	0.01
SD	37.27	CV	3.793
k hat (MLE)	0.173	k star (bias corrected MLE)	0.181
Theta hat (MLE)	56.72	Theta star (bias corrected MLE)	54.16
nu hat (MLE)	6.235	nu star (bias corrected)	6.529
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (6.53, α)	1.916	Adjusted Chi Square Value (6.53, β)	1.686
95% Gamma Approximate UCL (use when n>=50)	33.48	95% Gamma Adjusted UCL (use when n<50)	38.04

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	10.18	SD (KM)	36.12
Variance (KM)	1305	SE of Mean (KM)	9.201
k hat (KM)	0.0794	k star (KM)	0.103
nu hat (KM)	2.858	nu star (KM)	3.715
theta hat (KM)	128.2	theta star (KM)	98.62
80% gamma percentile (KM)	7.386	90% gamma percentile (KM)	27.43
95% gamma percentile (KM)	58.96	99% gamma percentile (KM)	159.1
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.72, α)	0.613	Adjusted Chi Square Value (3.72, β)	0.508
95% Gamma Approximate KM-UCL (use when n>=50)	61.73	95% Gamma Adjusted KM-UCL (use when n<50)	74.48
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	10.18	Mean in Log Scale	0.0303
SD in Original Scale	37.17	SD in Log Scale	1.762
95% t UCL (assumes normality of ROS data)	25.42	95% Percentile Bootstrap UCL	27.54
95% BCA Bootstrap UCL	36.79	95% Bootstrap t UCL	325.3
95% H-UCL (Log ROS)	25.65		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.188	KM Geo Mean	1.207
KM SD (logged)	1.495	95% Critical H Value (KM-Log)	3.425
KM Standard Error of Mean (logged)	0.495	95% H-UCL (KM -Log)	12.77
KM SD (logged)	1.495	95% Critical H Value (KM-Log)	3.425
KM Standard Error of Mean (logged)	0.495		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10.24	Mean in Log Scale	0.431
SD in Original Scale	37.15	SD in Log Scale	1.325
95% t UCL (Assumes normality)	25.47	95% H-Stat UCL	10.15
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	101.7		
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.			

CYANIDE			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	5
Number of Detects	13	Number of Non-Detects	2
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	2.5	Minimum Non-Detect	10
Maximum Detect	200	Maximum Non-Detect	10
Variance Detects	2769	Percent Non-Detects	13.33%
Mean Detects	32.56	SD Detects	52.62
Median Detects	11.6	CV Detects	1.616
Skewness Detects	3.123	Kurtosis Detects	10.27
Mean of Logged Detects	2.831	SD of Logged Detects	1.086
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.538	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	28.76	KM Standard Error of Mean	12.92
KM SD	48.06	95% KM (BCA) UCL	55.31
95% KM (t) UCL	51.51	95% KM (Percentile Bootstrap) UCL	52.49
95% KM (z) UCL	50.01	95% KM Bootstrap t UCL	128.8
90% KM Chebyshev UCL	67.51	95% KM Chebyshev UCL	85.06
97.5% KM Chebyshev UCL	109.4	99% KM Chebyshev UCL	157.3
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.993	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.763	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.25	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.244	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)	0.897	k star (bias corrected MLE)	0.741
Theta hat (MLE)	36.31	Theta star (bias corrected MLE)	43.93
nu hat (MLE)	23.32	nu star (bias corrected)	19.27
Mean (detects)	32.56		
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	28.22
Maximum	200	Median	11.5
SD	50.04	CV	1.773
k hat (MLE)	0.433	k star (bias corrected MLE)	0.391
Theta hat (MLE)	65.18	Theta star (bias corrected MLE)	72.21
nu hat (MLE)	12.99	nu star (bias corrected)	11.73
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (11.73, α)	5.047	Adjusted Chi Square Value (11.73, β)	4.518
95% Gamma Approximate UCL (use when n>=50)	65.57	95% Gamma Adjusted UCL (use when n<50)	73.24

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	28.76	SD (KM)	48.06
Variance (KM)	2309	SE of Mean (KM)	12.92
k hat (KM)	0.358	k star (KM)	0.331
nu hat (KM)	10.75	nu star (KM)	9.93
theta hat (KM)	80.3	theta star (KM)	86.89
80% gamma percentile (KM)	45.07	90% gamma percentile (KM)	83.74
95% gamma percentile (KM)	127.4	99% gamma percentile (KM)	239.6
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.93, α)	3.898	Adjusted Chi Square Value (9.93, β)	3.445
95% Gamma Approximate KM-UCL (use when n>=50)	73.27	95% Gamma Adjusted KM-UCL (use when n<50)	82.9
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	28.66	Mean in Log Scale	2.609
SD in Original Scale	49.79	SD in Log Scale	1.168
95% t UCL (assumes normality of ROS data)	51.31	95% Percentile Bootstrap UCL	51.64
95% BCA Bootstrap UCL	67.73	95% Bootstrap t UCL	130.2
95% H-UCL (Log ROS)	69.03		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.629	KM Geo Mean	13.87
KM SD (logged)	1.109	95% Critical H Value (KM-Log)	2.921
KM Standard Error of Mean (logged)	0.303	95% H-UCL (KM -Log)	60.94
KM SD (logged)	1.109	95% Critical H Value (KM-Log)	2.921
KM Standard Error of Mean (logged)	0.303		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	28.89	Mean in Log Scale	2.668
SD in Original Scale	49.67	SD in Log Scale	1.094
95% t UCL (Assumes normality)	51.48	95% H-Stat UCL	61.11
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	85.06		
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.			

LEAD			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	14
		Number of Missing Observations	2
Number of Detects	13	Number of Non-Detects	5
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.033	Minimum Non-Detect	1
Maximum Detect	1130	Maximum Non-Detect	1
Variance Detects	97585	Percent Non-Detects	27.78%
Mean Detects	90.51	SD Detects	312.4
Median Detects	0.71	CV Detects	3.451
Skewness Detects	3.603	Kurtosis Detects	12.99
Mean of Logged Detects	0.215	SD of Logged Detects	2.964
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.325	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.511	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	65.44	KM Standard Error of Mean	63.35
KM SD	258.2	95% KM (BCA) UCL	191.2
95% KM (t) UCL	175.7	95% KM (Percentile Bootstrap) UCL	190.3
95% KM (z) UCL	169.7	95% KM Bootstrap t UCL	6369
90% KM Chebyshev UCL	255.5	95% KM Chebyshev UCL	341.6
97.5% KM Chebyshev UCL	461.1	99% KM Chebyshev UCL	695.8
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.738	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.896	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.313	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.264	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)	0.175	k star (bias corrected MLE)	0.186
Theta hat (MLE)	517	Theta star (bias corrected MLE)	486.7
nu hat (MLE)	4.552	nu star (bias corrected)	4.835
Mean (detects)	90.51		
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	65.37
Maximum	1130	Median	0.207
SD	265.8	CV	4.065
k hat (MLE)	0.146	k star (bias corrected MLE)	0.158
Theta hat (MLE)	449.2	Theta star (bias corrected MLE)	412.9
nu hat (MLE)	5.24	nu star (bias corrected)	5.7
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (5.70, α)	1.488	Adjusted Chi Square Value (5.70, β)	1.293
95% Gamma Approximate UCL (use when n>=50)	250.4	95% Gamma Adjusted UCL (use when n<50)	288.2

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	65.44	SD (KM)	258.2
Variance (KM)	66692	SE of Mean (KM)	63.35
k hat (KM)	0.0642	k star (KM)	0.0905
nu hat (KM)	2.312	nu star (KM)	3.26
theta hat (KM)	1019	theta star (KM)	722.7
80% gamma percentile (KM)	38.92	90% gamma percentile (KM)	166.4
95% gamma percentile (KM)	381.2	99% gamma percentile (KM)	1092
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.26, α)	0.453	Adjusted Chi Square Value (3.26, β)	0.371
95% Gamma Approximate KM-UCL (use when n>=50)	470.5	95% Gamma Adjusted KM-UCL (use when n<50)	575.3
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	65.46	Mean in Log Scale	-0.375
SD in Original Scale	265.7	SD in Log Scale	2.79
95% t UCL (assumes normality of ROS data)	174.4	95% Percentile Bootstrap UCL	190.1
95% BCA Bootstrap UCL	255.9	95% Bootstrap t UCL	6578
95% H-UCL (Log ROS)	1687		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.388	KM Geo Mean	0.678
KM SD (logged)	2.673	95% Critical H Value (KM-Log)	5.56
KM Standard Error of Mean (logged)	0.682	95% H-UCL (KM -Log)	887
KM SD (logged)	2.673	95% Critical H Value (KM-Log)	5.56
KM Standard Error of Mean (logged)	0.682		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	65.51	Mean in Log Scale	-0.0371
SD in Original Scale	265.7	SD in Log Scale	2.526
95% t UCL (Assumes normality)	174.5	95% H-Stat UCL	594.9
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	695.8		
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.			

VANADIUM			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	14
		Number of Missing Observations	2
Number of Detects	14	Number of Non-Detects	4
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	0.73	Minimum Non-Detect	2.6
Maximum Detect	79	Maximum Non-Detect	2.6
Variance Detects	411.6	Percent Non-Detects	22.22%
Mean Detects	9.091	SD Detects	20.29
Median Detects	2.95	CV Detects	2.232
Skewness Detects	3.638	Kurtosis Detects	13.43
Mean of Logged Detects	1.32	SD of Logged Detects	1.113
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.402	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.405	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	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	7.452	KM Standard Error of Mean	4.285
KM SD	17.52	95% KM (BCA) UCL	15.94
95% KM (t) UCL	14.91	95% KM (Percentile Bootstrap) UCL	15.63
95% KM (z) UCL	14.5	95% KM Bootstrap t UCL	57.99
90% KM Chebyshev UCL	20.31	95% KM Chebyshev UCL	26.13
97.5% KM Chebyshev UCL	34.21	99% KM Chebyshev UCL	50.09
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.782	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.777	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.292	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.239	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)	0.683	k star (bias corrected MLE)	0.585
Theta hat (MLE)	13.3	Theta star (bias corrected MLE)	15.55
nu hat (MLE)	19.13	nu star (bias corrected)	16.37
Mean (detects)	9.091		
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	7.073
Maximum	79	Median	2.5
SD	18.16	CV	2.568
k hat (MLE)	0.345	k star (bias corrected MLE)	0.325
Theta hat (MLE)	20.5	Theta star (bias corrected MLE)	21.79
nu hat (MLE)	12.42	nu star (bias corrected)	11.69
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (11.69, α)	5.021	Adjusted Chi Square Value (11.69, β)	4.607
95% Gamma Approximate UCL (use when n>=50)	16.46	95% Gamma Adjusted UCL (use when n<50)	17.94

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	7.452	SD (KM)	17.52
Variance (KM)	306.8	SE of Mean (KM)	4.285
k hat (KM)	0.181	k star (KM)	0.188
nu hat (KM)	6.517	nu star (KM)	6.765
theta hat (KM)	41.16	theta star (KM)	39.66
80% gamma percentile (KM)	9.488	90% gamma percentile (KM)	22.51
95% gamma percentile (KM)	39.01	99% gamma percentile (KM)	84.91
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.76, α)	2.042	Adjusted Chi Square Value (6.76, β)	1.803
95% Gamma Approximate KM-UCL (use when n>=50)	24.68	95% Gamma Adjusted KM-UCL (use when n<50)	27.96
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	7.38	Mean in Log Scale	1.08
SD in Original Scale	18.05	SD in Log Scale	1.098
95% t UCL (assumes normality of ROS data)	14.78	95% Percentile Bootstrap UCL	15.74
95% BCA Bootstrap UCL	20.73	95% Bootstrap t UCL	58.61
95% H-UCL (Log ROS)	11.3		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.126	KM Geo Mean	3.084
KM SD (logged)	1.036	95% Critical H Value (KM-Log)	2.69
KM Standard Error of Mean (logged)	0.263	95% H-UCL (KM -Log)	10.36
KM SD (logged)	1.036	95% Critical H Value (KM-Log)	2.69
KM Standard Error of Mean (logged)	0.263		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	7.36	Mean in Log Scale	1.085
SD in Original Scale	18.05	SD in Log Scale	1.074
95% t UCL (Assumes normality)	14.76	95% H-Stat UCL	10.77
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	26.13		
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.			

ZINC			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	2
Number of Detects	17	Number of Non-Detects	1
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	2
Maximum Detect	1440	Maximum Non-Detect	2
Variance Detects	120386	Percent Non-Detects	5.556%
Mean Detects	94.45	SD Detects	347
Median Detects	6.9	CV Detects	3.674
Skewness Detects	4.114	Kurtosis Detects	16.95
Mean of Logged Detects	2.136	SD of Logged Detects	1.656
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.286	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.498	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	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	89.28	KM Standard Error of Mean	79.64
KM SD	327.8	95% KM (BCA) UCL	247.9
95% KM (t) UCL	227.8	95% KM (Percentile Bootstrap) UCL	246.7
95% KM (z) UCL	220.3	95% KM Bootstrap t UCL	3314
90% KM Chebyshev UCL	328.2	95% KM Chebyshev UCL	436.4
97.5% KM Chebyshev UCL	586.7	99% KM Chebyshev UCL	881.7
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.358	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.847	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.406	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.227	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)	0.288	k star (bias corrected MLE)	0.276
Theta hat (MLE)	328.2	Theta star (bias corrected MLE)	341.9
nu hat (MLE)	9.785	nu star (bias corrected)	9.392
Mean (detects)	94.45		
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	89.2
Maximum	1440	Median	6.65
SD	337.3	CV	3.782
k hat (MLE)	0.259	k star (bias corrected MLE)	0.253
Theta hat (MLE)	344.7	Theta star (bias corrected MLE)	353
nu hat (MLE)	9.316	nu star (bias corrected)	9.096
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (9.10, α)	3.385	Adjusted Chi Square Value (9.10, β)	3.058
95% Gamma Approximate UCL (use when n>=50)	239.7	95% Gamma Adjusted UCL (use when n<50)	265.3

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	89.28	SD (KM)	327.8
Variance (KM)	107463	SE of Mean (KM)	79.64
k hat (KM)	0.0742	k star (KM)	0.0989
nu hat (KM)	2.67	nu star (KM)	3.559
theta hat (KM)	1204	theta star (KM)	903.2
80% gamma percentile (KM)	60.91	90% gamma percentile (KM)	236.5
95% gamma percentile (KM)	518.6	99% gamma percentile (KM)	1426
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.56, α)	0.556	Adjusted Chi Square Value (3.56, β)	0.458
95% Gamma Approximate KM-UCL (use when n>=50)	571.9	95% Gamma Adjusted KM-UCL (use when n<50)	693.3
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.824	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	89.25	Mean in Log Scale	2.017
SD in Original Scale	337.3	SD in Log Scale	1.684
95% t UCL (assumes normality of ROS data)	227.6	95% Percentile Bootstrap UCL	247.2
95% BCA Bootstrap UCL	328.5	95% Bootstrap t UCL	3311
95% H-UCL (Log ROS)	143.7		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.037	KM Geo Mean	7.667
KM SD (logged)	1.614	95% Critical H Value (KM-Log)	3.63
KM Standard Error of Mean (logged)	0.393	95% H-UCL (KM -Log)	116.9
KM SD (logged)	1.614	95% Critical H Value (KM-Log)	3.63
KM Standard Error of Mean (logged)	0.393		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	89.26	Mean in Log Scale	2.017
SD in Original Scale	337.3	SD in Log Scale	1.684
95% t UCL (Assumes normality)	227.6	95% H-Stat UCL	143.4
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
975% KM (Chebyshev) UCL	586.7		
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.			

4,4'-DDD

General Statistics			
Total Number of Observations	20	Number of Distinct Observations	14
Number of Detects	8	Number of Non-Detects	12
Number of Distinct Detects	8	Number of Distinct Non-Detects	6
Minimum Detect	0.00102	Minimum Non-Detect	9.4000E-4
Maximum Detect	0.0334	Maximum Non-Detect	0.001
Variance Detects	1.2289E-4	Percent Non-Detects	60%
Mean Detects	0.00618	SD Detects	0.0111
Median Detects	0.00204	CV Detects	1.793
Skewness Detects	2.743	Kurtosis Detects	7.614
Mean of Logged Detects	-5.874	SD of Logged Detects	1.131

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.522	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.402	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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	0.00304	KM Standard Error of Mean	0.00168
KM SD	0.00704	95% KM (BCA) UCL	0.00661
95% KM (t) UCL	0.00595	95% KM (Percentile Bootstrap) UCL	0.00615
95% KM (z) UCL	0.00581	95% KM Bootstrap t UCL	0.0298
90% KM Chebyshev UCL	0.00809	95% KM Chebyshev UCL	0.0104
97.5% KM Chebyshev UCL	0.0136	99% KM Chebyshev UCL	0.0198

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.123	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.745	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.332	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.304	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)	0.758	k star (bias corrected MLE)	0.557
Theta hat (MLE)	0.00816	Theta star (bias corrected MLE)	0.0111
nu hat (MLE)	12.13	nu star (bias corrected)	8.914
Mean (detects)	0.00618		

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	0.00102	Mean	0.00847
Maximum	0.0334	Median	0.01
SD	0.007	CV	0.826
k hat (MLE)	1.608	k star (bias corrected MLE)	1.4
Theta hat (MLE)	0.00527	Theta star (bias corrected MLE)	0.00605
nu hat (MLE)	64.33	nu star (bias corrected)	56.02
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (56.02, α)	39.81	Adjusted Chi Square Value (56.02, β)	38.74
95% Gamma Approximate UCL (use when n>=50)	0.0119	95% Gamma Adjusted UCL (use when n<50)	0.0123

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00304	SD (KM)	0.00704
Variance (KM)	4.9610E-5	SE of Mean (KM)	0.00168
k hat (KM)	0.186	k star (KM)	0.191
nu hat (KM)	7.439	nu star (KM)	7.657
theta hat (KM)	0.0163	theta star (KM)	0.0159
80% gamma percentile (KM)	0.00391	90% gamma percentile (KM)	0.00918
95% gamma percentile (KM)	0.0158	99% gamma percentile (KM)	0.0343
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.66, α)	2.538	Adjusted Chi Square Value (7.66, β)	2.311
95% Gamma Approximate KM-UCL (use when n>=50)	0.00916	95% Gamma Adjusted KM-UCL (use when n<50)	0.0101
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00254	Mean in Log Scale	-7.968
SD in Original Scale	0.00739	SD in Log Scale	1.978
95% t UCL (assumes normality of ROS data)	0.0054	95% Percentile Bootstrap UCL	0.00566
95% BCA Bootstrap UCL	0.00741	95% Bootstrap t UCL	0.0189
95% H-UCL (Log ROS)	0.017		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.532	KM Geo Mean	0.00146
KM SD (logged)	0.858	95% Critical H Value (KM-Log)	2.435
KM Standard Error of Mean (logged)	0.205	95% H-UCL (KM -Log)	0.0034
KM SD (logged)	0.858	95% Critical H Value (KM-Log)	2.435
KM Standard Error of Mean (logged)	0.205		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00276	Mean in Log Scale	-6.929
SD in Original Scale	0.00731	SD in Log Scale	1.119
95% t UCL (Assumes normality)	0.00559	95% H-Stat UCL	0.00377
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0104		
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.			

4,4'-DDE

General Statistics

Total Number of Observations	20	Number of Distinct Observations	9
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	6
Minimum Detect	0.0022	Minimum Non-Detect	9.4000E-4
Maximum Detect	0.0554	Maximum Non-Detect	0.001
Variance Detects	9.3812E-4	Percent Non-Detects	85%
Mean Detects	0.02	SD Detects	0.0306
Median Detects	0.0025	CV Detects	1.529
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-5.001	SD of Logged Detects	1.827

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.754	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.383	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.0038	KM Standard Error of Mean	0.00324
KM SD	0.0118	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00941	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00914	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0135	95% KM Chebyshev UCL	0.0179
97.5% KM Chebyshev UCL	0.0241	99% KM Chebyshev UCL	0.0361

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.571	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0351	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.424	nu star (bias corrected)	N/A
Mean (detects)	0.02		

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	0.0022	Mean	0.0115
Maximum	0.0554	Median	0.01
SD	0.0106	CV	0.921
k hat (MLE)	2.66	k star (bias corrected MLE)	2.294
Theta hat (MLE)	0.00433	Theta star (bias corrected MLE)	0.00502
nu hat (MLE)	106.4	nu star (bias corrected)	91.76
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (91.76, α)	70.67	Adjusted Chi Square Value (91.76, β)	69.21
95% Gamma Approximate UCL (use when n>=50)	0.0149	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0038	SD (KM)	0.0118
Variance (KM)	1.4029E-4	SE of Mean (KM)	0.00324
k hat (KM)	0.103	k star (KM)	0.121
nu hat (KM)	4.126	nu star (KM)	4.84
theta hat (KM)	0.0369	theta star (KM)	0.0314
80% gamma percentile (KM)	0.00337	90% gamma percentile (KM)	0.0108
95% gamma percentile (KM)	0.0217	99% gamma percentile (KM)	0.0548
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.84, α)	1.079	Adjusted Chi Square Value (4.84, β)	0.948
95% Gamma Approximate KM-UCL (use when n>=50)	0.0171	95% Gamma Adjusted KM-UCL (use when n<50)	0.0194
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.373	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00301	Mean in Log Scale	-13.56
SD in Original Scale	0.0124	SD in Log Scale	4.578
95% t UCL (assumes normality of ROS data)	0.00778	95% Percentile Bootstrap UCL	0.00844
95% BCA Bootstrap UCL	0.0113	95% Bootstrap t UCL	0.0758
95% H-UCL (Log ROS)	742.6		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.674	KM Geo Mean	0.00126
KM SD (logged)	0.91	95% Critical H Value (KM-Log)	2.505
KM Standard Error of Mean (logged)	0.249	95% H-UCL (KM -Log)	0.00322
KM SD (logged)	0.91	95% Critical H Value (KM-Log)	2.505
KM Standard Error of Mean (logged)	0.249		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00342	Mean in Log Scale	-7.24
SD in Original Scale	0.0122	SD in Log Scale	1.132
95% t UCL (Assumes normality)	0.00815	95% H-Stat UCL	0.00284
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00941		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

1,4-DIOXANE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	18
Number of Detects	19	Number of Non-Detects	1
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	1.3	Minimum Non-Detect	0.5
Maximum Detect	150	Maximum Non-Detect	0.5
Variance Detects	2696	Percent Non-Detects	5%
Mean Detects	43.95	SD Detects	51.93
Median Detects	23	CV Detects	1.182
Skewness Detects	1.353	Kurtosis Detects	0.32
Mean of Logged Detects	3.046	SD of Logged Detects	1.353
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.734	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	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	41.78	KM Standard Error of Mean	11.52
KM SD	50.16	95% KM (BCA) UCL	59.77
95% KM (t) UCL	61.71	95% KM (Percentile Bootstrap) UCL	60.21
95% KM (z) UCL	60.73	95% KM Bootstrap t UCL	70.01
90% KM Chebyshev UCL	76.35	95% KM Chebyshev UCL	92.01
97.5% KM Chebyshev UCL	113.7	99% KM Chebyshev UCL	156.4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.622	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.777	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.212	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.206	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.805	k star (bias corrected MLE)	0.713
Theta hat (MLE)	54.62	Theta star (bias corrected MLE)	61.67
nu hat (MLE)	30.58	nu star (bias corrected)	27.08
Mean (detects)	43.95		
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	41.75
Maximum	150	Median	22.5
SD	51.49	CV	1.233
k hat (MLE)	0.581	k star (bias corrected MLE)	0.527
Theta hat (MLE)	71.85	Theta star (bias corrected MLE)	79.18
nu hat (MLE)	23.25	nu star (bias corrected)	21.09
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (21.09, α)	11.66	Adjusted Chi Square Value (21.09, β)	11.11
95% Gamma Approximate UCL (use when n>=50)	75.53	95% Gamma Adjusted UCL (use when n<50)	79.29

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	41.78	SD (KM)	50.16
Variance (KM)	2517	SE of Mean (KM)	11.52
k hat (KM)	0.694	k star (KM)	0.623
nu hat (KM)	27.74	nu star (KM)	24.91
theta hat (KM)	60.24	theta star (KM)	67.07
80% gamma percentile (KM)	68.85	90% gamma percentile (KM)	107.7
95% gamma percentile (KM)	148.3	99% gamma percentile (KM)	246.1
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (24.91, α)	14.55	Adjusted Chi Square Value (24.91, β)	13.92
95% Gamma Approximate KM-UCL (use when n>=50)	71.56	95% Gamma Adjusted KM-UCL (use when n<50)	74.77
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	41.79	Mean in Log Scale	2.88
SD in Original Scale	51.46	SD in Log Scale	1.511
95% t UCL (assumes normality of ROS data)	61.69	95% Percentile Bootstrap UCL	60.58
95% BCA Bootstrap UCL	64.76	95% Bootstrap t UCL	69.03
95% H-UCL (Log ROS)	184.2		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.859	KM Geo Mean	17.45
KM SD (logged)	1.52	95% Critical H Value (KM-Log)	3.461
KM Standard Error of Mean (logged)	0.349	95% H-UCL (KM -Log)	185.3
KM SD (logged)	1.52	95% Critical H Value (KM-Log)	3.461
KM Standard Error of Mean (logged)	0.349		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	41.77	Mean in Log Scale	2.824
SD in Original Scale	51.48	SD in Log Scale	1.648
95% t UCL (Assumes normality)	61.67	95% H-Stat UCL	263.5
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	74.77		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BENZO(A)ANTHRACENE			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	6
		Number of Missing Observations	3
Number of Detects	5	Number of Non-Detects	12
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.084	Minimum Non-Detect	0.1
Maximum Detect	2.3	Maximum Non-Detect	0.1
Variance Detects	0.901	Percent Non-Detects	70.59%
Mean Detects	0.774	SD Detects	0.949
Median Detects	0.29	CV Detects	1.227
Skewness Detects	1.38	Kurtosis Detects	1.121
Mean of Logged Detects	-1.026	SD of Logged Detects	1.466
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.291	KM Standard Error of Mean	0.151
KM SD	0.556	95% KM (BCA) UCL	0.494
95% KM (t) UCL	0.555	95% KM (Percentile Bootstrap) UCL	0.535
95% KM (z) UCL	0.539	95% KM Bootstrap t UCL	1.799
90% KM Chebyshev UCL	0.744	95% KM Chebyshev UCL	0.949
97.5% KM Chebyshev UCL	1.233	99% KM Chebyshev UCL	1.792
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.368	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.233	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.366	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.774	k star (bias corrected MLE)	0.443
Theta hat (MLE)	1	Theta star (bias corrected MLE)	1.747
nu hat (MLE)	7.743	nu star (bias corrected)	4.431
Mean (detects)	0.774		
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	0.305
Maximum	2.3	Median	0.084
SD	0.586	CV	1.922
k hat (MLE)	0.421	k star (bias corrected MLE)	0.386
Theta hat (MLE)	0.724	Theta star (bias corrected MLE)	0.79
nu hat (MLE)	14.31	nu star (bias corrected)	13.12
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (13.12, α)	5.974	Adjusted Chi Square Value (13.12, β)	5.476

95% Gamma Approximate UCL (use when n>=50)	0.669	95% Gamma Adjusted UCL (use when n<50)	0.73
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.291	SD (KM)	0.556
Variance (KM)	0.309	SE of Mean (KM)	0.151
k hat (KM)	0.274	k star (KM)	0.265
nu hat (KM)	9.322	nu star (KM)	9.011
theta hat (KM)	1.062	theta star (KM)	1.099
80% gamma percentile (KM)	0.431	90% gamma percentile (KM)	0.87
95% gamma percentile (KM)	1.385	99% gamma percentile (KM)	2.744
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.01, α)	3.333	Adjusted Chi Square Value (9.01, β)	2.981
95% Gamma Approximate KM-UCL (use when n>=50)	0.787	95% Gamma Adjusted KM-UCL (use when n<50)	0.88
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.314	Mean in Log Scale	-2.052
SD in Original Scale	0.571	SD in Log Scale	1.287
95% t UCL (assumes normality of ROS data)	0.556	95% Percentile Bootstrap UCL	0.567
95% BCA Bootstrap UCL	0.668	95% Bootstrap t UCL	1.429
95% H-UCL (Log ROS)	0.803		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.003	KM Geo Mean	0.135
KM SD (logged)	0.952	95% Critical H Value (KM-Log)	2.602
KM Standard Error of Mean (logged)	0.261	95% H-UCL (KM -Log)	0.394
KM SD (logged)	0.952	95% Critical H Value (KM-Log)	2.602
KM Standard Error of Mean (logged)	0.261		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.263	Mean in Log Scale	-2.416
SD in Original Scale	0.584	SD in Log Scale	1.18
95% t UCL (Assumes normality)	0.51	95% H-Stat UCL	0.428
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.555		
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.			

BENZO(A)PYRENE

General Statistics

Total Number of Observations	17	Number of Distinct Observations	2
		Number of Missing Observations	3
Number of Detects	1	Number of Non-Detects	16
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZO(A)PYRENE was not processed!

BENZO(B)FLUORANTHENE

General Statistics

Total Number of Observations	17	Number of Distinct Observations	4
		Number of Missing Observations	3
Number of Detects	3	Number of Non-Detects	14
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.12	Minimum Non-Detect	0.1
Maximum Detect	1.4	Maximum Non-Detect	0.1
Variance Detects	0.429	Percent Non-Detects	82.35%
Mean Detects	0.68	SD Detects	0.655
Median Detects	0.52	CV Detects	0.963
Skewness Detects	1.034	Kurtosis Detects	N/A
Mean of Logged Detects	-0.813	SD of Logged Detects	1.236

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.202	KM Standard Error of Mean	0.0936
KM SD	0.315	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.366	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.356	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.483	95% KM Chebyshev UCL	0.61
97.5% KM Chebyshev UCL	0.787	99% KM Chebyshev UCL	1.134

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.313	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.518	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	7.877	nu star (bias corrected)	N/A
Mean (detects)	0.68		

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	0.128
Maximum	1.4	Median	0.01
SD	0.351	CV	2.734
k hat (MLE)	0.356	k star (bias corrected MLE)	0.333
Theta hat (MLE)	0.36	Theta star (bias corrected MLE)	0.386
nu hat (MLE)	12.11	nu star (bias corrected)	11.31
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (11.31, α)	4.775	Adjusted Chi Square Value (11.31, β)	4.338
95% Gamma Approximate UCL (use when n>=50)	0.304	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.202	SD (KM)	0.315
Variance (KM)	0.0993	SE of Mean (KM)	0.0936
k hat (KM)	0.412	k star (KM)	0.379
nu hat (KM)	14.01	nu star (KM)	12.88
theta hat (KM)	0.491	theta star (KM)	0.534
80% gamma percentile (KM)	0.324	90% gamma percentile (KM)	0.577
95% gamma percentile (KM)	0.857	99% gamma percentile (KM)	1.564

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (12.88, α)	5.809	Adjusted Chi Square Value (12.88, β)	5.318
95% Gamma Approximate KM-UCL (use when n>=50)	0.449	95% Gamma Adjusted KM-UCL (use when n<50)	0.49

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.124	Mean in Log Scale	-6.416
SD in Original Scale	0.352	SD in Log Scale	3.713
95% t UCL (assumes normality of ROS data)	0.273	95% Percentile Bootstrap UCL	0.286
95% BCA Bootstrap UCL	0.343	95% Bootstrap t UCL	1.486
95% H-UCL (Log ROS)	2026		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.04	KM Geo Mean	0.13
KM SD (logged)	0.709	95% Critical H Value (KM-Log)	2.267
KM Standard Error of Mean (logged)	0.211	95% H-UCL (KM -Log)	0.25
KM SD (logged)	0.709	95% Critical H Value (KM-Log)	2.267
KM Standard Error of Mean (logged)	0.211		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.161	Mean in Log Scale	-2.61
SD in Original Scale	0.339	SD in Log Scale	0.963
95% t UCL (Assumes normality)	0.305	95% H-Stat UCL	0.219
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.366		
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.			

BIS(2-ETHYLHEXYL)PHTHALATE			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	7
		Number of Missing Observations	3
Number of Detects	7	Number of Non-Detects	10
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.63	Minimum Non-Detect	5
Maximum Detect	26	Maximum Non-Detect	5
Variance Detects	88.19	Percent Non-Detects	58.82%
Mean Detects	4.719	SD Detects	9.391
Median Detects	1.45	CV Detects	1.99
Skewness Detects	2.638	Kurtosis Detects	6.968
Mean of Logged Detects	0.553	SD of Logged Detects	1.243
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.489	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.491	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	2.632	KM Standard Error of Mean	1.538
KM SD	5.852	95% KM (BCA) UCL	5.607
95% KM (t) UCL	5.317	95% KM (Percentile Bootstrap) UCL	5.48
95% KM (z) UCL	5.161	95% KM Bootstrap t UCL	24.89
90% KM Chebyshev UCL	7.245	95% KM Chebyshev UCL	9.334
97.5% KM Chebyshev UCL	12.23	99% KM Chebyshev UCL	17.93
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.46	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.744	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.477	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.325	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)	0.617	k star (bias corrected MLE)	0.448
Theta hat (MLE)	7.653	Theta star (bias corrected MLE)	10.54
nu hat (MLE)	8.631	nu star (bias corrected)	6.266
Mean (detects)	4.719		
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	3.366
Maximum	26	Median	1.2
SD	6.411	CV	1.905
k hat (MLE)	0.369	k star (bias corrected MLE)	0.343
Theta hat (MLE)	9.12	Theta star (bias corrected MLE)	9.809
nu hat (MLE)	12.55	nu star (bias corrected)	11.67
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (11.67, α)	5.009	Adjusted Chi Square Value (11.67, β)	4.559
95% Gamma Approximate UCL (use when n>=50)	7.841	95% Gamma Adjusted UCL (use when n<50)	8.615

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.632	SD (KM)	5.852
Variance (KM)	34.25	SE of Mean (KM)	1.538
k hat (KM)	0.202	k star (KM)	0.206
nu hat (KM)	6.878	nu star (KM)	6.998
theta hat (KM)	13.01	theta star (KM)	12.79
80% gamma percentile (KM)	3.52	90% gamma percentile (KM)	7.961
95% gamma percentile (KM)	13.46	99% gamma percentile (KM)	28.53
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.00, α)	2.169	Adjusted Chi Square Value (7.00, β)	1.899
95% Gamma Approximate KM-UCL (use when n>=50)	8.491	95% Gamma Adjusted KM-UCL (use when n<50)	9.701
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.707	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.404	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.946	Mean in Log Scale	0.363
SD in Original Scale	6.038	SD in Log Scale	1.008
95% t UCL (assumes normality of ROS data)	5.502	95% Percentile Bootstrap UCL	5.761
95% BCA Bootstrap UCL	7.306	95% Bootstrap t UCL	17.28
95% H-UCL (Log ROS)	4.7		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.288	KM Geo Mean	1.334
KM SD (logged)	0.816	95% Critical H Value (KM-Log)	2.378
KM Standard Error of Mean (logged)	0.243	95% H-UCL (KM -Log)	3.024
KM SD (logged)	0.816	95% Critical H Value (KM-Log)	2.378
KM Standard Error of Mean (logged)	0.243		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.414	Mean in Log Scale	0.767
SD in Original Scale	5.86	SD in Log Scale	0.783
95% t UCL (Assumes normality)	5.895	95% H-Stat UCL	4.626
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	9.334		
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.			

DIBENZO(A,H)ANTHRACENE

General Statistics

Total Number of Observations	17	Number of Distinct Observations	2
		Number of Missing Observations	3
Number of Detects	1	Number of Non-Detects	16
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable DIBENZO(A,H)ANTHRACENE was not processed!

DIBENZOFURAN

General Statistics

Total Number of Observations	17	Number of Distinct Observations	3
		Number of Missing Observations	3
Number of Detects	2	Number of Non-Detects	15
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	4.2	Minimum Non-Detect	5
Maximum Detect	7.4	Maximum Non-Detect	5
Variance Detects	5.12	Percent Non-Detects	88.24%
Mean Detects	5.8	SD Detects	2.263
Median Detects	5.8	CV Detects	0.39
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	1.718	SD of Logged Detects	0.401

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	4.388	KM Standard Error of Mean	0.258
KM SD	0.753	95% KM (BCA) UCL	N/A
95% KM (t) UCL	4.839	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	4.813	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	5.163	95% KM Chebyshev UCL	5.514
97.5% KM Chebyshev UCL	6.001	99% KM Chebyshev UCL	6.958

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	12.8	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.453	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	51.19	nu star (bias corrected)	N/A
Mean (detects)	5.8		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.388	SD (KM)	0.753
Variance (KM)	0.567	SE of Mean (KM)	0.258
k hat (KM)	33.97	k star (KM)	28.01
nu hat (KM)	1155	nu star (KM)	952.4
theta hat (KM)	0.129	theta star (KM)	0.157
80% gamma percentile (KM)	5.067	90% gamma percentile (KM)	5.479
95% gamma percentile (KM)	5.835	99% gamma percentile (KM)	6.544

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (952.41, α)	881.8	Adjusted Chi Square Value (952.41, β)	874.7
95% Gamma Approximate KM-UCL (use when n>=50)	4.74	95% Gamma Adjusted KM-UCL (use when n<50)	4.778

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.446	Mean in Log Scale	1.461
SD in Original Scale	1.179	SD in Log Scale	0.256
95% t UCL (assumes normality of ROS data)	4.945	95% Percentile Bootstrap UCL	4.929
95% BCA Bootstrap UCL	4.961	95% Bootstrap t UCL	5.018
95% H-UCL (Log ROS)	5.005		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.468	KM Geo Mean	4.342
KM SD (logged)	0.133	95% Critical H Value (KM-Log)	1.755
KM Standard Error of Mean (logged)	0.0457	95% H-UCL (KM -Log)	4.645
KM SD (logged)	0.133	95% Critical H Value (KM-Log)	1.755
KM Standard Error of Mean (logged)	0.0457		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.888	Mean in Log Scale	1.011
SD in Original Scale	1.233	SD in Log Scale	0.285
95% t UCL (Assumes normality)	3.41	95% H-Stat UCL	3.263
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	4.839	KM H-UCL	4.645
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
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.			

INDENO(1,2,3-CD)PYRENE

General Statistics

Total Number of Observations	17	Number of Distinct Observations	2
		Number of Missing Observations	3
Number of Detects	1	Number of Non-Detects	16
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable INDENO(1,2,3-CD)PYRENE was not processed!

NAPHTHALENE			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	10
		Number of Missing Observations	3
Number of Detects	10	Number of Non-Detects	7
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.062	Minimum Non-Detect	0.1
Maximum Detect	3	Maximum Non-Detect	0.1
Variance Detects	0.792	Percent Non-Detects	41.18%
Mean Detects	0.493	SD Detects	0.89
Median Detects	0.19	CV Detects	1.805
Skewness Detects	3.042	Kurtosis Detects	9.423
Mean of Logged Detects	-1.436	SD of Logged Detects	1.078
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.495	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.406	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	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	0.323	KM Standard Error of Mean	0.174
KM SD	0.679	95% KM (BCA) UCL	0.648
95% KM (t) UCL	0.626	95% KM (Percentile Bootstrap) UCL	0.655
95% KM (z) UCL	0.608	95% KM Bootstrap t UCL	1.927
90% KM Chebyshev UCL	0.844	95% KM Chebyshev UCL	1.08
97.5% KM Chebyshev UCL	1.408	99% KM Chebyshev UCL	2.051
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.12	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.755	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.263	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.275	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.812	k star (bias corrected MLE)	0.635
Theta hat (MLE)	0.607	Theta star (bias corrected MLE)	0.777
nu hat (MLE)	16.25	nu star (bias corrected)	12.71
Mean (detects)	0.493		
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	0.294
Maximum	3	Median	0.096
SD	0.711	CV	2.417
k hat (MLE)	0.429	k star (bias corrected MLE)	0.392
Theta hat (MLE)	0.686	Theta star (bias corrected MLE)	0.75
nu hat (MLE)	14.58	nu star (bias corrected)	13.34
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (13.34, α)	6.121	Adjusted Chi Square Value (13.34, β)	5.616

95% Gamma Approximate UCL (use when n>=50)	0.641	95% Gamma Adjusted UCL (use when n<50)	0.699
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.323	SD (KM)	0.679
Variance (KM)	0.461	SE of Mean (KM)	0.174
k hat (KM)	0.226	k star (KM)	0.225
nu hat (KM)	7.677	nu star (KM)	7.656
theta hat (KM)	1.429	theta star (KM)	1.433
80% gamma percentile (KM)	0.45	90% gamma percentile (KM)	0.974
95% gamma percentile (KM)	1.61	99% gamma percentile (KM)	3.329
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.66, α)	2.537	Adjusted Chi Square Value (7.66, β)	2.239
95% Gamma Approximate KM-UCL (use when n>=50)	0.974	95% Gamma Adjusted KM-UCL (use when n<50)	1.103
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.174	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.315	Mean in Log Scale	-2.072
SD in Original Scale	0.703	SD in Log Scale	1.192
95% t UCL (assumes normality of ROS data)	0.612	95% Percentile Bootstrap UCL	0.645
95% BCA Bootstrap UCL	0.837	95% Bootstrap t UCL	1.904
95% H-UCL (Log ROS)	0.62		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.9	KM Geo Mean	0.15
KM SD (logged)	0.971	95% Critical H Value (KM-Log)	2.628
KM Standard Error of Mean (logged)	0.26	95% H-UCL (KM -Log)	0.454
KM SD (logged)	0.971	95% Critical H Value (KM-Log)	2.628
KM Standard Error of Mean (logged)	0.26		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.311	Mean in Log Scale	-2.078
SD in Original Scale	0.704	SD in Log Scale	1.131
95% t UCL (Assumes normality)	0.609	95% H-Stat UCL	0.535
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.103		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

PENTACHLOROPHENOL			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	5
		Number of Missing Observations	3
Number of Detects	6	Number of Non-Detects	11
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	0.2
Maximum Detect	0.61	Maximum Non-Detect	0.2
Variance Detects	0.0386	Percent Non-Detects	64.71%
Mean Detects	0.213	SD Detects	0.197
Median Detects	0.13	CV Detects	0.921
Skewness Detects	2.333	Kurtosis Detects	5.518
Mean of Logged Detects	-1.775	SD of Logged Detects	0.658
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.613	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.381	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	0.162	KM Standard Error of Mean	0.0327
KM SD	0.116	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.219	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.216	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.26	95% KM Chebyshev UCL	0.305
97.5% KM Chebyshev UCL	0.366	99% KM Chebyshev UCL	0.487
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.998	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.703	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.347	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.335	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)	2.326	k star (bias corrected MLE)	1.274
Theta hat (MLE)	0.0917	Theta star (bias corrected MLE)	0.167
nu hat (MLE)	27.91	nu star (bias corrected)	15.29
Mean (detects)	0.213		
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	0.173
Maximum	0.61	Median	0.13
SD	0.141	CV	0.818
k hat (MLE)	1.708	k star (bias corrected MLE)	1.445
Theta hat (MLE)	0.101	Theta star (bias corrected MLE)	0.12
nu hat (MLE)	58.06	nu star (bias corrected)	49.14
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (49.14, α)	34.05	Adjusted Chi Square Value (49.14, β)	32.74
95% Gamma Approximate UCL (use when n>=50)	0.249	95% Gamma Adjusted UCL (use when n<50)	0.259

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.162	SD (KM)	0.116
Variance (KM)	0.0134	SE of Mean (KM)	0.0327
k hat (KM)	1.965	k star (KM)	1.657
nu hat (KM)	66.8	nu star (KM)	56.35
theta hat (KM)	0.0825	theta star (KM)	0.0978
80% gamma percentile (KM)	0.248	90% gamma percentile (KM)	0.33
95% gamma percentile (KM)	0.408	99% gamma percentile (KM)	0.585
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (56.35, α)	40.09	Adjusted Chi Square Value (56.35, β)	38.66
95% Gamma Approximate KM-UCL (use when n>=50)	0.228	95% Gamma Adjusted KM-UCL (use when n<50)	0.236
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.727	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.323	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.174	Mean in Log Scale	-1.905
SD in Original Scale	0.126	SD in Log Scale	0.526
95% t UCL (assumes normality of ROS data)	0.227	95% Percentile Bootstrap UCL	0.225
95% BCA Bootstrap UCL	0.258	95% Bootstrap t UCL	0.286
95% H-UCL (Log ROS)	0.224		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.941	KM Geo Mean	0.144
KM SD (logged)	0.41	95% Critical H Value (KM-Log)	1.951
KM Standard Error of Mean (logged)	0.133	95% H-UCL (KM -Log)	0.191
KM SD (logged)	0.41	95% Critical H Value (KM-Log)	1.951
KM Standard Error of Mean (logged)	0.133		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.14	Mean in Log Scale	-2.116
SD in Original Scale	0.123	SD in Log Scale	0.451
95% t UCL (Assumes normality)	0.192	95% H-Stat UCL	0.167
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.191		
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.			

PHENANTHRENE			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	11
		Number of Missing Observations	3
Number of Detects	10	Number of Non-Detects	7
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.28	Minimum Non-Detect	0.1
Maximum Detect	22	Maximum Non-Detect	0.1
Variance Detects	41.51	Percent Non-Detects	41.18%
Mean Detects	4.147	SD Detects	6.443
Median Detects	2.3	CV Detects	1.554
Skewness Detects	2.866	Kurtosis Detects	8.606
Mean of Logged Detects	0.7	SD of Logged Detects	1.251
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.578	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.352	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	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	2.48	KM Standard Error of Mean	1.302
KM SD	5.093	95% KM (BCA) UCL	5.156
95% KM (t) UCL	4.754	95% KM (Percentile Bootstrap) UCL	4.781
95% KM (z) UCL	4.622	95% KM Bootstrap t UCL	9.661
90% KM Chebyshev UCL	6.387	95% KM Chebyshev UCL	8.156
97.5% KM Chebyshev UCL	10.61	99% KM Chebyshev UCL	15.44
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.542	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.229	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.275	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.819	k star (bias corrected MLE)	0.64
Theta hat (MLE)	5.061	Theta star (bias corrected MLE)	6.477
nu hat (MLE)	16.39	nu star (bias corrected)	12.8
Mean (detects)	4.147		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.443
Maximum	22	Median	0.49
SD	5.268	CV	2.156
k hat (MLE)	0.291	k star (bias corrected MLE)	0.279
Theta hat (MLE)	8.385	Theta star (bias corrected MLE)	8.751
nu hat (MLE)	9.907	nu star (bias corrected)	9.492
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (9.49, α)	3.627	Adjusted Chi Square Value (9.49, β)	3.256

95% Gamma Approximate UCL (use when n>=50)	6.394	95% Gamma Adjusted UCL (use when n<50)	7.123
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.48	SD (KM)	5.093
Variance (KM)	25.94	SE of Mean (KM)	1.302
k hat (KM)	0.237	k star (KM)	0.235
nu hat (KM)	8.063	nu star (KM)	7.973
theta hat (KM)	10.46	theta star (KM)	10.58
80% gamma percentile (KM)	3.516	90% gamma percentile (KM)	7.474
95% gamma percentile (KM)	12.23	99% gamma percentile (KM)	25.02
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.97, α)	2.72	Adjusted Chi Square Value (7.97, β)	2.408
95% Gamma Approximate KM-UCL (use when n>=50)	7.272	95% Gamma Adjusted KM-UCL (use when n<50)	8.212
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.481	Mean in Log Scale	-0.668
SD in Original Scale	5.25	SD in Log Scale	2.021
95% t UCL (assumes normality of ROS data)	4.704	95% Percentile Bootstrap UCL	4.847
95% BCA Bootstrap UCL	6.099	95% Bootstrap t UCL	9.379
95% H-UCL (Log ROS)	37.02		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.536	KM Geo Mean	0.585
KM SD (logged)	1.735	95% Critical H Value (KM-Log)	3.903
KM Standard Error of Mean (logged)	0.444	95% H-UCL (KM -Log)	14.34
KM SD (logged)	1.735	95% Critical H Value (KM-Log)	3.903
KM Standard Error of Mean (logged)	0.444		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.46	Mean in Log Scale	-0.822
SD in Original Scale	5.26	SD in Log Scale	2.096
95% t UCL (Assumes normality)	4.687	95% H-Stat UCL	43.33
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	8.212		
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.			

1,3-DICHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	4
Number of Detects	4	Number of Non-Detects	16
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.26	Minimum Non-Detect	0.5
Maximum Detect	1	Maximum Non-Detect	0.5
Variance Detects	0.122	Percent Non-Detects	80%
Mean Detects	0.75	SD Detects	0.349
Median Detects	0.87	CV Detects	0.465
Skewness Detects	-1.356	Kurtosis Detects	1.224
Mean of Logged Detects	-0.412	SD of Logged Detects	0.639
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.835	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.358	KM Standard Error of Mean	0.0615
KM SD	0.238	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.464	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.459	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.542	95% KM Chebyshev UCL	0.626
97.5% KM Chebyshev UCL	0.742	99% KM Chebyshev UCL	0.97
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.56	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.304	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.396	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)	4.18	k star (bias corrected MLE)	1.212
Theta hat (MLE)	0.179	Theta star (bias corrected MLE)	0.619
nu hat (MLE)	33.44	nu star (bias corrected)	9.693
Mean (detects)	0.75		
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	0.374
Maximum	1	Median	0.306
SD	0.294	CV	0.785
k hat (MLE)	1.158	k star (bias corrected MLE)	1.017
Theta hat (MLE)	0.323	Theta star (bias corrected MLE)	0.368
nu hat (MLE)	46.31	nu star (bias corrected)	40.69
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (40.69, α)	27.07	Adjusted Chi Square Value (40.69, β)	26.2
95% Gamma Approximate UCL (use when n>=50)	0.562	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.358	SD (KM)	0.238
Variance (KM)	0.0567	SE of Mean (KM)	0.0615
k hat (KM)	2.261	k star (KM)	1.955
nu hat (KM)	90.45	nu star (KM)	78.22
theta hat (KM)	0.158	theta star (KM)	0.183
80% gamma percentile (KM)	0.537	90% gamma percentile (KM)	0.7
95% gamma percentile (KM)	0.855	99% gamma percentile (KM)	1.2
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (78.22, α)	58.84	Adjusted Chi Square Value (78.22, β)	57.52
95% Gamma Approximate KM-UCL (use when n>=50)	0.476	95% Gamma Adjusted KM-UCL (use when n<50)	0.487
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.777	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.38	Mean in Log Scale	-1.175
SD in Original Scale	0.266	SD in Log Scale	0.66
95% t UCL (assumes normality of ROS data)	0.483	95% Percentile Bootstrap UCL	0.485
95% BCA Bootstrap UCL	0.506	95% Bootstrap t UCL	0.528
95% H-UCL (Log ROS)	0.535		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.16	KM Geo Mean	0.313
KM SD (logged)	0.449	95% Critical H Value (KM-Log)	1.971
KM Standard Error of Mean (logged)	0.116	95% H-UCL (KM -Log)	0.425
KM SD (logged)	0.449	95% Critical H Value (KM-Log)	1.971
KM Standard Error of Mean (logged)	0.116		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.35	Mean in Log Scale	-1.191
SD in Original Scale	0.248	SD in Log Scale	0.474
95% t UCL (Assumes normality)	0.446	95% H-Stat UCL	0.422
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.464		
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.			

1,4-DICHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	8
Number of Detects	10	Number of Non-Detects	10
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.35	Minimum Non-Detect	0.5
Maximum Detect	3.3	Maximum Non-Detect	0.5
Variance Detects	0.99	Percent Non-Detects	50%
Mean Detects	2.045	SD Detects	0.995
Median Detects	2	CV Detects	0.487
Skewness Detects	-0.257	Kurtosis Detects	-0.902
Mean of Logged Detects	0.552	SD of Logged Detects	0.689
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	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	1.198	KM Standard Error of Mean	0.254
KM SD	1.079	95% KM (BCA) UCL	1.705
95% KM (t) UCL	1.637	95% KM (Percentile Bootstrap) UCL	1.635
95% KM (z) UCL	1.616	95% KM Bootstrap t UCL	1.659
90% KM Chebyshev UCL	1.96	95% KM Chebyshev UCL	2.306
97.5% KM Chebyshev UCL	2.785	99% KM Chebyshev UCL	3.728
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.429	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.268	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)	3.223	k star (bias corrected MLE)	2.323
Theta hat (MLE)	0.635	Theta star (bias corrected MLE)	0.881
nu hat (MLE)	64.45	nu star (bias corrected)	46.45
Mean (detects)	2.045		
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	1.229
Maximum	3.3	Median	0.938
SD	1.112	CV	0.905
k hat (MLE)	0.702	k star (bias corrected MLE)	0.63
Theta hat (MLE)	1.751	Theta star (bias corrected MLE)	1.951
nu hat (MLE)	28.08	nu star (bias corrected)	25.2
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (25.20, α)	14.76	Adjusted Chi Square Value (25.20, β)	14.13
95% Gamma Approximate UCL (use when n>=50)	2.098	95% Gamma Adjusted UCL (use when n<50)	2.191

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.198	SD (KM)	1.079
Variance (KM)	1.164	SE of Mean (KM)	0.254
k hat (KM)	1.232	k star (KM)	1.081
nu hat (KM)	49.28	nu star (KM)	43.22
theta hat (KM)	0.972	theta star (KM)	1.108
80% gamma percentile (KM)	1.915	90% gamma percentile (KM)	2.705
95% gamma percentile (KM)	3.491	99% gamma percentile (KM)	5.305
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (43.22, α)	29.15	Adjusted Chi Square Value (43.22, β)	28.24
95% Gamma Approximate KM-UCL (use when n>=50)	1.776	95% Gamma Adjusted KM-UCL (use when n<50)	1.833
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.221	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.263	Mean in Log Scale	-0.149
SD in Original Scale	1.067	SD in Log Scale	0.939
95% t UCL (assumes normality of ROS data)	1.676	95% Percentile Bootstrap UCL	1.66
95% BCA Bootstrap UCL	1.682	95% Bootstrap t UCL	1.738
95% H-UCL (Log ROS)	2.318		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.249	KM Geo Mean	0.78
KM SD (logged)	0.925	95% Critical H Value (KM-Log)	2.527
KM Standard Error of Mean (logged)	0.218	95% H-UCL (KM -Log)	2.044
KM SD (logged)	0.925	95% Critical H Value (KM-Log)	2.527
KM Standard Error of Mean (logged)	0.218		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.148	Mean in Log Scale	-0.417
SD in Original Scale	1.148	SD in Log Scale	1.102
95% t UCL (Assumes normality)	1.591	95% H-Stat UCL	2.445
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.637		
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.			

BENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	14
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.27	Minimum Non-Detect	0.5
Maximum Detect	1.6	Maximum Non-Detect	0.5
Variance Detects	0.265	Percent Non-Detects	70%
Mean Detects	0.56	SD Detects	0.514
Median Detects	0.35	CV Detects	0.919
Skewness Detects	2.349	Kurtosis Detects	5.596
Mean of Logged Detects	-0.807	SD of Logged Detects	0.654
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.619	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.395	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	0.414	KM Standard Error of Mean	0.0743
KM SD	0.281	95% KM (BCA) UCL	0.552
95% KM (t) UCL	0.543	95% KM (Percentile Bootstrap) UCL	0.547
95% KM (z) UCL	0.537	95% KM Bootstrap t UCL	0.886
90% KM Chebyshev UCL	0.637	95% KM Chebyshev UCL	0.738
97.5% KM Chebyshev UCL	0.879	99% KM Chebyshev UCL	1.154
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.952	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.703	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.337	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.335	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)	2.349	k star (bias corrected MLE)	1.286
Theta hat (MLE)	0.238	Theta star (bias corrected MLE)	0.436
nu hat (MLE)	28.19	nu star (bias corrected)	15.43
Mean (detects)	0.56		
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	0.445
Maximum	1.6	Median	0.35
SD	0.359	CV	0.806
k hat (MLE)	1.51	k star (bias corrected MLE)	1.317
Theta hat (MLE)	0.295	Theta star (bias corrected MLE)	0.338
nu hat (MLE)	60.42	nu star (bias corrected)	52.69
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (52.69, α)	37.01	Adjusted Chi Square Value (52.69, β)	35.98
95% Gamma Approximate UCL (use when n>=50)	0.634	95% Gamma Adjusted UCL (use when n<50)	0.652

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.414	SD (KM)	0.281
Variance (KM)	0.0787	SE of Mean (KM)	0.0743
k hat (KM)	2.181	k star (KM)	1.887
nu hat (KM)	87.23	nu star (KM)	75.48
theta hat (KM)	0.19	theta star (KM)	0.22
80% gamma percentile (KM)	0.625	90% gamma percentile (KM)	0.817
95% gamma percentile (KM)	1.001	99% gamma percentile (KM)	1.411
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (75.48, α)	56.47	Adjusted Chi Square Value (75.48, β)	55.17
95% Gamma Approximate KM-UCL (use when n>=50)	0.554	95% Gamma Adjusted KM-UCL (use when n<50)	0.567
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.449	Mean in Log Scale	-0.951
SD in Original Scale	0.313	SD in Log Scale	0.521
95% t UCL (assumes normality of ROS data)	0.569	95% Percentile Bootstrap UCL	0.569
95% BCA Bootstrap UCL	0.616	95% Bootstrap t UCL	0.682
95% H-UCL (Log ROS)	0.565		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.986	KM Geo Mean	0.373
KM SD (logged)	0.383	95% Critical H Value (KM-Log)	1.914
KM Standard Error of Mean (logged)	0.121	95% H-UCL (KM -Log)	0.475
KM SD (logged)	0.383	95% Critical H Value (KM-Log)	1.914
KM Standard Error of Mean (logged)	0.121		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.343	Mean in Log Scale	-1.213
SD in Original Scale	0.301	SD in Log Scale	0.432
95% t UCL (Assumes normality)	0.46	95% H-Stat UCL	0.396
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.475		
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.			

CHLOROBENZENE			
General Statistics			
Total Number of Observations	20	Number of Distinct Observations	15
Number of Detects	14	Number of Non-Detects	6
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	0.825	Minimum Non-Detect	0.5
Maximum Detect	51	Maximum Non-Detect	0.5
Variance Detects	281	Percent Non-Detects	30%
Mean Detects	16.03	SD Detects	16.76
Median Detects	9.25	CV Detects	1.046
Skewness Detects	1.201	Kurtosis Detects	0.33
Mean of Logged Detects	2.097	SD of Logged Detects	1.378
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.221	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	11.37	KM Standard Error of Mean	3.544
KM SD	15.27	95% KM (BCA) UCL	17.93
95% KM (t) UCL	17.5	95% KM (Percentile Bootstrap) UCL	17.05
95% KM (z) UCL	17.2	95% KM Bootstrap t UCL	19.91
90% KM Chebyshev UCL	22	95% KM Chebyshev UCL	26.82
97.5% KM Chebyshev UCL	33.5	99% KM Chebyshev UCL	46.63
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.237	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0994	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.867	k star (bias corrected MLE)	0.729
Theta hat (MLE)	18.49	Theta star (bias corrected MLE)	21.99
nu hat (MLE)	24.27	nu star (bias corrected)	20.4
Mean (detects)	16.03		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	11.22
Maximum	51	Median	4.15
SD	15.78	CV	1.406
k hat (MLE)	0.296	k star (bias corrected MLE)	0.285
Theta hat (MLE)	37.87	Theta star (bias corrected MLE)	39.34
nu hat (MLE)	11.85	nu star (bias corrected)	11.41
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (11.41, α)	4.84	Adjusted Chi Square Value (11.41, β)	4.505
95% Gamma Approximate UCL (use when n>=50)	26.45	95% Gamma Adjusted UCL (use when n<50)	28.41

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	11.37	SD (KM)	15.27
Variance (KM)	233.3	SE of Mean (KM)	3.544
k hat (KM)	0.554	k star (KM)	0.504
nu hat (KM)	22.16	nu star (KM)	20.17
theta hat (KM)	20.52	theta star (KM)	22.54
80% gamma percentile (KM)	18.68	90% gamma percentile (KM)	30.7
95% gamma percentile (KM)	43.54	99% gamma percentile (KM)	75.08
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (20.17, α)	10.98	Adjusted Chi Square Value (20.17, β)	10.44
95% Gamma Approximate KM-UCL (use when n>=50)	20.89	95% Gamma Adjusted KM-UCL (use when n<50)	21.96
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.152	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	11.33	Mean in Log Scale	1.101
SD in Original Scale	15.7	SD in Log Scale	1.979
95% t UCL (assumes normality of ROS data)	17.4	95% Percentile Bootstrap UCL	16.95
95% BCA Bootstrap UCL	18.51	95% Bootstrap t UCL	20.54
95% H-UCL (Log ROS)	147.9		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.26	KM Geo Mean	3.524
KM SD (logged)	1.694	95% Critical H Value (KM-Log)	3.759
KM Standard Error of Mean (logged)	0.393	95% H-UCL (KM -Log)	63.74
KM SD (logged)	1.694	95% Critical H Value (KM-Log)	3.759
KM Standard Error of Mean (logged)	0.393		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	11.29	Mean in Log Scale	1.052
SD in Original Scale	15.72	SD in Log Scale	1.995
95% t UCL (Assumes normality)	17.37	95% H-Stat UCL	149.8
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	17.5		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Outside Landfill – Shallow Groundwater

Event 1

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 1

Samples	TCDD-TEQ	d_TCDD_TEQ	ANTIMONY	d_ANTIMONY	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	BORON	d_BORON	CADMIUM	d_CADMIUM	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT
LDCA-MW08-0314	0.158	0	5.3	1	20.8	1	306	1	180	1	2.7	1	5.2	1	24.1	1
LDCA-MW13S-0314			2	0	0.16	1	99.6	1	185	1	1	0	3.2	0	6.6	1
LDCA-MW14S-0314	0.164	0	2	0	11	1	142	1	307	1	1	0	2	0	9.7	1
LDCA-MW15S-0314	0.153	1	2	0	38.8	1	111	1	488	1	1	0	2.4	1	6.5	1
LDCA-MW16S-0314			2	0	2.2	1	437	1	1380	1	1	0	7.4	1	16.5	1
LDCA-MW17S-0314-AVG	0.236	0	2	0	1	0	52.5	1	35.3	1	1	0	4.35	1	1.4	1
LDCA-MW18S-0314	0.147	0	2	0	1	0	35.4	1	38.4	1	0.2	1	3.6	1	6.1	1
LDCA-MW24-0314																
LDCA-MW25-0314																
LDCA-MW26D-0314	0.036	1	2	0	7.3	1	235	1	47.1	1	1	0	6.2	1	15.1	1
LDCA-MW26S-0314	0.241	0	2	0	1	0	1110	1	114	1	1	0	2.3	1	4.4	1
LDCA-MW27-0314			2	0	10.8	1	497	1	587	1	1	0	2	0	9.5	1
LDCA-MW28-0314			2	0	1	0	133	1	779	1	0.86	1	2	0	12.1	1
LDCA-MW29-0314			2	0	1	0	82.9	1	72	1	1	0	2	0	2.4	1
LDCA-MW30-0314			2	0	1	0	77.6	1	350	1	1	0	2.6	1	7.4	1
LDCA-MW31-0314			2	0	1	0	43.2	1	109	1	1	0	3.7	1	8.6	1
LDCA-MW32-0314			2	0	1	0	99.3	1	452	1	1	0	2.3	1	4.6	1
LDCA-MW33-0314			2	0	1	0	56.2	1	65.2	1	1	0	6.3	1	7.8	1
LDCA-MW35-0314			2	0	1	0	61.5	1	101	1	1	0	2.7	1	11.1	1
LDCA-MW38-0314	0.225	0	2	0	1	0	353	1	1310	1	1	0	6.8	1	13	1
LDCA-MW39-0314	0.475	0	2	0	0.18	1	42.5	1	120	1	0.096	1	4.8	1	9.3	1
LDCA-MW40-0314			2	0	1	0	115	1	33.9	1	1	0	5.5	1	6.9	1
LDCA-MW41D-0314-AVG	0.182	0	2	0	2.3	1	461	1	181	1	2.2	1	3.7	1	52.8	1
LDCA-MW41S-0314	0.117	1	2	0	54.3	1	216	1	65.3	1	1	0	2.5	0	1.6	1
LDCA-MW42-0314	0.262	0	2	0	1	0	120	1	109	1	1	0	2.5	0	3.6	1
LDCA-MW43-0314			2	0	1	0	104	1	269	1	0.67	1	2.7	1	7	1
LDCA-MW44-0314			2	0	1.2	1	78.1	1	81.3	1	1	0	2.5	0	3.5	1
LDCA-MW45-0314	0.153	0	2	0	0.3	1	81.3	1	401	1	0.14	1	3.2	0	8.5	1
LDCA-MW46-0314			2	0	1	0	92.3	1	503	1	0.28	1	2	0	8.1	1
LDCA-MW47-0314-AVG			2	0	0.29	1	46.4	1	291	1	1	0	4.1	1	7.2	1

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 1

Samples	CYANIDE	d_CYANIDE	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	DIOXIN-LIKE PCB_TEQ	d_DIOXIN-LIKE PCB_TEQ	NON-DIOXIN-LIKE PCBS	d_NON-DIOXIN-LIKE PCBS	BETA-BHC
LDCA-MW08-0314	1.6	1	38500	1	51.6	1	790	1	21	0	840	1	0.05
LDCA-MW13S-0314	0.99	1	327	1	1	0	1130	1					0.05
LDCA-MW14S-0314	3.3	1	20000	1	1	0	3890	1	0.00063	1	3138	1	0.05
LDCA-MW15S-0314	10	0	38300	1	1.7	1	618	1					0.05
LDCA-MW16S-0314	10	0	21200	1	0.98	1	1420	1					0.036
LDCA-MW17S-0314-AVG	10	0	75.9	1	0.7	1	32.6	1	21	0	115	1	0.05
LDCA-MW18S-0314	10	0	200	0	0.92	1	1400	1	21	0	120	1	0.05
LDCA-MW24-0314													0.05
LDCA-MW25-0314													0.05
LDCA-MW26D-0314	10	0	43600	1	5.3	1	3840	1	0.010	1	59663	1	0.05
LDCA-MW26S-0314	10	0	42500	1	2.1	1	277	1	0.0067	1	209778	1	0.05
LDCA-MW27-0314	10	0	18400	1	1.3	1	2310	1					0.017
LDCA-MW28-0314	10	0	235	1	0.57	1	20100	1					0.05
LDCA-MW29-0314	10	0	200	0	1.9	1	59.6	1					0.05
LDCA-MW30-0314	10	0	200	0	0.55	1	738	1					0.05
LDCA-MW31-0314	10	0	323	1	1.1	1	1140	1					0.05
LDCA-MW32-0314	10	0	200	0	0.31	1	106	1					0.05
LDCA-MW33-0314	10	0	319	1	0.36	0	1670	1					0.05
LDCA-MW35-0314	10	0	200	0	0.54	1	4050	1					0.05
LDCA-MW38-0314	10	0	3400	1	0.54	1	6320	1	19	0	27771	1	0.05
LDCA-MW39-0314	0.97	1	323	1	1	0	236	1	21	0	230	1	0.05
LDCA-MW40-0314	10	0	200	0	0.88	1	1140	1					0.05
LDCA-MW41D-0314-AVG	0.94	1	701	1	0.765	1	33664	1	21	0	3200	1	0.05
LDCA-MW41S-0314	1.8	1	62400	1	4.2	1	5140	1	0.0015	1	7051	1	0.05
LDCA-MW42-0314	10	0	200	0	0.36	0	2080	1	21	0	1900	1	0.05
LDCA-MW43-0314	10	0	1020	1	0.49	1	2680	1					0.05
LDCA-MW44-0314	10	0	3660	1	0.36	0	11000	1					0.05
LDCA-MW45-0314	1.4	1	392	1	1	0	509	1	0.0011	1	16965	1	0.05
LDCA-MW46-0314	10	0	310	1	0.47	1	6580	1					0.05
LDCA-MW47-0314-AVG	1.8	1	200	0	1	0	42.6	1					0.05

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 1

Samples	d_BETA-BHC	1,4-DIOXANE	d_1,4-DIOXANE	PENTACHLOROPHENOL	d_PENTACHLOROPHENOL	BENZENE	d_BENZENE	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE
LDCA-MW08-0314	0	2	0	0.2	0	0.5	0	1.8	1
LDCA-MW13S-0314	0	2	0	0.2	0	0.5	0	0.3	1
LDCA-MW14S-0314	0	5.1	1			0.5	0	0.28	1
LDCA-MW15S-0314	0	2	0			5	0	5	0
LDCA-MW16S-0314	1	25	1	0.2	0	5	0	5	0
LDCA-MW17S-0314-AVG	0	2	0	0.2	0	5	0	5	0
LDCA-MW18S-0314	0	2	0			5	0	5	0
LDCA-MW24-0314	0	12	1			0.5	0	0.38	1
LDCA-MW25-0314	0	2	0	0.18	1	3.1	1	0.45	1
LDCA-MW26D-0314	0	2	0	0.2	0	5	0	5	0
LDCA-MW26S-0314	0	2	0	0.2	0	5	0	5	0
LDCA-MW27-0314	1	2	0			5	0	5	0
LDCA-MW28-0314	0	22	1			5	0	5	0
LDCA-MW29-0314	0	2	0	0.2	0	0.5	0	0.5	0
LDCA-MW30-0314	0	17	1			0.5	0	0.5	0
LDCA-MW31-0314	0	2	0			0.5	0	0.5	0
LDCA-MW32-0314	0	12	1	0.2	0	0.5	0	0.5	0
LDCA-MW33-0314	0	2	0	0.2	0	0.5	0	0.5	0
LDCA-MW35-0314	0	2	0	0.2	0	5	0	5	0
LDCA-MW38-0314	0	26	1	0.2	0	0.5	0	46	1
LDCA-MW39-0314	0	4.4	1			0.5	0	1.5	1
LDCA-MW40-0314	0	2	0	0.2	0	5	0	5	0
LDCA-MW41D-0314-AVG	0	260	1	0.2	0	0.5	0	0.5	0
LDCA-MW41S-0314	0	2	0			0.5	0	0.5	0
LDCA-MW42-0314	0	2.6	1			0.5	0	0.5	0
LDCA-MW43-0314	0	4.7	1	0.2	0	5	0	5	0
LDCA-MW44-0314	0	2	0	0.2	0	0.5	0	0.5	0
LDCA-MW45-0314	0	8.8	1			0.5	0	9.3	1
LDCA-MW46-0314	0	2	0	0.2	0	5	0	5	0
LDCA-MW47-0314-AVG	0	11.0	1	0.2	0	0.5	0	0.5	0

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 1

Samples	TRICHLOROETHENE	d_TRICHLOROETHENE	VINYL CHLORIDE	d_VINYL CHLORIDE
LDCA-MW08-0314	0.26	1	0.5	0
LDCA-MW13S-0314	0.5	0	0.5	0
LDCA-MW14S-0314	0.5	0	0.5	0
LDCA-MW15S-0314	5	0	5	0
LDCA-MW16S-0314	5	0	5	0
LDCA-MW17S-0314-AVG	5	0	5	0
LDCA-MW18S-0314	5	0	5	0
LDCA-MW24-0314	0.5	0	0.5	0
LDCA-MW25-0314	0.4	1	4.2	1
LDCA-MW26D-0314	5	0	5	0
LDCA-MW26S-0314	5	0	5	0
LDCA-MW27-0314	5	0	5	0
LDCA-MW28-0314	5	0	5	0
LDCA-MW29-0314	0.5	0	0.5	0
LDCA-MW30-0314	0.5	0	0.5	0
LDCA-MW31-0314	0.5	0	0.5	0
LDCA-MW32-0314	0.5	0	0.5	0
LDCA-MW33-0314	0.5	0	0.5	0
LDCA-MW35-0314	5	0	5	0
LDCA-MW38-0314	7.2	1	3.7	1
LDCA-MW39-0314	0.58	1	0.5	0
LDCA-MW40-0314	5	0	5	0
LDCA-MW41D-0314-AVG	0.5	0	0.5	0
LDCA-MW41S-0314	0.5	0	0.5	0
LDCA-MW42-0314	0.5	0	0.5	0
LDCA-MW43-0314	5	0	5	0
LDCA-MW44-0314	0.5	0	0.5	0
LDCA-MW45-0314	1.4	1	0.5	0
LDCA-MW46-0314	5	0	5	0
LDCA-MW47-0314-AVG	0.5	0	0.5	0

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 7:54:00 AM
From File	ProUCL Data Outside Shallow-Event 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

NON-DIOXIN-LIKE PCBS

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	16
Minimum	115	Mean	27564
Maximum	209778	Median	3169
SD	59987	Std. Error of Mean	17317
Coefficient of Variation	2.176	Skewness	3.005

Normal GOF Test

Shapiro Wilk Test Statistic	0.525	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	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	58663	95% Adjusted-CLT UCL (Chen-1995)	72099
		95% Modified-t UCL (Johnson-1978)	61167

Gamma GOF Test

A-D Test Statistic	0.488	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.819	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.265	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.324	k star (bias corrected MLE)	0.298
Theta hat (MLE)	85113	Theta star (bias corrected MLE)	92359
nu hat (MLE)	7.773	nu star (bias corrected)	7.163
MLE Mean (bias corrected)	27564	MLE Sd (bias corrected)	50456
		Approximate Chi Square Value (0.05)	2.26
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	1.864

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	87349	95% Adjusted Gamma UCL (use when n<50)	105932

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	4.745	Mean of logged Data	8.121
Maximum of Logged Data	12.25	SD of logged Data	2.43
Assuming Lognormal Distribution			
95% H-UCL	4887992	90% Chebyshev (MVUE) UCL	108829
95% Chebyshev (MVUE) UCL	142711	97.5% Chebyshev (MVUE) UCL	189739
99% Chebyshev (MVUE) UCL	282115		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	56048	95% Jackknife UCL	58663
95% Standard Bootstrap UCL	54193	95% Bootstrap-t UCL	184551
95% Hall's Bootstrap UCL	165862	95% Percentile Bootstrap UCL	58734
95% BCA Bootstrap UCL	76893		
90% Chebyshev(Mean, Sd) UCL	79514	95% Chebyshev(Mean, Sd) UCL	103046
97.5% Chebyshev(Mean, Sd) UCL	135707	99% Chebyshev(Mean, Sd) UCL	199863
Suggested UCL to Use			
95% Adjusted Gamma UCL	105932		
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.			

BARIUM

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	28
		Number of Missing Observations	2
Minimum	35.4	Mean	188.9
Maximum	1110	Median	101.8
SD	224.7	Std. Error of Mean	42.46
Coefficient of Variation	1.19	Skewness	2.895

Normal GOF Test		
Shapiro Wilk Test Statistic	0.647	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	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	261.2	95% Adjusted-CLT UCL (Chen-1995)	283.5
		95% Modified-t UCL (Johnson-1978)	265.1

Gamma GOF Test		
A-D Test Statistic	1.384	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.767	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.169	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	1.32	k star (bias corrected MLE)	1.202
Theta hat (MLE)	143.1	Theta star (bias corrected MLE)	157.1
nu hat (MLE)	73.92	nu star (bias corrected)	67.34
MLE Mean (bias corrected)	188.9	MLE Sd (bias corrected)	172.2
		Approximate Chi Square Value (0.05)	49.45
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	48.5

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	257.2	95% Adjusted Gamma UCL (use when n<50)	262.2

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	3.567	Mean of logged Data	4.817
Maximum of Logged Data	7.012	SD of logged Data	0.868

Assuming Lognormal Distribution			
95% H-UCL	264.5	90% Chebyshev (MVUE) UCL	274
95% Chebyshev (MVUE) UCL	318	97.5% Chebyshev (MVUE) UCL	379
99% Chebyshev (MVUE) UCL	498.9		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	258.7	95% Jackknife UCL	261.2
95% Standard Bootstrap UCL	258.6	95% Bootstrap-t UCL	315
95% Hall's Bootstrap UCL	520.4	95% Percentile Bootstrap UCL	262.5
95% BCA Bootstrap UCL	284.8		
90% Chebyshev(Mean, Sd) UCL	316.2	95% Chebyshev(Mean, Sd) UCL	373.9
97.5% Chebyshev(Mean, Sd) UCL	454	99% Chebyshev(Mean, Sd) UCL	611.3
Suggested UCL to Use			
95% H-UCL	264.5		
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.			
ProUCL computes and outputs H-statistic based UCLs for historical reasons only.			
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.			
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.			
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.			

BORON

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	27
		Number of Missing Observations	2
Minimum	33.9	Mean	309.1
Maximum	1380	Median	180.5
SD	350.3	Std. Error of Mean	66.21
Coefficient of Variation	1.133	Skewness	2.035

Normal GOF Test		
Shapiro Wilk Test Statistic	0.737	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	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	421.9	95% Adjusted-CLT UCL (Chen-1995)	445.2
		95% Modified-t UCL (Johnson-1978)	426.1

Gamma GOF Test		
A-D Test Statistic	0.592	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.157	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.17	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	1.071	k star (bias corrected MLE)	0.98
Theta hat (MLE)	288.7	Theta star (bias corrected MLE)	315.5
nu hat (MLE)	59.95	nu star (bias corrected)	54.86
MLE Mean (bias corrected)	309.1	MLE Sd (bias corrected)	312.3
		Approximate Chi Square Value (0.05)	38.84
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	38.01

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	436.6	95% Adjusted Gamma UCL (use when n<50)	446.1

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.114	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	3.523	Mean of logged Data	5.199
Maximum of Logged Data	7.23	SD of logged Data	1.066

Assuming Lognormal Distribution			
95% H-UCL	537.5	90% Chebyshev (MVUE) UCL	527
95% Chebyshev (MVUE) UCL	625.3	97.5% Chebyshev (MVUE) UCL	761.8
99% Chebyshev (MVUE) UCL	1030		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	418	95% Jackknife UCL	421.9
95% Standard Bootstrap UCL	416.8	95% Bootstrap-t UCL	484
95% Hall's Bootstrap UCL	527.2	95% Percentile Bootstrap UCL	427
95% BCA Bootstrap UCL	437.6		
90% Chebyshev(Mean, Sd) UCL	507.7	95% Chebyshev(Mean, Sd) UCL	597.7
97.5% Chebyshev(Mean, Sd) UCL	722.6	99% Chebyshev(Mean, Sd) UCL	967.9
Suggested UCL to Use			
95% Adjusted Gamma UCL	446.1		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

COBALT

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	28
		Number of Missing Observations	2
Minimum	1.4	Mean	9.834
Maximum	52.75	Median	7.6
SD	9.7	Std. Error of Mean	1.833
Coefficient of Variation	0.986	Skewness	3.49

Normal GOF Test		
Shapiro Wilk Test Statistic	0.629	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	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	12.96	95% Adjusted-CLT UCL (Chen-1995)	14.14
		95% Modified-t UCL (Johnson-1978)	13.16

Gamma GOF Test		
A-D Test Statistic	0.779	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.161	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.168	Detected data appear Gamma Distributed at 5% Significance Level
Detected data follow Appr. Gamma Distribution at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	1.891	k star (bias corrected MLE)	1.713
Theta hat (MLE)	5.199	Theta star (bias corrected MLE)	5.742
nu hat (MLE)	105.9	nu star (bias corrected)	95.9
MLE Mean (bias corrected)	9.834	MLE Sd (bias corrected)	7.515
		Approximate Chi Square Value (0.05)	74.32
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	73.14

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	12.69	95% Adjusted Gamma UCL (use when n<50)	12.89

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.15	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	0.336	Mean of logged Data	1.999
Maximum of Logged Data	3.966	SD of logged Data	0.755

Assuming Lognormal Distribution			
95% H-UCL	13.47	90% Chebyshev (MVUE) UCL	14.22
95% Chebyshev (MVUE) UCL	16.27	97.5% Chebyshev (MVUE) UCL	19.12
99% Chebyshev (MVUE) UCL	24.71		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	12.85	95% Jackknife UCL	12.96
95% Standard Bootstrap UCL	12.74	95% Bootstrap-t UCL	16.16
95% Hall's Bootstrap UCL	26.73	95% Percentile Bootstrap UCL	13.02
95% BCA Bootstrap UCL	14.58		
90% Chebyshev(Mean, Sd) UCL	15.33	95% Chebyshev(Mean, Sd) UCL	17.82
97.5% Chebyshev(Mean, Sd) UCL	21.28	99% Chebyshev(Mean, Sd) UCL	28.07
Suggested UCL to Use			
95% Adjusted Gamma UCL	12.89		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

MANGANESE

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	27
		Number of Missing Observations	2
Minimum	32.6	Mean	4034
Maximum	33664	Median	1410
SD	7170	Std. Error of Mean	1355
Coefficient of Variation	1.777	Skewness	3.233

Normal GOF Test		
Shapiro Wilk Test Statistic	0.567	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	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	6342	95% Adjusted-CLT UCL (Chen-1995)	7148
		95% Modified-t UCL (Johnson-1978)	6480

Gamma GOF Test		
A-D Test Statistic	0.476	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.806	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.108	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.174	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.539	k star (bias corrected MLE)	0.505
Theta hat (MLE)	7482	Theta star (bias corrected MLE)	7985
nu hat (MLE)	30.2	nu star (bias corrected)	28.29
MLE Mean (bias corrected)	4034	MLE Sd (bias corrected)	5676
		Approximate Chi Square Value (0.05)	17.16
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	16.62

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	6653	95% Adjusted Gamma UCL (use when n<50)	6868

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	3.484	Mean of logged Data	7.138
Maximum of Logged Data	10.42	SD of logged Data	1.752

Assuming Lognormal Distribution			
95% H-UCL	19042	90% Chebyshev (MVUE) UCL	11821
95% Chebyshev (MVUE) UCL	14833	97.5% Chebyshev (MVUE) UCL	19013
99% Chebyshev (MVUE) UCL	27225		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	6263	95% Jackknife UCL	6342
95% Standard Bootstrap UCL	6219	95% Bootstrap-t UCL	10029
95% Hall's Bootstrap UCL	16039	95% Percentile Bootstrap UCL	6513
95% BCA Bootstrap UCL	7488		
90% Chebyshev(Mean, Sd) UCL	8099	95% Chebyshev(Mean, Sd) UCL	9940
97.5% Chebyshev(Mean, Sd) UCL	12496	99% Chebyshev(Mean, Sd) UCL	17516
Suggested UCL to Use			
95% Adjusted Gamma UCL	6868		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 7:52:09 AM
From File	ProUCL Data Outside Shallow-Event 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TCDD-TEQ

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	15
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	10
Minimum Detect	0.036	Minimum Non-Detect	0.147
Maximum Detect	0.153	Maximum Non-Detect	0.475
Variance Detects	0.00359	Percent Non-Detects	76.92%
Mean Detects	0.102	SD Detects	0.0599
Median Detects	0.117	CV Detects	0.587
Skewness Detects	-1.056	Kurtosis Detects	N/A
Mean of Logged Detects	-2.449	SD of Logged Detects	0.77

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0918	KM Standard Error of Mean	0.0327
KM SD	0.0474	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.15	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.146	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.19	95% KM Chebyshev UCL	0.234
97.5% KM Chebyshev UCL	0.296	99% KM Chebyshev UCL	0.417

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.164	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0322	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	18.99	nu star (bias corrected)	N/A
Mean (detects)	0.102		

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	0.036	Mean	0.0859
Maximum	0.153	Median	0.0834
SD	0.0265	CV	0.308
k hat (MLE)	11.38	k star (bias corrected MLE)	8.801
Theta hat (MLE)	0.00755	Theta star (bias corrected MLE)	0.00976
nu hat (MLE)	295.8	nu star (bias corrected)	228.8
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (228.84, α)	194.8	Adjusted Chi Square Value (228.84, β)	190.4
95% Gamma Approximate UCL (use when n>=50)	0.101	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0918	SD (KM)	0.0474
Variance (KM)	0.00225	SE of Mean (KM)	0.0327
k hat (KM)	3.748	k star (KM)	2.934
nu hat (KM)	97.44	nu star (KM)	76.29
theta hat (KM)	0.0245	theta star (KM)	0.0313
80% gamma percentile (KM)	0.131	90% gamma percentile (KM)	0.164
95% gamma percentile (KM)	0.194	99% gamma percentile (KM)	0.259

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (76.29, α)	57.17	Adjusted Chi Square Value (76.29, β)	54.82
95% Gamma Approximate KM-UCL (use when n>=50)	0.122	95% Gamma Adjusted KM-UCL (use when n<50)	0.128

Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.32	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0776	Mean in Log Scale	-2.61
SD in Original Scale	0.0285	SD in Log Scale	0.334
95% t UCL (assumes normality of ROS data)	0.0916	95% Percentile Bootstrap UCL	0.0906
95% BCA Bootstrap UCL	0.0927	95% Bootstrap t UCL	0.108
95% H-UCL (Log ROS)	0.0937		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.563	KM Geo Mean	0.077
KM SD (logged)	0.629	95% Critical H Value (KM-Log)	2.273
KM Standard Error of Mean (logged)	0.449	95% H-UCL (KM -Log)	0.142
KM SD (logged)	0.629	95% Critical H Value (KM-Log)	2.273
KM Standard Error of Mean (logged)	0.449		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.11	Mean in Log Scale	-2.298
SD in Original Scale	0.049	SD in Log Scale	0.449
95% t UCL (Assumes normality)	0.134	95% H-Stat UCL	0.145
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.15		
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.			

ANTIMONY

General Statistics

Total Number of Observations	28	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	27
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ANTIMONY was not processed!

ARSENIC			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	14
		Number of Missing Observations	2
Number of Detects	13	Number of Non-Detects	15
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.16	Minimum Non-Detect	1
Maximum Detect	54.3	Maximum Non-Detect	1
Variance Detects	288.9	Percent Non-Detects	53.57%
Mean Detects	11.51	SD Detects	17
Median Detects	2.3	CV Detects	1.477
Skewness Detects	1.824	Kurtosis Detects	2.689
Mean of Logged Detects	1.021	SD of Logged Detects	2.062
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.72	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	5.468	KM Standard Error of Mean	2.453
KM SD	12.47	95% KM (BCA) UCL	9.969
95% KM (t) UCL	9.646	95% KM (Percentile Bootstrap) UCL	9.722
95% KM (z) UCL	9.503	95% KM Bootstrap t UCL	16.3
90% KM Chebyshev UCL	12.83	95% KM Chebyshev UCL	16.16
97.5% KM Chebyshev UCL	20.78	99% KM Chebyshev UCL	29.87
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.393	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.799	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.169	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.251	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.453	k star (bias corrected MLE)	0.4
Theta hat (MLE)	25.39	Theta star (bias corrected MLE)	28.77
nu hat (MLE)	11.79	nu star (bias corrected)	10.4
Mean (detects)	11.51		
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	5.401
Maximum	54.3	Median	0.085
SD	12.73	CV	2.357
k hat (MLE)	0.209	k star (bias corrected MLE)	0.21
Theta hat (MLE)	25.87	Theta star (bias corrected MLE)	25.7
nu hat (MLE)	11.69	nu star (bias corrected)	11.77
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (11.77, α)	5.077	Adjusted Chi Square Value (11.77, β)	4.806
95% Gamma Approximate UCL (use when n>=50)	12.52	95% Gamma Adjusted UCL (use when n<50)	13.23

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.468	SD (KM)	12.47
Variance (KM)	155.5	SE of Mean (KM)	2.453
k hat (KM)	0.192	k star (KM)	0.196
nu hat (KM)	10.77	nu star (KM)	10.95
theta hat (KM)	28.43	theta star (KM)	27.96
80% gamma percentile (KM)	7.12	90% gamma percentile (KM)	16.54
95% gamma percentile (KM)	28.34	99% gamma percentile (KM)	60.96
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (10.95, α)	4.545	Adjusted Chi Square Value (10.95, β)	4.291
95% Gamma Approximate KM-UCL (use when n>=50)	13.18	95% Gamma Adjusted KM-UCL (use when n<50)	13.96
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	5.582	Mean in Log Scale	-0.338
SD in Original Scale	12.65	SD in Log Scale	2.142
95% t UCL (assumes normality of ROS data)	9.655	95% Percentile Bootstrap UCL	9.825
95% BCA Bootstrap UCL	11.72	95% Bootstrap t UCL	16.33
95% H-UCL (Log ROS)	38.5		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.328	KM Geo Mean	0.72
KM SD (logged)	1.855	95% Critical H Value (KM-Log)	3.661
KM Standard Error of Mean (logged)	0.375	95% H-UCL (KM -Log)	14.86
KM SD (logged)	1.855	95% Critical H Value (KM-Log)	3.661
KM Standard Error of Mean (logged)	0.375		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5.612	Mean in Log Scale	0.103
SD in Original Scale	12.64	SD in Log Scale	1.627
95% t UCL (Assumes normality)	9.679	95% H-Stat UCL	11.75
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	13.96		

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.

CADMIUM			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	9
		Number of Missing Observations	2
Number of Detects	8	Number of Non-Detects	20
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.096	Minimum Non-Detect	1
Maximum Detect	2.7	Maximum Non-Detect	1
Variance Detects	1.012	Percent Non-Detects	71.43%
Mean Detects	0.893	SD Detects	1.006
Median Detects	0.475	CV Detects	1.126
Skewness Detects	1.239	Kurtosis Detects	0.014
Mean of Logged Detects	-0.745	SD of Logged Detects	1.249
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.789	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.523	KM Standard Error of Mean	0.159
KM SD	0.606	95% KM (BCA) UCL	0.821
95% KM (t) UCL	0.794	95% KM (Percentile Bootstrap) UCL	0.795
95% KM (z) UCL	0.785	95% KM Bootstrap t UCL	0.897
90% KM Chebyshev UCL	1.001	95% KM Chebyshev UCL	1.217
97.5% KM Chebyshev UCL	1.518	99% KM Chebyshev UCL	2.108
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.392	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.213	**Kolmogorov-Smirnov GOF**	
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 on Detected Data Only			
k hat (MLE)	0.922	k star (bias corrected MLE)	0.659
Theta hat (MLE)	0.969	Theta star (bias corrected MLE)	1.354
nu hat (MLE)	14.75	nu star (bias corrected)	10.55
Mean (detects)	0.893		
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	0.566
Maximum	2.7	Median	0.308
SD	0.664	CV	1.174
k hat (MLE)	0.69	k star (bias corrected MLE)	0.64
Theta hat (MLE)	0.82	Theta star (bias corrected MLE)	0.884
nu hat (MLE)	38.63	nu star (bias corrected)	35.82
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (35.82, α)	23.13	Adjusted Chi Square Value (35.82, β)	22.49
95% Gamma Approximate UCL (use when n>=50)	0.876	95% Gamma Adjusted UCL (use when n<50)	0.901

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.523	SD (KM)	0.606
Variance (KM)	0.367	SE of Mean (KM)	0.159
k hat (KM)	0.745	k star (KM)	0.689
nu hat (KM)	41.69	nu star (KM)	38.56
theta hat (KM)	0.702	theta star (KM)	0.759
80% gamma percentile (KM)	0.859	90% gamma percentile (KM)	1.317
95% gamma percentile (KM)	1.789	99% gamma percentile (KM)	2.919
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (38.56, α)	25.34	Adjusted Chi Square Value (38.56, β)	24.67
95% Gamma Approximate KM-UCL (use when n>=50)	0.795	95% Gamma Adjusted KM-UCL (use when n<50)	0.817
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.529	Mean in Log Scale	-1.155
SD in Original Scale	0.625	SD in Log Scale	1.032
95% t UCL (assumes normality of ROS data)	0.73	95% Percentile Bootstrap UCL	0.736
95% BCA Bootstrap UCL	0.775	95% Bootstrap t UCL	0.865
95% H-UCL (Log ROS)	0.881		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.135	KM Geo Mean	0.322
KM SD (logged)	0.948	95% Critical H Value (KM-Log)	2.393
KM Standard Error of Mean (logged)	0.34	95% H-UCL (KM -Log)	0.779
KM SD (logged)	0.948	95% Critical H Value (KM-Log)	2.393
KM Standard Error of Mean (logged)	0.34		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.612	Mean in Log Scale	-0.708
SD in Original Scale	0.543	SD in Log Scale	0.636
95% t UCL (Assumes normality)	0.787	95% H-Stat UCL	0.776
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.794		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

CHROMIUM			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	18
		Number of Missing Observations	2
Number of Detects	18	Number of Non-Detects	10
Number of Distinct Detects	15	Number of Distinct Non-Detects	3
Minimum Detect	2.3	Minimum Non-Detect	2
Maximum Detect	7.4	Maximum Non-Detect	3.2
Variance Detects	2.754	Percent Non-Detects	35.71%
Mean Detects	4.258	SD Detects	1.659
Median Detects	3.9	CV Detects	0.39
Skewness Detects	0.463	Kurtosis Detects	-1.014
Mean of Logged Detects	1.376	SD of Logged Detects	0.395
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	3.482	KM Standard Error of Mean	0.324
KM SD	1.663	95% KM (BCA) UCL	4.057
95% KM (t) UCL	4.034	95% KM (Percentile Bootstrap) UCL	4.047
95% KM (z) UCL	4.015	95% KM Bootstrap t UCL	4.074
90% KM Chebyshev UCL	4.455	95% KM Chebyshev UCL	4.895
97.5% KM Chebyshev UCL	5.506	99% KM Chebyshev UCL	6.707
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.443	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.173	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.204	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)	7.021	k star (bias corrected MLE)	5.888
Theta hat (MLE)	0.607	Theta star (bias corrected MLE)	0.723
nu hat (MLE)	252.8	nu star (bias corrected)	212
Mean (detects)	4.258		
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	0.0416	Mean	3.163
Maximum	7.4	Median	2.65
SD	2.031	CV	0.642
k hat (MLE)	1.702	k star (bias corrected MLE)	1.543
Theta hat (MLE)	1.859	Theta star (bias corrected MLE)	2.05
nu hat (MLE)	95.3	nu star (bias corrected)	86.42
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (86.42, α)	65.99	Adjusted Chi Square Value (86.42, β)	64.89
95% Gamma Approximate UCL (use when n>=50)	4.143	95% Gamma Adjusted UCL (use when n<50)	4.213

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.482	SD (KM)	1.663
Variance (KM)	2.767	SE of Mean (KM)	0.324
k hat (KM)	4.383	k star (KM)	3.937
nu hat (KM)	245.5	nu star (KM)	220.5
theta hat (KM)	0.794	theta star (KM)	0.884
80% gamma percentile (KM)	4.81	90% gamma percentile (KM)	5.835
95% gamma percentile (KM)	6.779	99% gamma percentile (KM)	8.796
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (220.49, α)	187.1	Adjusted Chi Square Value (220.49, β)	185.2
95% Gamma Approximate KM-UCL (use when n>=50)	4.103	95% Gamma Adjusted KM-UCL (use when n<50)	4.145
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.344	Mean in Log Scale	1.064
SD in Original Scale	1.83	SD in Log Scale	0.548
95% t UCL (assumes normality of ROS data)	3.933	95% Percentile Bootstrap UCL	3.893
95% BCA Bootstrap UCL	3.937	95% Bootstrap t UCL	3.993
95% H-UCL (Log ROS)	4.151		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.146	KM Geo Mean	3.145
KM SD (logged)	0.439	95% Critical H Value (KM-Log)	1.895
KM Standard Error of Mean (logged)	0.0858	95% H-UCL (KM -Log)	4.064
KM SD (logged)	0.439	95% Critical H Value (KM-Log)	1.895
KM Standard Error of Mean (logged)	0.0858		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.164	Mean in Log Scale	0.942
SD in Original Scale	1.997	SD in Log Scale	0.68
95% t UCL (Assumes normality)	3.807	95% H-Stat UCL	4.256
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	4.034		
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.			

CYANIDE			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	8
		Number of Missing Observations	2
Number of Detects	8	Number of Non-Detects	20
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.94	Minimum Non-Detect	10
Maximum Detect	3.3	Maximum Non-Detect	10
Variance Detects	0.602	Percent Non-Detects	71.43%
Mean Detects	1.6	SD Detects	0.776
Median Detects	1.5	CV Detects	0.485
Skewness Detects	1.695	Kurtosis Detects	3.463
Mean of Logged Detects	0.384	SD of Logged Detects	0.427
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1.6	KM Standard Error of Mean	0.274
KM SD	0.726	95% KM (BCA) UCL	2.157
95% KM (t) UCL	2.067	95% KM (Percentile Bootstrap) UCL	2.075
95% KM (z) UCL	2.051	95% KM Bootstrap t UCL	2.448
90% KM Chebyshev UCL	2.423	95% KM Chebyshev UCL	2.796
97.5% KM Chebyshev UCL	3.313	99% KM Chebyshev UCL	4.33
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.47	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.209	**Kolmogorov-Smirnov GOF**	
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 on Detected Data Only			
k hat (MLE)	5.989	k star (bias corrected MLE)	3.826
Theta hat (MLE)	0.267	Theta star (bias corrected MLE)	0.418
nu hat (MLE)	95.82	nu star (bias corrected)	61.22
Mean (detects)	1.6		
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	0.388	Mean	1.616
Maximum	3.353	Median	1.531
SD	0.775	CV	0.48
k hat (MLE)	4.385	k star (bias corrected MLE)	3.939
Theta hat (MLE)	0.369	Theta star (bias corrected MLE)	0.41
nu hat (MLE)	245.5	nu star (bias corrected)	220.6
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (220.56, α)	187.2	Adjusted Chi Square Value (220.56, β)	185.3
95% Gamma Approximate UCL (use when n>=50)	1.904	95% Gamma Adjusted UCL (use when n<50)	1.924

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.6	SD (KM)	0.726
Variance (KM)	0.527	SE of Mean (KM)	0.274
k hat (KM)	4.859	k star (KM)	4.362
nu hat (KM)	272.1	nu star (KM)	244.3
theta hat (KM)	0.329	theta star (KM)	0.367
80% gamma percentile (KM)	2.184	90% gamma percentile (KM)	2.626
95% gamma percentile (KM)	3.032	99% gamma percentile (KM)	3.894
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (244.30, α)	209.1	Adjusted Chi Square Value (244.30, β)	207.1
95% Gamma Approximate KM-UCL (use when n>=50)	1.869	95% Gamma Adjusted KM-UCL (use when n<50)	1.887
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.609	Mean in Log Scale	0.384
SD in Original Scale	0.725	SD in Log Scale	0.433
95% t UCL (assumes normality of ROS data)	1.842	95% Percentile Bootstrap UCL	1.842
95% BCA Bootstrap UCL	1.853	95% Bootstrap t UCL	1.879
95% H-UCL (Log ROS)	1.887		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.384	KM Geo Mean	1.468
KM SD (logged)	0.399	95% Critical H Value (KM-Log)	1.866
KM Standard Error of Mean (logged)	0.151	95% H-UCL (KM -Log)	1.835
KM SD (logged)	0.399	95% Critical H Value (KM-Log)	1.866
KM Standard Error of Mean (logged)	0.151		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.029	Mean in Log Scale	1.259
SD in Original Scale	1.613	SD in Log Scale	0.604
95% t UCL (Assumes normality)	4.548	95% H-Stat UCL	5.354
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.067		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

IRON			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	20
		Number of Missing Observations	2
Number of Detects	20	Number of Non-Detects	8
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	75.85	Minimum Non-Detect	200
Maximum Detect	62400	Maximum Non-Detect	200
Variance Detects	3.887E+8	Percent Non-Detects	28.57%
Mean Detects	14799	SD Detects	19715
Median Detects	2210	CV Detects	1.332
Skewness Detects	1.122	Kurtosis Detects	0.0455
Mean of Logged Detects	7.88	SD of Logged Detects	2.286
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.314	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	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	10593	KM Standard Error of Mean	3403
KM SD	17550	95% KM (BCA) UCL	16337
95% KM (t) UCL	16388	95% KM (Percentile Bootstrap) UCL	16406
95% KM (z) UCL	16190	95% KM Bootstrap t UCL	17945
90% KM Chebyshev UCL	20801	95% KM Chebyshev UCL	25425
97.5% KM Chebyshev UCL	31843	99% KM Chebyshev UCL	44449
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.326	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.827	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.223	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.208	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)	0.385	k star (bias corrected MLE)	0.36
Theta hat (MLE)	38487	Theta star (bias corrected MLE)	41089
nu hat (MLE)	15.38	nu star (bias corrected)	14.41
Mean (detects)	14799		
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	10571
Maximum	62400	Median	325
SD	17885	CV	1.692
k hat (MLE)	0.155	k star (bias corrected MLE)	0.162
Theta hat (MLE)	68417	Theta star (bias corrected MLE)	65349
nu hat (MLE)	8.652	nu star (bias corrected)	9.059
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (9.06, α)	3.362	Adjusted Chi Square Value (9.06, β)	3.15
95% Gamma Approximate UCL (use when n>=50)	28479	95% Gamma Adjusted UCL (use when n<50)	30395

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	10593	SD (KM)	17550
Variance (KM)	3.080E+8	SE of Mean (KM)	3403
k hat (KM)	0.364	k star (KM)	0.349
nu hat (KM)	20.4	nu star (KM)	19.55
theta hat (KM)	29076	theta star (KM)	30344
80% gamma percentile (KM)	16765	90% gamma percentile (KM)	30600
95% gamma percentile (KM)	46102	99% gamma percentile (KM)	85670
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (19.55, α)	10.52	Adjusted Chi Square Value (19.55, β)	10.11
95% Gamma Approximate KM-UCL (use when n>=50)	19685	95% Gamma Adjusted KM-UCL (use when n<50)	20482
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	10584	Mean in Log Scale	6.555
SD in Original Scale	17877	SD in Log Scale	2.944
95% t UCL (assumes normality of ROS data)	16338	95% Percentile Bootstrap UCL	16323
95% BCA Bootstrap UCL	17232	95% Bootstrap t UCL	18522
95% H-UCL (Log ROS)	1150161		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	6.865	KM Geo Mean	958.6
KM SD (logged)	2.474	95% Critical H Value (KM-Log)	4.641
KM Standard Error of Mean (logged)	0.48	95% H-UCL (KM -Log)	186279
KM SD (logged)	2.474	95% Critical H Value (KM-Log)	4.641
KM Standard Error of Mean (logged)	0.48		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10599	Mean in Log Scale	6.944
SD in Original Scale	17867	SD in Log Scale	2.439
95% t UCL (Assumes normality)	16351	95% H-Stat UCL	174465
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	31843		
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.			

LEAD			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	21
		Number of Missing Observations	2
Number of Detects	20	Number of Non-Detects	8
Number of Distinct Detects	19	Number of Distinct Non-Detects	2
Minimum Detect	0.31	Minimum Non-Detect	0.36
Maximum Detect	51.6	Maximum Non-Detect	1
Variance Detects	128	Percent Non-Detects	28.57%
Mean Detects	3.846	SD Detects	11.31
Median Detects	0.9	CV Detects	2.942
Skewness Detects	4.38	Kurtosis Detects	19.4
Mean of Logged Detects	0.172	SD of Logged Detects	1.152
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.313	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.411	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	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	2.883	KM Standard Error of Mean	1.831
KM SD	9.443	95% KM (BCA) UCL	6.538
95% KM (t) UCL	6.002	95% KM (Percentile Bootstrap) UCL	6.424
95% KM (z) UCL	5.895	95% KM Bootstrap t UCL	27.62
90% KM Chebyshev UCL	8.376	95% KM Chebyshev UCL	10.86
97.5% KM Chebyshev UCL	14.32	99% KM Chebyshev UCL	21.1
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.14	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.799	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.321	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.204	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)	0.535	k star (bias corrected MLE)	0.488
Theta hat (MLE)	7.191	Theta star (bias corrected MLE)	7.882
nu hat (MLE)	21.39	nu star (bias corrected)	19.52
Mean (detects)	3.846		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.771
Maximum	51.6	Median	0.591
SD	9.647	CV	3.481
k hat (MLE)	0.329	k star (bias corrected MLE)	0.317
Theta hat (MLE)	8.427	Theta star (bias corrected MLE)	8.73
nu hat (MLE)	18.42	nu star (bias corrected)	17.78
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (17.78, α)	9.23	Adjusted Chi Square Value (17.78, β)	8.849
95% Gamma Approximate UCL (use when n>=50)	5.338	95% Gamma Adjusted UCL (use when n<50)	5.567

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.883	SD (KM)	9.443
Variance (KM)	89.18	SE of Mean (KM)	1.831
k hat (KM)	0.0932	k star (KM)	0.107
nu hat (KM)	5.22	nu star (KM)	5.994
theta hat (KM)	30.93	theta star (KM)	26.94
80% gamma percentile (KM)	2.198	90% gamma percentile (KM)	7.878
95% gamma percentile (KM)	16.65	99% gamma percentile (KM)	44.26
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.99, α)	1.637	Adjusted Chi Square Value (5.99, β)	1.501
95% Gamma Approximate KM-UCL (use when n>=50)	10.56	95% Gamma Adjusted KM-UCL (use when n<50)	11.51
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.811	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.865	Mean in Log Scale	-0.214
SD in Original Scale	9.622	SD in Log Scale	1.222
95% t UCL (assumes normality of ROS data)	5.962	95% Percentile Bootstrap UCL	6.504
95% BCA Bootstrap UCL	8.369	95% Bootstrap t UCL	27.7
95% H-UCL (Log ROS)	3.247		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.115	KM Geo Mean	0.891
KM SD (logged)	1.074	95% Critical H Value (KM-Log)	2.548
KM Standard Error of Mean (logged)	0.212	95% H-UCL (KM -Log)	2.688
KM SD (logged)	1.074	95% Critical H Value (KM-Log)	2.548
KM Standard Error of Mean (logged)	0.212		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.856	Mean in Log Scale	-0.185
SD in Original Scale	9.624	SD in Log Scale	1.156
95% t UCL (Assumes normality)	5.953	95% H-Stat UCL	2.926
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	2.688		
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.			

DIOXIN-LIKE PCBS TEQ			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	7
		Number of Missing Observations	16
Number of Detects	5	Number of Non-Detects	7
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	6.3000E-4	Minimum Non-Detect	19
Maximum Detect	0.0101	Maximum Non-Detect	21
Variance Detects	1.7717E-5	Percent Non-Detects	58.33%
Mean Detects	0.00398	SD Detects	0.00421
Median Detects	0.00147	CV Detects	1.057
Skewness Detects	0.951	Kurtosis Detects	-1.229
Mean of Logged Detects	-6.071	SD of Logged Detects	1.206
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.827	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00398	KM Standard Error of Mean	0.00188
KM SD	0.00376	95% KM (BCA) UCL	0.00716
95% KM (t) UCL	0.00736	95% KM (Percentile Bootstrap) UCL	0.007
95% KM (z) UCL	0.00708	95% KM Bootstrap t UCL	0.0334
90% KM Chebyshev UCL	0.00963	95% KM Chebyshev UCL	0.0122
97.5% KM Chebyshev UCL	0.0157	99% KM Chebyshev UCL	0.0227
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.437	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.691	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.302	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.364	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.051	k star (bias corrected MLE)	0.554
Theta hat (MLE)	0.00379	Theta star (bias corrected MLE)	0.00719
nu hat (MLE)	10.51	nu star (bias corrected)	5.538
Mean (detects)	0.00398		
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	6.3000E-4	Mean	0.00758
Maximum	0.0111	Median	0.01
SD	0.00408	CV	0.538
k hat (MLE)	1.682	k star (bias corrected MLE)	1.317
Theta hat (MLE)	0.00451	Theta star (bias corrected MLE)	0.00576
nu hat (MLE)	40.37	nu star (bias corrected)	31.61
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (31.61, α)	19.77	Adjusted Chi Square Value (31.61, β)	18.35
95% Gamma Approximate UCL (use when n>=50)	0.0121	95% Gamma Adjusted UCL (use when n<50)	0.0131

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00398	SD (KM)	0.00376
Variance (KM)	1.4173E-5	SE of Mean (KM)	0.00188
k hat (KM)	1.12	k star (KM)	0.895
nu hat (KM)	26.88	nu star (KM)	21.49
theta hat (KM)	0.00356	theta star (KM)	0.00445
80% gamma percentile (KM)	0.00647	90% gamma percentile (KM)	0.00943
95% gamma percentile (KM)	0.0124	99% gamma percentile (KM)	0.0194
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (21.49, α)	11.96	Adjusted Chi Square Value (21.49, β)	10.89
95% Gamma Approximate KM-UCL (use when n>=50)	0.00716	95% Gamma Adjusted KM-UCL (use when n<50)	0.00787
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00384	Mean in Log Scale	-6.071
SD in Original Scale	0.00392	SD in Log Scale	1.087
95% t UCL (assumes normality of ROS data)	0.00587	95% Percentile Bootstrap UCL	0.00566
95% BCA Bootstrap UCL	0.00598	95% Bootstrap t UCL	0.00681
95% H-UCL (Log ROS)	0.0114		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.071	KM Geo Mean	0.00231
KM SD (logged)	1.078	95% Critical H Value (KM-Log)	3.059
KM Standard Error of Mean (logged)	0.539	95% H-UCL (KM -Log)	0.0112
KM SD (logged)	1.078	95% Critical H Value (KM-Log)	3.059
KM Standard Error of Mean (logged)	0.539		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.043	Mean in Log Scale	-1.166
SD in Original Scale	5.338	SD in Log Scale	4.39
95% t UCL (Assumes normality)	8.811	95% H-Stat UCL	4.360E+9
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00736		
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.			

BETA-BHC

General Statistics

Total Number of Observations	30	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	28
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.017	Minimum Non-Detect	0.05
Maximum Detect	0.036	Maximum Non-Detect	0.05
Variance Detects	1.8050E-4	Percent Non-Detects	93.33%
Mean Detects	0.0265	SD Detects	0.0134
Median Detects	0.0265	CV Detects	0.507
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.699	SD of Logged Detects	0.531

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0265	KM Standard Error of Mean	0.0095
KM SD	0.0095	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0426	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0421	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.055	95% KM Chebyshev UCL	0.0679
97.5% KM Chebyshev UCL	0.0858	99% KM Chebyshev UCL	0.121

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	7.432	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00357	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	29.73	nu star (bias corrected)	N/A
Mean (detects)	0.0265		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0265	SD (KM)	0.0095
Variance (KM)	9.0250E-5	SE of Mean (KM)	0.0095
k hat (KM)	7.781	k star (KM)	7.025
nu hat (KM)	466.9	nu star (KM)	421.5
theta hat (KM)	0.00341	theta star (KM)	0.00377
80% gamma percentile (KM)	0.0343	90% gamma percentile (KM)	0.0398
95% gamma percentile (KM)	0.0448	99% gamma percentile (KM)	0.0551

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.041
Approximate Chi Square Value (421.52, α)	374.9	Adjusted Chi Square Value (421.52, β)	372.4
95% Gamma Approximate KM-UCL (use when n>=50)	0.0298	95% Gamma Adjusted KM-UCL (use when n<50)	0.03

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0328	Mean in Log Scale	-3.699
SD in Original Scale	0.0265	SD in Log Scale	0.774
95% t UCL (assumes normality of ROS data)	0.041	95% Percentile Bootstrap UCL	0.041
95% BCA Bootstrap UCL	0.0425	95% Bootstrap t UCL	0.0448
95% H-UCL (Log ROS)	0.0459		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.699	KM Geo Mean	0.0247
KM SD (logged)	0.375	95% Critical H Value (KM-Log)	1.857
KM Standard Error of Mean (logged)	0.375	95% H-UCL (KM -Log)	0.0302
KM SD (logged)	0.375	95% Critical H Value (KM-Log)	1.857
KM Standard Error of Mean (logged)	0.375		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0251	Mean in Log Scale	-3.69
SD in Original Scale	0.00252	SD in Log Scale	0.0986
95% t UCL (Assumes normality)	0.0259	95% H-Stat UCL	N/A
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0679		
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

1,4-DIOXANE			
General Statistics			
Total Number of Observations	30	Number of Distinct Observations	13
Number of Detects	13	Number of Non-Detects	17
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	2.6	Minimum Non-Detect	2
Maximum Detect	260	Maximum Non-Detect	2
Variance Detects	4772	Percent Non-Detects	56.67%
Mean Detects	31.58	SD Detects	69.08
Median Detects	12	CV Detects	2.187
Skewness Detects	3.524	Kurtosis Detects	12.57
Mean of Logged Detects	2.547	SD of Logged Detects	1.158
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.413	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.455	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	14.82	KM Standard Error of Mean	8.757
KM SD	46.08	95% KM (BCA) UCL	32.27
95% KM (t) UCL	29.7	95% KM (Percentile Bootstrap) UCL	31.34
95% KM (z) UCL	29.22	95% KM Bootstrap t UCL	96.88
90% KM Chebyshev UCL	41.09	95% KM Chebyshev UCL	52.99
97.5% KM Chebyshev UCL	69.51	99% KM Chebyshev UCL	102
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.482	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.776	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.32	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.247	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)	0.671	k star (bias corrected MLE)	0.568
Theta hat (MLE)	47.03	Theta star (bias corrected MLE)	55.62
nu hat (MLE)	17.46	nu star (bias corrected)	14.76
Mean (detects)	31.58		
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	13.69
Maximum	260	Median	0.01
SD	47.2	CV	3.448
k hat (MLE)	0.181	k star (bias corrected MLE)	0.185
Theta hat (MLE)	75.54	Theta star (bias corrected MLE)	73.87
nu hat (MLE)	10.87	nu star (bias corrected)	11.12
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (11.12, α)	4.654	Adjusted Chi Square Value (11.12, β)	4.414
95% Gamma Approximate UCL (use when n>=50)	32.72	95% Gamma Adjusted UCL (use when n<50)	34.49

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	14.82	SD (KM)	46.08
Variance (KM)	2124	SE of Mean (KM)	8.757
k hat (KM)	0.103	k star (KM)	0.115
nu hat (KM)	6.203	nu star (KM)	6.916
theta hat (KM)	143.3	theta star (KM)	128.5
80% gamma percentile (KM)	12.4	90% gamma percentile (KM)	41.5
95% gamma percentile (KM)	84.97	99% gamma percentile (KM)	219
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.92, α)	2.125	Adjusted Chi Square Value (6.92, β)	1.975
95% Gamma Approximate KM-UCL (use when n>=50)	48.24	95% Gamma Adjusted KM-UCL (use when n<50)	51.89
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	14.1	Mean in Log Scale	0.603
SD in Original Scale	47.08	SD in Log Scale	2.102
95% t UCL (assumes normality of ROS data)	28.7	95% Percentile Bootstrap UCL	30.72
95% BCA Bootstrap UCL	40.75	95% Bootstrap t UCL	90.9
95% H-UCL (Log ROS)	82.43		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.497	KM Geo Mean	4.466
KM SD (logged)	1.175	95% Critical H Value (KM-Log)	2.705
KM Standard Error of Mean (logged)	0.223	95% H-UCL (KM -Log)	16.07
KM SD (logged)	1.175	95% Critical H Value (KM-Log)	2.705
KM Standard Error of Mean (logged)	0.223		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	14.25	Mean in Log Scale	1.104
SD in Original Scale	47.04	SD in Log Scale	1.484
95% t UCL (Assumes normality)	28.84	95% H-Stat UCL	21.57
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	16.07		
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.			

PENTACHLOROPHENOL

General Statistics

Total Number of Observations	18	Number of Distinct Observations	2
		Number of Missing Observations	12
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable PENTACHLOROPHENOL was not processed!

BENZENE

General Statistics

Total Number of Observations	30	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	29
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZENE was not processed!

CIS-1,2-DICHLOROETHENE			
General Statistics			
Total Number of Observations	30	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	22
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.28	Minimum Non-Detect	0.5
Maximum Detect	46	Maximum Non-Detect	5
Variance Detects	251.2	Percent Non-Detects	73.33%
Mean Detects	7.501	SD Detects	15.85
Median Detects	0.975	CV Detects	2.113
Skewness Detects	2.641	Kurtosis Detects	7.106
Mean of Logged Detects	0.351	SD of Logged Detects	1.844
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.54	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.39	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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	2.324	KM Standard Error of Mean	1.616
KM SD	8.273	95% KM (BCA) UCL	5.349
95% KM (t) UCL	5.07	95% KM (Percentile Bootstrap) UCL	5.263
95% KM (z) UCL	4.983	95% KM Bootstrap t UCL	29.91
90% KM Chebyshev UCL	7.173	95% KM Chebyshev UCL	9.37
97.5% KM Chebyshev UCL	12.42	99% KM Chebyshev UCL	18.41
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.909	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.78	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.318	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.313	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)	0.396	k star (bias corrected MLE)	0.331
Theta hat (MLE)	18.94	Theta star (bias corrected MLE)	22.67
nu hat (MLE)	6.337	nu star (bias corrected)	5.294
Mean (detects)	7.501		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.593
Maximum	46	Median	0.01
SD	8.53	CV	3.289
k hat (MLE)	0.218	k star (bias corrected MLE)	0.218
Theta hat (MLE)	11.91	Theta star (bias corrected MLE)	11.88
nu hat (MLE)	13.07	nu star (bias corrected)	13.09
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (13.09, α)	5.956	Adjusted Chi Square Value (13.09, β)	5.679
95% Gamma Approximate UCL (use when n>=50)	5.701	95% Gamma Adjusted UCL (use when n<50)	5.979

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.324	SD (KM)	8.273
Variance (KM)	68.44	SE of Mean (KM)	1.616
k hat (KM)	0.0789	k star (KM)	0.0932
nu hat (KM)	4.734	nu star (KM)	5.594
theta hat (KM)	29.45	theta star (KM)	24.93
80% gamma percentile (KM)	1.449	90% gamma percentile (KM)	5.994
95% gamma percentile (KM)	13.53	99% gamma percentile (KM)	38.22
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.59, α)	1.436	Adjusted Chi Square Value (5.59, β)	1.319
95% Gamma Approximate KM-UCL (use when n>=50)	9.053	95% Gamma Adjusted KM-UCL (use when n<50)	9.854
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.496	Mean in Log Scale	-0.59
SD in Original Scale	8.393	SD in Log Scale	1.44
95% t UCL (assumes normality of ROS data)	5.099	95% Percentile Bootstrap UCL	5.44
95% BCA Bootstrap UCL	7.68	95% Bootstrap t UCL	26.25
95% H-UCL (Log ROS)	3.563		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.606	KM Geo Mean	0.545
KM SD (logged)	1.125	95% Critical H Value (KM-Log)	2.638
KM Standard Error of Mean (logged)	0.247	95% H-UCL (KM -Log)	1.78
KM SD (logged)	1.125	95% Critical H Value (KM-Log)	2.638
KM Standard Error of Mean (logged)	0.247		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.084	Mean in Log Scale	-0.00195
SD in Original Scale	8.302	SD in Log Scale	1.366
95% t UCL (Assumes normality)	5.659	95% H-Stat UCL	5.383
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	9.37		
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.			

TRICHLOROETHENE			
General Statistics			
Total Number of Observations	30	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	25
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.26	Minimum Non-Detect	0.5
Maximum Detect	7.2	Maximum Non-Detect	5
Variance Detects	8.75	Percent Non-Detects	83.33%
Mean Detects	1.968	SD Detects	2.958
Median Detects	0.58	CV Detects	1.503
Skewness Detects	2.117	Kurtosis Detects	4.535
Mean of Logged Detects	-0.0995	SD of Logged Detects	1.314
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.673	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	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	0.634	KM Standard Error of Mean	0.262
KM SD	1.246	95% KM (BCA) UCL	1.189
95% KM (t) UCL	1.079	95% KM (Percentile Bootstrap) UCL	1.115
95% KM (z) UCL	1.065	95% KM Bootstrap t UCL	2.455
90% KM Chebyshev UCL	1.42	95% KM Chebyshev UCL	1.776
97.5% KM Chebyshev UCL	2.27	99% KM Chebyshev UCL	3.241
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.523	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.286	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.367	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.768	k star (bias corrected MLE)	0.441
Theta hat (MLE)	2.561	Theta star (bias corrected MLE)	4.466
nu hat (MLE)	7.684	nu star (bias corrected)	4.407
Mean (detects)	1.968		
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	0.567
Maximum	7.2	Median	0.01
SD	1.367	CV	2.41
k hat (MLE)	0.318	k star (bias corrected MLE)	0.308
Theta hat (MLE)	1.786	Theta star (bias corrected MLE)	1.841
nu hat (MLE)	19.05	nu star (bias corrected)	18.48
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (18.48, α)	9.739	Adjusted Chi Square Value (18.48, β)	9.373
95% Gamma Approximate UCL (use when n>=50)	1.076	95% Gamma Adjusted UCL (use when n<50)	1.118

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.634	SD (KM)	1.246
Variance (KM)	1.554	SE of Mean (KM)	0.262
k hat (KM)	0.259	k star (KM)	0.255
nu hat (KM)	15.53	nu star (KM)	15.31
theta hat (KM)	2.45	theta star (KM)	2.485
80% gamma percentile (KM)	0.927	90% gamma percentile (KM)	1.9
95% gamma percentile (KM)	3.051	99% gamma percentile (KM)	6.104
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.31, α)	7.476	Adjusted Chi Square Value (15.31, β)	7.16
95% Gamma Approximate KM-UCL (use when n>=50)	1.298	95% Gamma Adjusted KM-UCL (use when n<50)	1.355
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.233	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.654	Mean in Log Scale	-1.049
SD in Original Scale	1.282	SD in Log Scale	0.99
95% t UCL (assumes normality of ROS data)	1.052	95% Percentile Bootstrap UCL	1.089
95% BCA Bootstrap UCL	1.369	95% Bootstrap t UCL	2.042
95% H-UCL (Log ROS)	0.9		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.911	KM Geo Mean	0.402
KM SD (logged)	0.674	95% Critical H Value (KM-Log)	2.109
KM Standard Error of Mean (logged)	0.205	95% H-UCL (KM -Log)	0.657
KM SD (logged)	0.674	95% Critical H Value (KM-Log)	2.109
KM Standard Error of Mean (logged)	0.205		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.436	Mean in Log Scale	-0.251
SD in Original Scale	1.534	SD in Log Scale	1.176
95% t UCL (Assumes normality)	1.912	95% H-Stat UCL	2.808
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.355		
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.			

VINYL CHLORIDE

General Statistics

Total Number of Observations	30	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	28
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	3.7	Minimum Non-Detect	0.5
Maximum Detect	4.2	Maximum Non-Detect	5
Variance Detects	0.125	Percent Non-Detects	93.33%
Mean Detects	3.95	SD Detects	0.354
Median Detects	3.95	CV Detects	0.0895
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	1.372	SD of Logged Detects	0.0896

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.883	KM Standard Error of Mean	0.362
KM SD	1.087	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.499	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.48	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.971	95% KM Chebyshev UCL	2.463
97.5% KM Chebyshev UCL	3.147	99% KM Chebyshev UCL	4.49

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	249.3	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0158	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	997.2	nu star (bias corrected)	N/A
Mean (detects)	3.95		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.883	SD (KM)	1.087
Variance (KM)	1.183	SE of Mean (KM)	0.362
k hat (KM)	0.66	k star (KM)	0.616
nu hat (KM)	39.59	nu star (KM)	36.97
theta hat (KM)	1.339	theta star (KM)	1.434
80% gamma percentile (KM)	1.456	90% gamma percentile (KM)	2.284
95% gamma percentile (KM)	3.148	99% gamma percentile (KM)	5.235

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.041
Approximate Chi Square Value (36.97, α)	24.05	Adjusted Chi Square Value (36.97, β)	23.45
95% Gamma Approximate KM-UCL (use when n>=50)	1.358	95% Gamma Adjusted KM-UCL (use when n<50)	1.393

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.279	Mean in Log Scale	0.772
SD in Original Scale	0.759	SD in Log Scale	0.326
95% t UCL (assumes normality of ROS data)	2.514	95% Percentile Bootstrap UCL	2.502
95% BCA Bootstrap UCL	2.521	95% Bootstrap t UCL	2.528
95% H-UCL (Log ROS)	2.549		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.464	KM Geo Mean	0.629
KM SD (logged)	0.649	95% Critical H Value (KM-Log)	2.085
KM Standard Error of Mean (logged)	0.216	95% H-UCL (KM -Log)	0.998
KM SD (logged)	0.649	95% Critical H Value (KM-Log)	2.085
KM Standard Error of Mean (logged)	0.216		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.397	Mean in Log Scale	-0.281
SD in Original Scale	1.297	SD in Log Scale	1.207
95% t UCL (Assumes normality)	1.799	95% H-Stat UCL	2.893
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.499	KM H-UCL	0.998
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
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.			

Outside Landfill – Shallow Groundwater

Event 2

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	TCDD-TEQ	d_TCDD_TEQ	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	BORON	d_BORON	CADMIUM	d_CADMIUM	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	CYANIDE	d_CYANIDE
LDCA-MW08-1014	0.052	1	2.7	1	205	1	204	1	0.24	1	0.34	1	0.46	1	10	0
LDCA-MW13S-1014			0.66	1	271	1	222	1	0.1	1	2	0	4.6	1	10	0
LDCA-MW14S-1014	0.022	1	16.6	1	197	1	392	1	1	0	2	0	8	1	10	0
LDCA-MW15S-1014	0.686	0	51.3	1	123	1	346	1	5	0	4.7	1	50	0	1.1	1
LDCA-MW16S-1014			10	0	232	1	1100	1	5	0	3	1	50	0	10	0
LDCA-MW17S-1014-AVG	0.320	1	0.125	1	57.9	1	28.9	1	0.033	1	0.33	1	0.125	1	10	0
LDCA-MW18S-1014	0.223	0	0.25	1	39	1	100	0	0.28	1	2	0	5.2	1	10	0
LDCA-MW24-1014	2.12	1														
LDCA-MW25-1014	0.151	1	10	0	533	1	2920	1	5	0	1.1	1	50	0	10	0
LDCA-MW26D-1014	0.048	1	11.3	1	230	1	100	0	1	0	2	0	11.7	1	10	0
LDCA-MW26S-1014	2.10	1	0.5	0	1220	1	119	1	1	0	2	0	1	0	10	0
LDCA-MW27-1014			14.6	1	525	1	646	1	1	0	2	0	6.8	1	10	0
LDCA-MW28-1014			0.69	1	166	1	956	1	1.1	1	2	0	9.8	1	10	0
LDCA-MW29-1014			0.5	0	68.4	1	100	0	1	0	2	0	1	0	10	0
LDCA-MW30-1014			0.5	0	74.6	1	191	1	1	0	2	0	1	0	10	0
LDCA-MW31-1014			10	0	33.1	1	124	1	5	0	2.4	1	50	0	10	0
LDCA-MW32-1014			0.5	0	87.1	1	503	1	1	0	2	0	2.1	1	10	0
LDCA-MW33-1014			0.5	0	75.4	1	100	0	1	0	1.2	1	50	0	10	0
LDCA-MW35-1014			0.5	0	72.4	1	117	1	1	0	2	0	50	0	10	0
LDCA-MW38-1014	0.548	0	1.5	1	408	1	1330	1	1	0	1.4	1	50	0	10	0
LDCA-MW39-1014	0.272	0	0.28	1	55.8	1	111	1	0.076	1	2.5	1	1	0	10	0
LDCA-MW40-1014			0.5	0	126	1	100	0	1	0	3.8	1	50	0	10	0
LDCA-MW41D-1014-AVG	0.093	1	1.15	1	574	1	219	1	2.15	1	1.55	1	60.5	1	10	0
LDCA-MW41S-1014																
LDCA-MW42-1014	0.278	0	0.34	1	121	1	277	1	0.073	1	0.24	1	3.4	1	10	0
LDCA-MW43-1014			10	0	43.7	1	351	1	5	0	1.5	1	50	0	10	0
LDCA-MW44-1014			0.92	1	89.9	1	101	1	1	0	2	0	50	0	10	0
LDCA-MW46-1014			10	0	87.8	1	501	1	5	0	3.6	1	50	0	10	0
LDCA-MW47-1014-AVG			0.325	1	54.5	1	324.5	1	0.047	1	2	0	1.25	1	1.3	1

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	THALLIUM	d_THALLIUM	PENTADECAFLUOROOCTANOIC ACID	d_PENTADECAFLUOROOCTANOIC ACID
LDCA-MW08-1014	14700	1	4.5	1	625	1	1	0	0.13	1
LDCA-MW13S-1014	200	0	1	0	3970	1	1	0	0.11	1
LDCA-MW14S-1014	25300	1	1	0	6260	1	1	0	2	1
LDCA-MW15S-1014	53400	1	10	0	920	1	25	0	0.052	1
LDCA-MW16S-1014	18800	1	10	0	1220	1	25	0	0.13	1
LDCA-MW17S-1014-AVG	200	0	1	0	4.85	1	1	0	0.012	1
LDCA-MW18S-1014	200	0	1	0	1560	1	1	0	0.044	1
LDCA-MW24-1014									0.13	1
LDCA-MW25-1014	5160	1	19.8	1	555	1	25	0	0.2	0
LDCA-MW26D-1014	38400	1	1	0	2740	1	1	0	0.021	1
LDCA-MW26S-1014	41300	1	1	0	337	1	1	0	0.021	1
LDCA-MW27-1014	17000	1	1	0	2360	1	1	0	0.054	1
LDCA-MW28-1014	200	0	1	0	21400	1	1	0	0.14	1
LDCA-MW29-1014	200	0	1	0	2.5	1	1	0	0.044	1
LDCA-MW30-1014	200	0	1	0	92.9	1	1	0	0.048	1
LDCA-MW31-1014	189	1	10	0	825	1	25	0	0.025	1
LDCA-MW32-1014	200	0	1	0	22.4	1	1	0	0.071	1
LDCA-MW33-1014	274	1	1	0	643	1	1	0	0.047	1
LDCA-MW35-1014	100	0	1	0	3730	1	1	0	0.028	1
LDCA-MW38-1014	3350	1	1	0	5350	1	1	0	0.18	1
LDCA-MW39-1014	200	0	1	0	6	1	1	0	0.029	1
LDCA-MW40-1014	544	1	1	0	106	1	1	0	0.021	1
LDCA-MW41D-1014-AVG	855	1	1	0	68850	1	1	0	0.2	1
LDCA-MW41S-1014									0.2	0
LDCA-MW42-1014	200	0	0.35	1	1680	1	1	0	0.044	1
LDCA-MW43-1014	2260	1	10	0	793	1	25	0	0.082	1
LDCA-MW44-1014	3220	1	1	0	11800	1	1	0	0.037	1
LDCA-MW46-1014	132	1	10	0	6160	1	3.9	1	0.13	1
LDCA-MW47-1014-AVG	200	0	1	0	22	1	1	0	0.070	1

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	PERFLUOROOCTANE SULFONIC ACID	d_PERFLUOROOCTANE SULFONIC ACID	NON-DIOXIN-LIKE PCBS	d_NON-DIOXIN-LIKE PCBS	DIOXIN-LIKE PCB_TEQ	d_DIOXIN-LIKE PCB_TEQ
LDCA-MW08-1014	0.42	1	3673	1	0.0011	1
LDCA-MW13S-1014	0.074	1				
LDCA-MW14S-1014	0.17	1	1048	1	0.00051	1
LDCA-MW15S-1014	0.041	0				
LDCA-MW16S-1014	0.16	1				
LDCA-MW17S-1014-AVG	0.041	0	615	1	0.00014	1
LDCA-MW18S-1014	0.04	0	342	1	0.000084	1
LDCA-MW24-1014	0.39	0	31171	1	0.051	1
LDCA-MW25-1014	0.25	1	3088	1	0.0043	1
LDCA-MW26D-1014	0.04	0	23947	1	0.0011	1
LDCA-MW26S-1014	0.016	1	199170	1	0.0046	1
LDCA-MW27-1014	0.021	1				
LDCA-MW28-1014	0.087	1				
LDCA-MW29-1014	0.039	0				
LDCA-MW30-1014	0.025	1				
LDCA-MW31-1014	0.04	0				
LDCA-MW32-1014	0.065	1				
LDCA-MW33-1014	0.015	1				
LDCA-MW35-1014	0.019	1				
LDCA-MW38-1014	0.17	1	101016	1	0.00017	1
LDCA-MW39-1014	0.016	1	2408	1	0.0070	1
LDCA-MW40-1014	0.017	1				
LDCA-MW41D-1014-AVG	0.21	0	1883	1	0.00017	1
LDCA-MW41S-1014	0.41	0				
LDCA-MW42-1014	0.049	1	3757	1	0.00028	1
LDCA-MW43-1014	0.088	1				
LDCA-MW44-1014	0.02	1				
LDCA-MW46-1014	0.11	1				
LDCA-MW47-1014-AVG	0.068	1				

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	ALDRIN	d_ALDRIN	DIELDRIN	d_DIELDRIN	HEPTACHLOR	d_HEPTACHLOR	HEPTACHLOR EPOXIDE	d_HEPTACHLOR EPOXIDE	1,4-DIOXANE	d_1,4-DIOXANE
LDCA-MW08-1014	0.0048	0	0.0019	0	0.00095	0	0.0019	0	0.5	0
LDCA-MW13S-1014	0.00023	1	0.0022	1	0.00074	1	0.00022	1	24	1
LDCA-MW14S-1014	0.0011	1	0.00033	1	0.00056	1	0.00035	1	6.1	1
LDCA-MW15S-1014	0.005	0	0.00038	1	0.001	0	0.002	0	0.37	1
LDCA-MW16S-1014	0.00093	1	0.0075	1	0.00097	0	0.0011	1	24	1
LDCA-MW17S-1014-AVG	0.00018	1	0.002	0	0.001	0	0.000275	1	0.5	0
LDCA-MW18S-1014	0.00019	1	0.042	1	0.001	0	0.00049	1	0.5	0
LDCA-MW24-1014	0.0012	1	0.001	1	0.00053	1	0.002	0	12	1
LDCA-MW25-1014	0.0059	1	0.0054	1	0.0028	1	0.0039	1	0.86	1
LDCA-MW26D-1014	0.0019	1	0.00035	1	0.0012	1	0.0012	1	1	1
LDCA-MW26S-1014	0.00018	1	0.00019	1	0.001	0	0.002	0	0.5	0
LDCA-MW27-1014	0.00025	1	0.00068	1	0.0017	1	0.00033	1	0.34	1
LDCA-MW28-1014	0.0015	1	0.0033	1	0.0021	1	0.00062	1	58	1
LDCA-MW29-1014	0.005	0	0.002	0	0.001	0	0.00022	1	0.14	1
LDCA-MW30-1014	0.00028	1	0.00086	1	0.001	0	0.00036	1	0.9	1
LDCA-MW31-1014	0.00036	1	0.00031	1	0.00067	1	0.00039	1	0.5	0
LDCA-MW32-1014	0.00015	1	0.0011	1	0.00075	1	0.00047	1	12	1
LDCA-MW33-1014	0.005	0	0.0005	1	0.0003	1	0.002	0	2.4	1
LDCA-MW35-1014	0.0003	1	0.0002	1	0.00098	0	0.002	0	0.63	1
LDCA-MW38-1014	0.0014	1	0.0014	1	0.0008	1	0.0019	0	43	1
LDCA-MW39-1014	0.0046	0	0.0027	1	0.00093	0	0.0026	1	0.89	1
LDCA-MW40-1014	0.0049	0	0.0019	0	0.00097	0	0.0019	0	1	1
LDCA-MW41D-1014-AVG	0.00035	1	0.0007	1	0.0016	1	0.001725	1	130	1
LDCA-MW41S-1014	0.00045	1	0.00047	1	0.001	0	0.00026	1	0.12	1
LDCA-MW42-1014	0.00022	1	0.038	1	0.001	0	0.002	0	7.2	1
LDCA-MW43-1014	0.00041	1	0.002	0	0.00087	1	0.00067	1	10	1
LDCA-MW44-1014	0.0049	0	0.00029	1	0.00097	0	0.0019	0	0.86	1
LDCA-MW46-1014	0.00059	1	0.00028	1	0.00054	1	0.00054	1	22	1
LDCA-MW47-1014-AVG	0.0048	0	0.0052	1	0.00058	1	0.00044	1	11.5	1

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	NAPHTHALENE	d_NAPHTHALENE	PENTACHLOROPHENOL	d_PENTACHLOROPHENOL
LDCA-MW08-1014	0.1	0	0.1	0		
LDCA-MW13S-1014	0.1	0	0.013	1		
LDCA-MW14S-1014	0.1	0	0.1	0		
LDCA-MW15S-1014	0.1	0	0.016	1		
LDCA-MW16S-1014	0.02	1	0.0089	1		
LDCA-MW17S-1014-AVG	0.1	0	0.0075	1		
LDCA-MW18S-1014	0.1	0	0.1	0		
LDCA-MW24-1014			4.6	0		
LDCA-MW25-1014	0.1	0	5.2	1	0.21	1
LDCA-MW26D-1014	0.1	0	0.1	0		
LDCA-MW26S-1014	0.1	0	0.1	0		
LDCA-MW27-1014	0.091	0	0.091	0		
LDCA-MW28-1014	0.034	1	0.11	1		
LDCA-MW29-1014	0.093	0	0.044	1		
LDCA-MW30-1014	0.098	0	0.098	0		
LDCA-MW31-1014	0.1	0	0.1	0		
LDCA-MW32-1014	0.099	0	0.02	1		
LDCA-MW33-1014	0.1	0	0.1	0		
LDCA-MW35-1014	0.1	0	0.1	0		
LDCA-MW38-1014	0.1	0	0.1	0		
LDCA-MW39-1014	0.1	0	0.0098	1		
LDCA-MW40-1014	0.1	0	0.032	1		
LDCA-MW41D-1014-AVG	0.1	0	0.039	1		
LDCA-MW41S-1014			4.8	0		
LDCA-MW42-1014	0.1	0	0.0079	1	0.2	0
LDCA-MW43-1014	0.097	0	0.028	1		
LDCA-MW44-1014	0.1	0	0.1	0		
LDCA-MW46-1014	0.097	0	0.057	1		
LDCA-MW47-1014-AVG	0.0078	1	0.0089	1		

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	BIS(2-CHLOROETHYL)ETHER	d_BIS(2-CHLOROETHYL)ETHER	1,1,2-TRICHLOROETHANE	d_1,1,2-TRICHLOROETHANE	1,2-DIBROMO-3-CHLOROPROPANE	d_1,2-DIBROMO-3-CHLOROPROPANE
LDCA-MW08-1014	5	0	0.5	0	0.5	0
LDCA-MW13S-1014	5	0	0.5	0	0.5	0
LDCA-MW14S-1014	1.2	1	0.5	0	0.5	0
LDCA-MW15S-1014	5	0	0.5	0	0.5	0
LDCA-MW16S-1014	4.5	0	0.5	0	0.5	0
LDCA-MW17S-1014-AVG	5	0	0.5	0	0.5	0
LDCA-MW18S-1014	5	0	0.5	0	0.5	0
LDCA-MW24-1014	4.6	0	0.5	0	0.5	0
LDCA-MW25-1014	5	0	0.12	1	0.5	0
LDCA-MW26D-1014	5	0	0.5	0	0.5	0
LDCA-MW26S-1014	5	0	0.5	0	0.5	0
LDCA-MW27-1014	4.5	0	0.5	0	0.5	0
LDCA-MW28-1014	5	0	0.5	0	0.5	0
LDCA-MW29-1014	4.9	0	0.5	0	0.5	0
LDCA-MW30-1014	5	0	0.5	0	0.5	0
LDCA-MW31-1014	5	0	0.5	0	0.5	0
LDCA-MW32-1014	4.5	0	0.5	0	0.5	0
LDCA-MW33-1014	5	0	0.5	0	0.5	0
LDCA-MW35-1014	5	0	0.5	0	0.5	0
LDCA-MW38-1014	5	0	0.5	0	0.5	0
LDCA-MW39-1014	5	0	0.5	0	0.23	1
LDCA-MW40-1014	5	0	0.5	0	0.5	0
LDCA-MW41D-1014-AVG	5	0	0.5	0	0.5	0
LDCA-MW41S-1014	4.8	0	0.5	0	0.5	0
LDCA-MW42-1014	5	0	0.5	0	0.5	0
LDCA-MW43-1014	4.9	0	0.5	0	0.5	0
LDCA-MW44-1014	5	0	0.5	0	0.5	0
LDCA-MW46-1014	4.9	0	0.5	0	0.5	0
LDCA-MW47-1014-AVG	5	0	0.5	0	0.5	0

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	1,2-DICHLOROETHANE	d_1,2-DICHLOROETHANE	1,4-DICHLOROBENZENE	d_1,4-DICHLOROBENZENE	BENZENE	d_BENZENE	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE
LDCA-MW08-1014	0.5	0	0.5	0	0.5	0	2	1
LDCA-MW13S-1014	0.5	0	0.1	1	0.1	1	53	1
LDCA-MW14S-1014	1.1	1	0.5	0	0.19	1	0.26	1
LDCA-MW15S-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW16S-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW17S-1014-AVG	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW18S-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW24-1014	0.5	0	0.5	0	0.12	1	0.38	1
LDCA-MW25-1014	0.5	0	0.31	1	5.9	1	0.55	1
LDCA-MW26D-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW26S-1014	0.5	0	0.77	1	0.5	0	0.073	1
LDCA-MW27-1014	0.5	0	0.37	1	0.5	0	0.18	1
LDCA-MW28-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW29-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW30-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW31-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW32-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW33-1014	0.5	0	0.5	0	0.5	0	0.85	1
LDCA-MW35-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW38-1014	0.5	0	0.26	1	0.27	1	94	1
LDCA-MW39-1014	0.5	0	0.5	0	0.5	0	0.17	1
LDCA-MW40-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW41D-1014-AVG	0.5	0	0.16	1	0.5	0	0.5	0
LDCA-MW41S-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW42-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW43-1014	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW44-1014	0.5	0	0.5	0	0.5	0	0.13	1
LDCA-MW46-1014	0.5	0	0.5	0	0.5	0	0.23	1
LDCA-MW47-1014-AVG	0.5	0	0.5	0	0.5	0	0.5	0

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 2

Samples	ETHYLBENZENE	d_ETHYLBENZENE	TRICHLOROETHENE	d_TRICHLOROETHENE	VINYL CHLORIDE	d_VINYL CHLORIDE
LDCA-MW08-1014	0.5	0	0.5	0	0.25	1
LDCA-MW13S-1014	0.5	0	4.5	1	1.8	1
LDCA-MW14S-1014	0.5	0	0.5	0	0.5	0
LDCA-MW15S-1014	0.5	0	0.5	0	0.5	0
LDCA-MW16S-1014	0.5	0	0.5	0	0.5	0
LDCA-MW17S-1014-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW18S-1014	0.5	0	0.5	0	0.5	0
LDCA-MW24-1014	0.5	0	0.5	0	0.5	0
LDCA-MW25-1014	3.5	1	0.18	1	1.8	1
LDCA-MW26D-1014	0.5	0	0.5	0	0.5	0
LDCA-MW26S-1014	0.5	0	0.5	0	0.14	1
LDCA-MW27-1014	0.5	0	0.5	0	0.5	0
LDCA-MW28-1014	0.5	0	0.5	0	0.5	0
LDCA-MW29-1014	0.5	0	0.5	0	0.5	0
LDCA-MW30-1014	0.5	0	0.5	0	0.5	0
LDCA-MW31-1014	0.5	0	0.5	0	0.5	0
LDCA-MW32-1014	0.5	0	0.5	0	0.5	0
LDCA-MW33-1014	0.5	0	0.41	1	0.5	0
LDCA-MW35-1014	0.5	0	0.5	0	0.5	0
LDCA-MW38-1014	0.5	0	14	1	2.2	1
LDCA-MW39-1014	0.5	0	0.16	1	0.5	0
LDCA-MW40-1014	0.5	0	0.5	0	0.5	0
LDCA-MW41D-1014-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW41S-1014	0.5	0	0.5	0	0.5	0
LDCA-MW42-1014	0.5	0	0.5	0	0.5	0
LDCA-MW43-1014	0.5	0	0.5	0	0.5	0
LDCA-MW44-1014	0.5	0	0.5	0	0.5	0
LDCA-MW46-1014	0.5	0	0.5	0	0.2	1
LDCA-MW47-1014-AVG	0.5	0	0.5	0	0.5	0

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.18/15/2017 11:55:43 AM
From File	ProUCL Data Outside Shallow-Event 2_Rev.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BARIUM

General Statistics

Total Number of Observations	27	Number of Distinct Observations	27
		Number of Missing Observations	2
Minimum	33.1	Mean	213.7
Maximum	1220	Median	121
SD	255.9	Std. Error of Mean	49.26
Coefficient of Variation	1.198	Skewness	2.697

Normal GOF Test

Shapiro Wilk Test Statistic	0.672	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.249	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	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	297.7	95% Adjusted-CLT UCL (Chen-1995)	322
		95% Modified-t UCL (Johnson-1978)	302

Gamma GOF Test

A-D Test Statistic	1.067	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.769	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.179	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.172	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.212	k star (bias corrected MLE)	1.102
Theta hat (MLE)	176.3	Theta star (bias corrected MLE)	193.8
nu hat (MLE)	65.47	nu star (bias corrected)	59.53
MLE Mean (bias corrected)	213.7	MLE Sd (bias corrected)	203.5
		Approximate Chi Square Value (0.05)	42.79
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	41.88

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	297.3	95% Adjusted Gamma UCL (use when n<50)	303.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	3.5	Mean of logged Data	4.899
Maximum of Logged Data	7.107	SD of logged Data	0.931
Assuming Lognormal Distribution			
95% H-UCL	322.5	90% Chebyshev (MVUE) UCL	324.9
95% Chebyshev (MVUE) UCL	380.4	97.5% Chebyshev (MVUE) UCL	457.4
99% Chebyshev (MVUE) UCL	608.7		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	294.7	95% Jackknife UCL	297.7
95% Standard Bootstrap UCL	292.5	95% Bootstrap-t UCL	353.1
95% Hall's Bootstrap UCL	422.3	95% Percentile Bootstrap UCL	299.8
95% BCA Bootstrap UCL	329		
90% Chebyshev(Mean, Sd) UCL	361.5	95% Chebyshev(Mean, Sd) UCL	428.4
97.5% Chebyshev(Mean, Sd) UCL	521.3	99% Chebyshev(Mean, Sd) UCL	703.8
Suggested UCL to Use			
95% H-UCL	322.5		
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.			
ProUCL computes and outputs H-statistic based UCLs for historical reasons only.			
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.			
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.			
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.			

MANGANESE

General Statistics

Total Number of Observations	27	Number of Distinct Observations	27
		Number of Missing Observations	2
Minimum	2.5	Mean	5261
Maximum	68850	Median	920
SD	13515	Std. Error of Mean	2601
Coefficient of Variation	2.569	Skewness	4.37

Normal GOF Test

Shapiro Wilk Test Statistic	0.41	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.359	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	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	9697	95% Adjusted-CLT UCL (Chen-1995)	11876
		95% Modified-t UCL (Johnson-1978)	10061

Gamma GOF Test

A-D Test Statistic	0.572	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.846	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.138	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.182	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.329	k star (bias corrected MLE)	0.317
Theta hat (MLE)	15998	Theta star (bias corrected MLE)	16595
nu hat (MLE)	17.76	nu star (bias corrected)	17.12
MLE Mean (bias corrected)	5261	MLE Sd (bias corrected)	9344
		Approximate Chi Square Value (0.05)	8.756
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	8.374

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	10284	95% Adjusted Gamma UCL (use when n<50)	10753

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.916	Mean of logged Data	6.502
Maximum of Logged Data	11.14	SD of logged Data	2.606

Assuming Lognormal Distribution

95% H-UCL	263881	90% Chebyshev (MVUE) UCL	39032
95% Chebyshev (MVUE) UCL	50838	97.5% Chebyshev (MVUE) UCL	67226
99% Chebyshev (MVUE) UCL	99415		

Nonparametric Distribution Free UCL Statistics

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

Nonparametric Distribution Free UCLs

95% CLT UCL	9539	95% Jackknife UCL	9697
95% Standard Bootstrap UCL	9552	95% Bootstrap-t UCL	22987
95% Hall's Bootstrap UCL	25360	95% Percentile Bootstrap UCL	10116
95% BCA Bootstrap UCL	13206		
90% Chebyshev(Mean, Sd) UCL	13063	95% Chebyshev(Mean, Sd) UCL	16598
97.5% Chebyshev(Mean, Sd) UCL	21503	99% Chebyshev(Mean, Sd) UCL	31140

Suggested UCL to Use

95% Adjusted Gamma UCL	10753		

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.

NON-DIOXIN-LIKE PCBS			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Minimum	342.1	Mean	31010
Maximum	199170	Median	3381
SD	60247	Std. Error of Mean	17392
Coefficient of Variation	1.943	Skewness	2.446
Normal GOF Test			
Shapiro Wilk Test Statistic	0.586	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	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	62243	95% Adjusted-CLT UCL (Chen-1995)	72740
		95% Modified-t UCL (Johnson-1978)	64290
Gamma GOF Test			
A-D Test Statistic	0.897	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.808	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.322	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.263	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.38	k star (bias corrected MLE)	0.341
Theta hat (MLE)	81545	Theta star (bias corrected MLE)	91001
nu hat (MLE)	9.127	nu star (bias corrected)	8.178
MLE Mean (bias corrected)	31010	MLE Sd (bias corrected)	53122
		Approximate Chi Square Value (0.05)	2.839
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	2.381
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	89339	95% Adjusted Gamma UCL (use when n<50)	106516
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.835	Mean of logged Data	8.597
Maximum of Logged Data	12.2	SD of logged Data	2.006
Assuming Lognormal Distribution			
95% H-UCL	821014	90% Chebyshev (MVUE) UCL	80756
95% Chebyshev (MVUE) UCL	104637	97.5% Chebyshev (MVUE) UCL	137783
99% Chebyshev (MVUE) UCL	202892		
Nonparametric Distribution Free UCL Statistics			

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

Nonparametric Distribution Free UCLs

95% CLT UCL	59617	95% Jackknife UCL	62243
95% Standard Bootstrap UCL	58776	95% Bootstrap-t UCL	178097
95% Hall's Bootstrap UCL	186916	95% Percentile Bootstrap UCL	61440
95% BCA Bootstrap UCL	72227		
90% Chebyshev(Mean, Sd) UCL	83185	95% Chebyshev(Mean, Sd) UCL	106819
97.5% Chebyshev(Mean, Sd) UCL	139622	99% Chebyshev(Mean, Sd) UCL	204056

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	204056		

Recommended UCL exceeds the maximum observation

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

DIOXIN-LIKE PCB_TEQ			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Minimum	8.4000E-5	Mean	0.00591
Maximum	0.0514	Median	7.9200E-4
SD	0.0145	Std. Error of Mean	0.00419
Coefficient of Variation	2.453	Skewness	3.316
Normal GOF Test			
Shapiro Wilk Test Statistic	0.448	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.387	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	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	0.0134	95% Adjusted-CLT UCL (Chen-1995)	0.0171
		95% Modified-t UCL (Johnson-1978)	0.0141
Gamma GOF Test			
A-D Test Statistic	0.956	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.812	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.245	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.263	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.362	k star (bias corrected MLE)	0.327
Theta hat (MLE)	0.0163	Theta star (bias corrected MLE)	0.0181
nu hat (MLE)	8.681	nu star (bias corrected)	7.844
MLE Mean (bias corrected)	0.00591	MLE Sd (bias corrected)	0.0103
		Approximate Chi Square Value (0.05)	2.645
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	2.207
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	0.0175	95% Adjusted Gamma UCL (use when n<50)	0.021
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-9.385	Mean of logged Data	-6.98
Maximum of Logged Data	-2.969	SD of logged Data	1.96
Assuming Lognormal Distribution			
95% H-UCL	0.113	90% Chebyshev (MVUE) UCL	0.0128
95% Chebyshev (MVUE) UCL	0.0165	97.5% Chebyshev (MVUE) UCL	0.0217
99% Chebyshev (MVUE) UCL	0.032		
Nonparametric Distribution Free UCL Statistics			

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

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0128	95% Jackknife UCL	0.0134
95% Standard Bootstrap UCL	0.0124	95% Bootstrap-t UCL	0.0487
95% Hall's Bootstrap UCL	0.0394	95% Percentile Bootstrap UCL	0.014
95% BCA Bootstrap UCL	0.0178		
90% Chebyshev(Mean, Sd) UCL	0.0185	95% Chebyshev(Mean, Sd) UCL	0.0242
97.5% Chebyshev(Mean, Sd) UCL	0.0321	99% Chebyshev(Mean, Sd) UCL	0.0476

Suggested UCL to Use

95% Adjusted Gamma UCL	0.021		

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

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

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

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

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/15/2017 12:06:49 PM
From File	ProUCL Data Outside Shallow-Event 2_Rev.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TCDD-TEQ			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	12
Number of Detects	8	Number of Non-Detects	5
Number of Distinct Detects	8	Number of Distinct Non-Detects	5
Minimum Detect	0.0221	Minimum Non-Detect	0.223
Maximum Detect	2.122	Maximum Non-Detect	0.686
Variance Detects	0.864	Percent Non-Detects	38.46%
Mean Detects	0.614	SD Detects	0.929
Median Detects	0.122	CV Detects	1.515
Skewness Detects	1.399	Kurtosis Detects	-0.0614
Mean of Logged Detects	-1.716	SD of Logged Detects	1.717
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.642	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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	0.41	KM Standard Error of Mean	0.217
KM SD	0.73	95% KM (BCA) UCL	0.78
95% KM (t) UCL	0.797	95% KM (Percentile Bootstrap) UCL	0.755
95% KM (z) UCL	0.767	95% KM Bootstrap t UCL	2.893
90% KM Chebyshev UCL	1.061	95% KM Chebyshev UCL	1.356
97.5% KM Chebyshev UCL	1.765	99% KM Chebyshev UCL	2.57
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.731	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.252	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.309	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.515	k star (bias corrected MLE)	0.405
Theta hat (MLE)	1.192	Theta star (bias corrected MLE)	1.514
nu hat (MLE)	8.24	nu star (bias corrected)	6.483
Mean (detects)	0.614		
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	0.387
Maximum	2.122	Median	0.0478
SD	0.77	CV	1.991
k hat (MLE)	0.4	k star (bias corrected MLE)	0.359
Theta hat (MLE)	0.968	Theta star (bias corrected MLE)	1.078
nu hat (MLE)	10.39	nu star (bias corrected)	9.325
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (9.33, α)	3.525	Adjusted Chi Square Value (9.33, β)	3.034

95% Gamma Approximate UCL (use when n>=50)	1.023	95% Gamma Adjusted UCL (use when n<50)	1.189
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.41	SD (KM)	0.73
Variance (KM)	0.533	SE of Mean (KM)	0.217
k hat (KM)	0.315	k star (KM)	0.294
nu hat (KM)	8.192	nu star (KM)	7.635
theta hat (KM)	1.301	theta star (KM)	1.396
80% gamma percentile (KM)	0.625	90% gamma percentile (KM)	1.212
95% gamma percentile (KM)	1.888	99% gamma percentile (KM)	3.65
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.64, α)	2.526	Adjusted Chi Square Value (7.64, β)	2.127
95% Gamma Approximate KM-UCL (use when n>=50)	1.239	95% Gamma Adjusted KM-UCL (use when n<50)	1.472
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.174	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.406	Mean in Log Scale	-2.055
SD in Original Scale	0.761	SD in Log Scale	1.387
95% t UCL (assumes normality of ROS data)	0.782	95% Percentile Bootstrap UCL	0.728
95% BCA Bootstrap UCL	0.883	95% Bootstrap t UCL	3.6
95% H-UCL (Log ROS)	1.395		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.111	KM Geo Mean	0.121
KM SD (logged)	1.428	95% Critical H Value (KM-Log)	3.641
KM Standard Error of Mean (logged)	0.459	95% H-UCL (KM -Log)	1.505
KM SD (logged)	1.428	95% Critical H Value (KM-Log)	3.641
KM Standard Error of Mean (logged)	0.459		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.455	Mean in Log Scale	-1.712
SD in Original Scale	0.742	SD in Log Scale	1.342
95% t UCL (Assumes normality)	0.822	95% H-Stat UCL	1.706
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2.893	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.472
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.			

ARSENIC

General Statistics			
Total Number of Observations	27	Number of Distinct Observations	17
		Number of Missing Observations	2
Number of Detects	15	Number of Non-Detects	12
Number of Distinct Detects	15	Number of Distinct Non-Detects	2
Minimum Detect	0.125	Minimum Non-Detect	0.5
Maximum Detect	51.3	Maximum Non-Detect	10
Variance Detects	182.7	Percent Non-Detects	44.44%
Mean Detects	6.849	SD Detects	13.52
Median Detects	0.92	CV Detects	1.973
Skewness Detects	2.897	Kurtosis Detects	9.182
Mean of Logged Detects	0.372	SD of Logged Detects	1.816

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.559	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	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	3.985	KM Standard Error of Mean	2.043
KM SD	10.25	95% KM (BCA) UCL	7.733
95% KM (t) UCL	7.469	95% KM (Percentile Bootstrap) UCL	7.634
95% KM (z) UCL	7.345	95% KM Bootstrap t UCL	13.59
90% KM Chebyshev UCL	10.11	95% KM Chebyshev UCL	12.89
97.5% KM Chebyshev UCL	16.74	99% KM Chebyshev UCL	24.31

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.139	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.81	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.236	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)	0.421	k star (bias corrected MLE)	0.381
Theta hat (MLE)	16.29	Theta star (bias corrected MLE)	17.98
nu hat (MLE)	12.62	nu star (bias corrected)	11.43
Mean (detects)	6.849		

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	3.949
Maximum	51.3	Median	0.28
SD	10.48	CV	2.654
k hat (MLE)	0.239	k star (bias corrected MLE)	0.237
Theta hat (MLE)	16.52	Theta star (bias corrected MLE)	16.65
nu hat (MLE)	12.9	nu star (bias corrected)	12.8
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (12.80, α)	5.761	Adjusted Chi Square Value (12.80, β)	5.461

95% Gamma Approximate UCL (use when n>=50)	8.775	95% Gamma Adjusted UCL (use when n<50)	9.259
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.985	SD (KM)	10.25
Variance (KM)	105.1	SE of Mean (KM)	2.043
k hat (KM)	0.151	k star (KM)	0.159
nu hat (KM)	8.161	nu star (KM)	8.587
theta hat (KM)	26.37	theta star (KM)	25.06
80% gamma percentile (KM)	4.541	90% gamma percentile (KM)	11.9
95% gamma percentile (KM)	21.67	99% gamma percentile (KM)	49.7
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (8.59, α)	3.08	Adjusted Chi Square Value (8.59, β)	2.872
95% Gamma Approximate KM-UCL (use when n>=50)	11.11	95% Gamma Adjusted KM-UCL (use when n<50)	11.91
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.01	Mean in Log Scale	-0.363
SD in Original Scale	10.44	SD in Log Scale	1.726
95% t UCL (assumes normality of ROS data)	7.436	95% Percentile Bootstrap UCL	7.422
95% BCA Bootstrap UCL	9.254	95% Bootstrap t UCL	14.25
95% H-UCL (Log ROS)	10.41		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.318	KM Geo Mean	0.728
KM SD (logged)	1.578	95% Critical H Value (KM-Log)	3.358
KM Standard Error of Mean (logged)	0.332	95% H-UCL (KM -Log)	7.142
KM SD (logged)	1.578	95% Critical H Value (KM-Log)	3.358
KM Standard Error of Mean (logged)	0.332		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.796	Mean in Log Scale	0.145
SD in Original Scale	10.31	SD in Log Scale	1.688
95% t UCL (Assumes normality)	8.181	95% H-Stat UCL	15.47
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	12.89		
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.			

BORON			
General Statistics			
Total Number of Observations	27	Number of Distinct Observations	23
		Number of Missing Observations	2
Number of Detects	22	Number of Non-Detects	5
Number of Distinct Detects	22	Number of Distinct Non-Detects	1
Minimum Detect	28.9	Minimum Non-Detect	100
Maximum Detect	2920	Maximum Non-Detect	100
Variance Detects	408447	Percent Non-Detects	18.52%
Mean Detects	503.8	SD Detects	639.1
Median Detects	300.8	CV Detects	1.269
Skewness Detects	2.899	Kurtosis Detects	9.791
Mean of Logged Detects	5.702	SD of Logged Detects	1.033
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.65	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	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	415.8	KM Standard Error of Mean	116.8
KM SD	593.1	95% KM (BCA) UCL	635.4
95% KM (t) UCL	615.1	95% KM (Percentile Bootstrap) UCL	635.7
95% KM (z) UCL	608	95% KM Bootstrap t UCL	773.9
90% KM Chebyshev UCL	766.3	95% KM Chebyshev UCL	925
97.5% KM Chebyshev UCL	1145	99% KM Chebyshev UCL	1578
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.632	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.152	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.19	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.098	k star (bias corrected MLE)	0.978
Theta hat (MLE)	458.9	Theta star (bias corrected MLE)	514.9
nu hat (MLE)	48.3	nu star (bias corrected)	43.05
Mean (detects)	503.8		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	410.5
Maximum	2920	Median	219
SD	608	CV	1.481
k hat (MLE)	0.309	k star (bias corrected MLE)	0.299
Theta hat (MLE)	1330	Theta star (bias corrected MLE)	1373
nu hat (MLE)	16.66	nu star (bias corrected)	16.15
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (16.15, α)	8.066	Adjusted Chi Square Value (16.15, β)	7.701

95% Gamma Approximate UCL (use when n>=50)	821.8	95% Gamma Adjusted UCL (use when n<50)	860.7
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	415.8	SD (KM)	593.1
Variance (KM)	351710	SE of Mean (KM)	116.8
k hat (KM)	0.492	k star (KM)	0.462
nu hat (KM)	26.55	nu star (KM)	24.93
theta hat (KM)	845.8	theta star (KM)	900.6
80% gamma percentile (KM)	680	90% gamma percentile (KM)	1143
95% gamma percentile (KM)	1643	99% gamma percentile (KM)	2882
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (24.93, α)	14.56	Adjusted Chi Square Value (24.93, β)	14.05
95% Gamma Approximate KM-UCL (use when n>=50)	712.1	95% Gamma Adjusted KM-UCL (use when n<50)	737.8
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.981	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.101	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	417.6	Mean in Log Scale	5.305
SD in Original Scale	603.2	SD in Log Scale	1.272
95% t UCL (assumes normality of ROS data)	615.6	95% Percentile Bootstrap UCL	615.3
95% BCA Bootstrap UCL	698.5	95% Bootstrap t UCL	778.4
95% H-UCL (Log ROS)	930.2		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.269	KM Geo Mean	194.2
KM SD (logged)	1.286	95% Critical H Value (KM-Log)	2.916
KM Standard Error of Mean (logged)	0.253	95% H-UCL (KM -Log)	926.6
KM SD (logged)	1.286	95% Critical H Value (KM-Log)	2.916
KM Standard Error of Mean (logged)	0.253		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	419.8	Mean in Log Scale	5.37
SD in Original Scale	601.8	SD in Log Scale	1.168
95% t UCL (Assumes normality)	617.3	95% H-Stat UCL	797.1
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	737.8		
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.			

CADMIUM			
General Statistics			
Total Number of Observations	27	Number of Distinct Observations	11
		Number of Missing Observations	2
Number of Detects	9	Number of Non-Detects	18
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	0.033	Minimum Non-Detect	1
Maximum Detect	2.15	Maximum Non-Detect	5
Variance Detects	0.516	Percent Non-Detects	66.67%
Mean Detects	0.455	SD Detects	0.718
Median Detects	0.1	CV Detects	1.577
Skewness Detects	2.091	Kurtosis Detects	4.027
Mean of Logged Detects	-1.757	SD of Logged Detects	1.428
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.656	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	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	0.264	KM Standard Error of Mean	0.114
KM SD	0.478	95% KM (BCA) UCL	0.449
95% KM (t) UCL	0.458	95% KM (Percentile Bootstrap) UCL	0.46
95% KM (z) UCL	0.451	95% KM Bootstrap t UCL	0.803
90% KM Chebyshev UCL	0.606	95% KM Chebyshev UCL	0.76
97.5% KM Chebyshev UCL	0.974	99% KM Chebyshev UCL	1.396
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.713	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.252	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.292	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.632	k star (bias corrected MLE)	0.495
Theta hat (MLE)	0.721	Theta star (bias corrected MLE)	0.92
nu hat (MLE)	11.37	nu star (bias corrected)	8.914
Mean (detects)	0.455		
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	0.29
Maximum	2.15	Median	0.0927
SD	0.468	CV	1.613
k hat (MLE)	0.538	k star (bias corrected MLE)	0.503
Theta hat (MLE)	0.539	Theta star (bias corrected MLE)	0.577
nu hat (MLE)	29.06	nu star (bias corrected)	27.16
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (27.16, α)	16.28	Adjusted Chi Square Value (27.16, β)	15.74

95% Gamma Approximate UCL (use when n>=50)	0.484	95% Gamma Adjusted UCL (use when n<50)	0.501
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.264	SD (KM)	0.478
Variance (KM)	0.229	SE of Mean (KM)	0.114
k hat (KM)	0.306	k star (KM)	0.297
nu hat (KM)	16.52	nu star (KM)	16.02
theta hat (KM)	0.864	theta star (KM)	0.891
80% gamma percentile (KM)	0.404	90% gamma percentile (KM)	0.781
95% gamma percentile (KM)	1.214	99% gamma percentile (KM)	2.341
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (16.02, α)	7.976	Adjusted Chi Square Value (16.02, β)	7.614
95% Gamma Approximate KM-UCL (use when n>=50)	0.531	95% Gamma Adjusted KM-UCL (use when n<50)	0.556
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.259	Mean in Log Scale	-2.092
SD in Original Scale	0.44	SD in Log Scale	1.164
95% t UCL (assumes normality of ROS data)	0.404	95% Percentile Bootstrap UCL	0.407
95% BCA Bootstrap UCL	0.488	95% Bootstrap t UCL	0.618
95% H-UCL (Log ROS)	0.455		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.114	KM Geo Mean	0.121
KM SD (logged)	1.086	95% Critical H Value (KM-Log)	2.635
KM Standard Error of Mean (logged)	0.329	95% H-UCL (KM -Log)	0.382
KM SD (logged)	1.086	95% Critical H Value (KM-Log)	2.635
KM Standard Error of Mean (logged)	0.329		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.93	Mean in Log Scale	-0.69
SD in Original Scale	0.944	SD in Log Scale	1.272
95% t UCL (Assumes normality)	1.239	95% H-Stat UCL	2.317
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.556		
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.			

CHROMIUM			
General Statistics			
Total Number of Observations	27	Number of Distinct Observations	15
		Number of Missing Observations	2
Number of Detects	14	Number of Non-Detects	13
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	0.24	Minimum Non-Detect	2
Maximum Detect	4.7	Maximum Non-Detect	2
Variance Detects	1.954	Percent Non-Detects	48.15%
Mean Detects	1.976	SD Detects	1.398
Median Detects	1.525	CV Detects	0.707
Skewness Detects	0.536	Kurtosis Detects	-0.665
Mean of Logged Detects	0.35	SD of Logged Detects	0.955
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	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	1.485	KM Standard Error of Mean	0.259
KM SD	1.154	95% KM (BCA) UCL	1.908
95% KM (t) UCL	1.927	95% KM (Percentile Bootstrap) UCL	1.916
95% KM (z) UCL	1.911	95% KM Bootstrap t UCL	1.939
90% KM Chebyshev UCL	2.262	95% KM Chebyshev UCL	2.614
97.5% KM Chebyshev UCL	3.103	99% KM Chebyshev UCL	4.062
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.365	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.144	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.232	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.657	k star (bias corrected MLE)	1.35
Theta hat (MLE)	1.192	Theta star (bias corrected MLE)	1.464
nu hat (MLE)	46.4	nu star (bias corrected)	37.79
Mean (detects)	1.976		
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	0.0876	Mean	1.487
Maximum	4.7	Median	1.207
SD	1.188	CV	0.799
k hat (MLE)	1.509	k star (bias corrected MLE)	1.366
Theta hat (MLE)	0.986	Theta star (bias corrected MLE)	1.089
nu hat (MLE)	81.47	nu star (bias corrected)	73.75
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (73.75, α)	54.98	Adjusted Chi Square Value (73.75, β)	53.94

95% Gamma Approximate UCL (use when n>=50)	1.995	95% Gamma Adjusted UCL (use when n<50)	2.033
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.485	SD (KM)	1.154
Variance (KM)	1.332	SE of Mean (KM)	0.259
k hat (KM)	1.656	k star (KM)	1.497
nu hat (KM)	89.43	nu star (KM)	80.82
theta hat (KM)	0.897	theta star (KM)	0.992
80% gamma percentile (KM)	2.299	90% gamma percentile (KM)	3.097
95% gamma percentile (KM)	3.872	99% gamma percentile (KM)	5.623
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (80.82, α)	61.11	Adjusted Chi Square Value (80.82, β)	60.01
95% Gamma Approximate KM-UCL (use when n>=50)	1.965	95% Gamma Adjusted KM-UCL (use when n<50)	2.001
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.437	Mean in Log Scale	0.0288
SD in Original Scale	1.186	SD in Log Scale	0.866
95% t UCL (assumes normality of ROS data)	1.826	95% Percentile Bootstrap UCL	1.824
95% BCA Bootstrap UCL	1.877	95% Bootstrap t UCL	1.913
95% H-UCL (Log ROS)	2.233		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.0516	KM Geo Mean	1.053
KM SD (logged)	0.893	95% Critical H Value (KM-Log)	2.385
KM Standard Error of Mean (logged)	0.243	95% H-UCL (KM -Log)	2.382
KM SD (logged)	0.893	95% Critical H Value (KM-Log)	2.385
KM Standard Error of Mean (logged)	0.243		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.506	Mean in Log Scale	0.181
SD in Original Scale	1.106	SD in Log Scale	0.698
95% t UCL (Assumes normality)	1.869	95% H-Stat UCL	2.057
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.927		
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.			

COBALT

General Statistics			
Total Number of Observations	27	Number of Distinct Observations	14
		Number of Missing Observations	2
Number of Detects	12	Number of Non-Detects	15
Number of Distinct Detects	12	Number of Distinct Non-Detects	2
Minimum Detect	0.125	Minimum Non-Detect	1
Maximum Detect	60.45	Maximum Non-Detect	50
Variance Detects	271.1	Percent Non-Detects	55.56%
Mean Detects	9.49	SD Detects	16.47
Median Detects	4.9	CV Detects	1.735
Skewness Detects	3.161	Kurtosis Detects	10.47
Mean of Logged Detects	1.279	SD of Logged Detects	1.61

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.538	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.363	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	5.744	KM Standard Error of Mean	2.366
KM SD	11.34	95% KM (BCA) UCL	10.69
95% KM (t) UCL	9.781	95% KM (Percentile Bootstrap) UCL	10.14
95% KM (z) UCL	9.637	95% KM Bootstrap t UCL	15.08
90% KM Chebyshev UCL	12.84	95% KM Chebyshev UCL	16.06
97.5% KM Chebyshev UCL	20.52	99% KM Chebyshev UCL	29.29

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.415	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.194	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.257	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.631	k star (bias corrected MLE)	0.529
Theta hat (MLE)	15.03	Theta star (bias corrected MLE)	17.94
nu hat (MLE)	15.15	nu star (bias corrected)	12.7
Mean (detects)	9.49		

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	6.024
Maximum	60.45	Median	2.054
SD	12.05	CV	2.001
k hat (MLE)	0.273	k star (bias corrected MLE)	0.267
Theta hat (MLE)	22.06	Theta star (bias corrected MLE)	22.53
nu hat (MLE)	14.75	nu star (bias corrected)	14.44
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (14.44, α)	6.875	Adjusted Chi Square Value (14.44, β)	6.542

95% Gamma Approximate UCL (use when n>=50)	12.65	95% Gamma Adjusted UCL (use when n<50)	13.3
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.744	SD (KM)	11.34
Variance (KM)	128.6	SE of Mean (KM)	2.366
k hat (KM)	0.257	k star (KM)	0.253
nu hat (KM)	13.85	nu star (KM)	13.65
theta hat (KM)	22.39	theta star (KM)	22.73
80% gamma percentile (KM)	8.374	90% gamma percentile (KM)	17.23
95% gamma percentile (KM)	27.72	99% gamma percentile (KM)	55.59
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (13.65, α)	6.33	Adjusted Chi Square Value (13.65, β)	6.013
95% Gamma Approximate KM-UCL (use when n>=50)	12.38	95% Gamma Adjusted KM-UCL (use when n<50)	13.04
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	5.692	Mean in Log Scale	0.578
SD in Original Scale	11.65	SD in Log Scale	1.626
95% t UCL (assumes normality of ROS data)	9.516	95% Percentile Bootstrap UCL	9.73
95% BCA Bootstrap UCL	12.5	95% Bootstrap t UCL	15.98
95% H-UCL (Log ROS)	19.97		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.507	KM Geo Mean	1.661
KM SD (logged)	1.735	95% Critical H Value (KM-Log)	3.607
KM Standard Error of Mean (logged)	0.468	95% H-UCL (KM -Log)	25.51
KM SD (logged)	1.735	95% Critical H Value (KM-Log)	3.607
KM Standard Error of Mean (logged)	0.468		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	14.48	Mean in Log Scale	1.777
SD in Original Scale	14.25	SD in Log Scale	1.741
95% t UCL (Assumes normality)	19.16	95% H-Stat UCL	92.43
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	13.04		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

CYANIDE

General Statistics

Total Number of Observations	27	Number of Distinct Observations	3
		Number of Missing Observations	2
Number of Detects	2	Number of Non-Detects	25
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	10
Maximum Detect	1.3	Maximum Non-Detect	10
Variance Detects	0.02	Percent Non-Detects	92.59%
Mean Detects	1.2	SD Detects	0.141
Median Detects	1.2	CV Detects	0.118
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.179	SD of Logged Detects	0.118

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	1.2	KM Standard Error of Mean	0.1
KM SD	0.1	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.371	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.364	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.5	95% KM Chebyshev UCL	1.636
97.5% KM Chebyshev UCL	1.824	99% KM Chebyshev UCL	2.195

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	143.7	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00835	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	574.7	nu star (bias corrected)	N/A
Mean (detects)	1.2		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.2	SD (KM)	0.1
Variance (KM)	0.01	SE of Mean (KM)	0.1
k hat (KM)	144	k star (KM)	128
nu hat (KM)	7776	nu star (KM)	6913
theta hat (KM)	0.00833	theta star (KM)	0.00937
80% gamma percentile (KM)	1.288	90% gamma percentile (KM)	1.338
95% gamma percentile (KM)	1.38	99% gamma percentile (KM)	1.46

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (N/A, α)	6721	Adjusted Chi Square Value (N/A, β)	6709
95% Gamma Approximate KM-UCL (use when n>=50)	1.234	95% Gamma Adjusted KM-UCL (use when n<50)	1.237

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.213	Mean in Log Scale	0.179
SD in Original Scale	0.207	SD in Log Scale	0.17
95% t UCL (assumes normality of ROS data)	1.281	95% Percentile Bootstrap UCL	1.278
95% BCA Bootstrap UCL	1.283	95% Bootstrap t UCL	1.284
95% H-UCL (Log ROS)	1.286		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.179	KM Geo Mean	1.196
KM SD (logged)	0.0835	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0835	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0835	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0835		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.719	Mean in Log Scale	1.503
SD in Original Scale	1.015	SD in Log Scale	0.383
95% t UCL (Assumes normality)	5.052	95% H-Stat UCL	5.57
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.371	KM H-UCL	N/A
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

IRON

General Statistics

Total Number of Observations	27	Number of Distinct Observations	18
		Number of Missing Observations	2
Number of Detects	16	Number of Non-Detects	11
Number of Distinct Detects	16	Number of Distinct Non-Detects	2
Minimum Detect	132	Minimum Non-Detect	100
Maximum Detect	53400	Maximum Non-Detect	200
Variance Detects	2.949E+8	Percent Non-Detects	40.74%
Mean Detects	14055	SD Detects	17174
Median Detects	4255	CV Detects	1.222
Skewness Detects	1.196	Kurtosis Detects	0.348
Mean of Logged Detects	8.29	SD of Logged Detects	2.03

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.805	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	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	8385	KM Standard Error of Mean	2885
KM SD	14513	95% KM (BCA) UCL	13503
95% KM (t) UCL	13305	95% KM (Percentile Bootstrap) UCL	13138
95% KM (z) UCL	13130	95% KM Bootstrap t UCL	15575
90% KM Chebyshev UCL	17039	95% KM Chebyshev UCL	20959
97.5% KM Chebyshev UCL	26399	99% KM Chebyshev UCL	37087

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.385	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.796	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.503	k star (bias corrected MLE)	0.451
Theta hat (MLE)	27927	Theta star (bias corrected MLE)	31193
nu hat (MLE)	16.11	nu star (bias corrected)	14.42
Mean (detects)	14055		

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	8329
Maximum	53400	Median	274
SD	14822	CV	1.78
k hat (MLE)	0.131	k star (bias corrected MLE)	0.141
Theta hat (MLE)	63673	Theta star (bias corrected MLE)	59085
nu hat (MLE)	7.064	nu star (bias corrected)	7.612
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (7.61, α)	2.513	Adjusted Chi Square Value (7.61, β)	2.329

95% Gamma Approximate UCL (use when n>=50)	25234	95% Gamma Adjusted UCL (use when n<50)	27224
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	8385	SD (KM)	14513
Variance (KM)	2.106E+8	SE of Mean (KM)	2885
k hat (KM)	0.334	k star (KM)	0.321
nu hat (KM)	18.02	nu star (KM)	17.35
theta hat (KM)	25120	theta star (KM)	26089
80% gamma percentile (KM)	13062	90% gamma percentile (KM)	24513
95% gamma percentile (KM)	37508	99% gamma percentile (KM)	70999
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (17.35, α)	8.926	Adjusted Chi Square Value (17.35, β)	8.54
95% Gamma Approximate KM-UCL (use when n>=50)	16302	95% Gamma Adjusted KM-UCL (use when n<50)	17039
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	8380	Mean in Log Scale	6.547
SD in Original Scale	14793	SD in Log Scale	2.804
95% t UCL (assumes normality of ROS data)	13235	95% Percentile Bootstrap UCL	13394
95% BCA Bootstrap UCL	14552	95% Bootstrap t UCL	15454
95% H-UCL (Log ROS)	694967		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	6.902	KM Geo Mean	993.9
KM SD (logged)	2.263	95% Critical H Value (KM-Log)	4.477
KM Standard Error of Mean (logged)	0.455	95% H-UCL (KM -Log)	93885
KM SD (logged)	2.263	95% Critical H Value (KM-Log)	4.477
KM Standard Error of Mean (logged)	0.455		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8368	Mean in Log Scale	6.763
SD in Original Scale	14799	SD in Log Scale	2.432
95% t UCL (Assumes normality)	13226	95% H-Stat UCL	161869
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	17039		
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.			

LEAD

General Statistics

Total Number of Observations	27	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	24
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.35	Minimum Non-Detect	1
Maximum Detect	19.8	Maximum Non-Detect	10
Variance Detects	104.9	Percent Non-Detects	88.89%
Mean Detects	8.217	SD Detects	10.24
Median Detects	4.5	CV Detects	1.247
Skewness Detects	1.418	Kurtosis Detects	N/A
Mean of Logged Detects	1.147	SD of Logged Detects	2.041

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.308	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	1.261	KM Standard Error of Mean	0.887
KM SD	3.738	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.773	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.719	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.921	95% KM Chebyshev UCL	5.125
97.5% KM Chebyshev UCL	6.798	99% KM Chebyshev UCL	10.08

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.638	k star (bias corrected MLE)	N/A
Theta hat (MLE)	12.88	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.829	nu star (bias corrected)	N/A
Mean (detects)	8.217		

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	1.606
Maximum	19.8	Median	0.01
SD	3.973	CV	2.473
k hat (MLE)	0.241	k star (bias corrected MLE)	0.239
Theta hat (MLE)	6.66	Theta star (bias corrected MLE)	6.719
nu hat (MLE)	13.02	nu star (bias corrected)	12.91
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (12.91, α)	5.832	Adjusted Chi Square Value (12.91, β)	5.529

95% Gamma Approximate UCL (use when n>=50)	3.556	95% Gamma Adjusted UCL (use when n<50)	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.261	SD (KM)	3.738
Variance (KM)	13.97	SE of Mean (KM)	0.887
k hat (KM)	0.114	k star (KM)	0.126
nu hat (KM)	6.143	nu star (KM)	6.793
theta hat (KM)	11.08	theta star (KM)	10.02
80% gamma percentile (KM)	1.164	90% gamma percentile (KM)	3.616
95% gamma percentile (KM)	7.148	99% gamma percentile (KM)	17.81
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.79, α)	2.058	Adjusted Chi Square Value (6.79, β)	1.896
95% Gamma Approximate KM-UCL (use when n>=50)	4.162	95% Gamma Adjusted KM-UCL (use when n<50)	4.518
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.481	Mean in Log Scale	-0.91
SD in Original Scale	3.802	SD in Log Scale	1.568
95% t UCL (assumes normality of ROS data)	2.729	95% Percentile Bootstrap UCL	2.884
95% BCA Bootstrap UCL	3.914	95% Bootstrap t UCL	6.387
95% H-UCL (Log ROS)	3.844		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.783	KM Geo Mean	0.457
KM SD (logged)	0.912	95% Critical H Value (KM-Log)	2.408
KM Standard Error of Mean (logged)	0.223	95% H-UCL (KM -Log)	1.065
KM SD (logged)	0.912	95% Critical H Value (KM-Log)	2.408
KM Standard Error of Mean (logged)	0.223		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.191	Mean in Log Scale	-0.0623
SD in Original Scale	3.984	SD in Log Scale	1.148
95% t UCL (Assumes normality)	3.498	95% H-Stat UCL	3.349
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.773		
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.			

THALLIUM

General Statistics

Total Number of Observations	27	Number of Distinct Observations	3
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	26
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable THALLIUM was not processed!

PENTADECAFLUOROOCTANOIC ACID			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	20
Number of Detects	27	Number of Non-Detects	2
Number of Distinct Detects	20	Number of Distinct Non-Detects	1
Minimum Detect	0.012	Minimum Non-Detect	0.2
Maximum Detect	2	Maximum Non-Detect	0.2
Variance Detects	0.14	Percent Non-Detects	6.897%
Mean Detects	0.144	SD Detects	0.374
Median Detects	0.052	CV Detects	2.593
Skewness Detects	5.037	Kurtosis Detects	25.84
Mean of Logged Detects	-2.749	SD of Logged Detects	1.017
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.307	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.923	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.404	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.167	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	0.139	KM Standard Error of Mean	0.0673
KM SD	0.355	95% KM (BCA) UCL	0.273
95% KM (t) UCL	0.254	95% KM (Percentile Bootstrap) UCL	0.271
95% KM (z) UCL	0.25	95% KM Bootstrap t UCL	0.747
90% KM Chebyshev UCL	0.341	95% KM Chebyshev UCL	0.432
97.5% KM Chebyshev UCL	0.559	99% KM Chebyshev UCL	0.809
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.628	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.785	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.246	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.175	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)	0.737	k star (bias corrected MLE)	0.68
Theta hat (MLE)	0.196	Theta star (bias corrected MLE)	0.212
nu hat (MLE)	39.79	nu star (bias corrected)	36.7
Mean (detects)	0.144		
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	0.139
Maximum	2	Median	0.052
SD	0.362	CV	2.599
k hat (MLE)	0.734	k star (bias corrected MLE)	0.681
Theta hat (MLE)	0.19	Theta star (bias corrected MLE)	0.204
nu hat (MLE)	42.58	nu star (bias corrected)	39.51
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (39.51, α)	26.11	Adjusted Chi Square Value (39.51, β)	25.46
95% Gamma Approximate UCL (use when n>=50)	0.211	95% Gamma Adjusted UCL (use when n<50)	0.216

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.139	SD (KM)	0.355
Variance (KM)	0.126	SE of Mean (KM)	0.0673
k hat (KM)	0.153	k star (KM)	0.16
nu hat (KM)	8.896	nu star (KM)	9.309
theta hat (KM)	0.907	theta star (KM)	0.867
80% gamma percentile (KM)	0.16	90% gamma percentile (KM)	0.416
95% gamma percentile (KM)	0.755	99% gamma percentile (KM)	1.727
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.31, α)	3.515	Adjusted Chi Square Value (9.31, β)	3.304
95% Gamma Approximate KM-UCL (use when n>=50)	0.369	95% Gamma Adjusted KM-UCL (use when n<50)	0.392
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.923	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.167	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.139	Mean in Log Scale	-2.757
SD in Original Scale	0.362	SD in Log Scale	0.987
95% t UCL (assumes normality of ROS data)	0.253	95% Percentile Bootstrap UCL	0.272
95% BCA Bootstrap UCL	0.339	95% Bootstrap t UCL	0.772
95% H-UCL (Log ROS)	0.163		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.762	KM Geo Mean	0.0632
KM SD (logged)	0.983	95% Critical H Value (KM-Log)	2.445
KM Standard Error of Mean (logged)	0.19	95% H-UCL (KM -Log)	0.161
KM SD (logged)	0.983	95% Critical H Value (KM-Log)	2.445
KM Standard Error of Mean (logged)	0.19		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.141	Mean in Log Scale	-2.719
SD in Original Scale	0.361	SD in Log Scale	0.987
95% t UCL (Assumes normality)	0.255	95% H-Stat UCL	0.17
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.161		
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.			

PERFLUOROOCTANE SULFONIC ACID			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	24
Number of Detects	20	Number of Non-Detects	9
Number of Distinct Detects	18	Number of Distinct Non-Detects	6
Minimum Detect	0.015	Minimum Non-Detect	0.039
Maximum Detect	0.42	Maximum Non-Detect	0.41
Variance Detects	0.0103	Percent Non-Detects	31.03%
Mean Detects	0.093	SD Detects	0.102
Median Detects	0.0663	CV Detects	1.093
Skewness Detects	2.039	Kurtosis Detects	4.841
Mean of Logged Detects	-2.887	SD of Logged Detects	1.052
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	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	0.0741	KM Standard Error of Mean	0.0175
KM SD	0.0896	95% KM (BCA) UCL	0.109
95% KM (t) UCL	0.104	95% KM (Percentile Bootstrap) UCL	0.102
95% KM (z) UCL	0.103	95% KM Bootstrap t UCL	0.117
90% KM Chebyshev UCL	0.127	95% KM Chebyshev UCL	0.15
97.5% KM Chebyshev UCL	0.183	99% KM Chebyshev UCL	0.248
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.675	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.199	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.115	k star (bias corrected MLE)	0.981
Theta hat (MLE)	0.0834	Theta star (bias corrected MLE)	0.0947
nu hat (MLE)	44.62	nu star (bias corrected)	39.26
Mean (detects)	0.093		
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	0.0714
Maximum	0.42	Median	0.0386
SD	0.0902	CV	1.263
k hat (MLE)	1.005	k star (bias corrected MLE)	0.924
Theta hat (MLE)	0.0711	Theta star (bias corrected MLE)	0.0773
nu hat (MLE)	58.28	nu star (bias corrected)	53.58
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (53.58, α)	37.77	Adjusted Chi Square Value (53.58, β)	36.97
95% Gamma Approximate UCL (use when n>=50)	0.101	95% Gamma Adjusted UCL (use when n<50)	0.104

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0741	SD (KM)	0.0896
Variance (KM)	0.00804	SE of Mean (KM)	0.0175
k hat (KM)	0.683	k star (KM)	0.636
nu hat (KM)	39.63	nu star (KM)	36.86
theta hat (KM)	0.108	theta star (KM)	0.117
80% gamma percentile (KM)	0.122	90% gamma percentile (KM)	0.19
95% gamma percentile (KM)	0.261	99% gamma percentile (KM)	0.432
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (36.86, α)	23.96	Adjusted Chi Square Value (36.86, β)	23.34
95% Gamma Approximate KM-UCL (use when n>=50)	0.114	95% Gamma Adjusted KM-UCL (use when n<50)	0.117
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.073	Mean in Log Scale	-3.117
SD in Original Scale	0.0893	SD in Log Scale	0.96
95% t UCL (assumes normality of ROS data)	0.101	95% Percentile Bootstrap UCL	0.101
95% BCA Bootstrap UCL	0.11	95% Bootstrap t UCL	0.118
95% H-UCL (Log ROS)	0.109		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.155	KM Geo Mean	0.0426
KM SD (logged)	1.006	95% Critical H Value (KM-Log)	2.474
KM Standard Error of Mean (logged)	0.201	95% H-UCL (KM -Log)	0.113
KM SD (logged)	1.006	95% Critical H Value (KM-Log)	2.474
KM Standard Error of Mean (logged)	0.201		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0857	Mean in Log Scale	-2.988
SD in Original Scale	0.0944	SD in Log Scale	1.046
95% t UCL (Assumes normality)	0.116	95% H-Stat UCL	0.143
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.117		
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.			

ALDRIN			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	25
Number of Detects	21	Number of Non-Detects	8
Number of Distinct Detects	20	Number of Distinct Non-Detects	5
Minimum Detect	1.5000E-4	Minimum Non-Detect	0.0046
Maximum Detect	0.0059	Maximum Non-Detect	0.005
Variance Detects	1.6011E-6	Percent Non-Detects	27.59%
Mean Detects	8.6048E-4	SD Detects	0.00127
Median Detects	3.6000E-4	CV Detects	1.471
Skewness Detects	3.457	Kurtosis Detects	13.57
Mean of Logged Detects	-7.611	SD of Logged Detects	0.976
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.555	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.287	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.188	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	7.9097E-4	KM Standard Error of Mean	2.1647E-4
KM SD	0.00109	95% KM (BCA) UCL	0.00116
95% KM (t) UCL	0.00116	95% KM (Percentile Bootstrap) UCL	0.00117
95% KM (z) UCL	0.00115	95% KM Bootstrap t UCL	0.00149
90% KM Chebyshev UCL	0.00144	95% KM Chebyshev UCL	0.00173
97.5% KM Chebyshev UCL	0.00214	99% KM Chebyshev UCL	0.00294
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.219	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.769	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.219	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.195	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)	1.04	k star (bias corrected MLE)	0.923
Theta hat (MLE)	8.2750E-4	Theta star (bias corrected MLE)	9.3221E-4
nu hat (MLE)	43.67	nu star (bias corrected)	38.77
Mean (detects)	8.6048E-4		
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	1.5000E-4	Mean	0.00338
Maximum	0.01	Median	9.3000E-4
SD	0.00429	CV	1.269
k hat (MLE)	0.57	k star (bias corrected MLE)	0.534
Theta hat (MLE)	0.00593	Theta star (bias corrected MLE)	0.00633
nu hat (MLE)	33.06	nu star (bias corrected)	30.98
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (30.98, α)	19.26	Adjusted Chi Square Value (30.98, β)	18.71
95% Gamma Approximate UCL (use when n>=50)	0.00544	95% Gamma Adjusted UCL (use when n<50)	0.0056

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	7.9097E-4	SD (KM)	0.00109
Variance (KM)	1.1908E-6	SE of Mean (KM)	2.1647E-4
k hat (KM)	0.525	k star (KM)	0.494
nu hat (KM)	30.47	nu star (KM)	28.65
theta hat (KM)	0.00151	theta star (KM)	0.0016
80% gamma percentile (KM)	0.0013	90% gamma percentile (KM)	0.00215
95% gamma percentile (KM)	0.00305	99% gamma percentile (KM)	0.00528
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (28.65, α)	17.44	Adjusted Chi Square Value (28.65, β)	16.91
95% Gamma Approximate KM-UCL (use when n>=50)	0.0013	95% Gamma Adjusted KM-UCL (use when n<50)	0.00134
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.908	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.188	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	7.5805E-4	Mean in Log Scale	-7.634
SD in Original Scale	0.00109	SD in Log Scale	0.851
95% t UCL (assumes normality of ROS data)	0.0011	95% Percentile Bootstrap UCL	0.00112
95% BCA Bootstrap UCL	0.00128	95% Bootstrap t UCL	0.00157
95% H-UCL (Log ROS)	0.001		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-7.645	KM Geo Mean	4.7853E-4
KM SD (logged)	0.913	95% Critical H Value (KM-Log)	2.362
KM Standard Error of Mean (logged)	0.198	95% H-UCL (KM -Log)	0.00109
KM SD (logged)	0.913	95% Critical H Value (KM-Log)	2.362
KM Standard Error of Mean (logged)	0.198		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00129	Mean in Log Scale	-7.171
SD in Original Scale	0.00129	SD in Log Scale	1.098
95% t UCL (Assumes normality)	0.0017	95% H-Stat UCL	0.0024
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.00109		
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.			

DIELDRIN			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	26
Number of Detects	24	Number of Non-Detects	5
Number of Distinct Detects	24	Number of Distinct Non-Detects	2
Minimum Detect	1.9000E-4	Minimum Non-Detect	0.0019
Maximum Detect	0.042	Maximum Non-Detect	0.002
Variance Detects	1.2157E-4	Percent Non-Detects	17.24%
Mean Detects	0.00481	SD Detects	0.011
Median Detects	7.8000E-4	CV Detects	2.294
Skewness Detects	3.07	Kurtosis Detects	8.535
Mean of Logged Detects	-6.753	SD of Logged Detects	1.531
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.447	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.916	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.177	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	0.00407	KM Standard Error of Mean	0.00189
KM SD	0.00995	95% KM (BCA) UCL	0.00766
95% KM (t) UCL	0.00729	95% KM (Percentile Bootstrap) UCL	0.00726
95% KM (z) UCL	0.00718	95% KM Bootstrap t UCL	0.0213
90% KM Chebyshev UCL	0.00974	95% KM Chebyshev UCL	0.0123
97.5% KM Chebyshev UCL	0.0159	99% KM Chebyshev UCL	0.0229
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.297	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.816	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.235	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.189	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)	0.455	k star (bias corrected MLE)	0.426
Theta hat (MLE)	0.0106	Theta star (bias corrected MLE)	0.0113
nu hat (MLE)	21.86	nu star (bias corrected)	20.46
Mean (detects)	0.00481		
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	1.9000E-4	Mean	0.0057
Maximum	0.042	Median	0.0011
SD	0.0102	CV	1.787
k hat (MLE)	0.519	k star (bias corrected MLE)	0.489
Theta hat (MLE)	0.011	Theta star (bias corrected MLE)	0.0117
nu hat (MLE)	30.13	nu star (bias corrected)	28.34
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (28.34, α)	17.2	Adjusted Chi Square Value (28.34, β)	16.68
95% Gamma Approximate UCL (use when n>=50)	0.0094	95% Gamma Adjusted UCL (use when n<50)	0.00969

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00407	SD (KM)	0.00995
Variance (KM)	9.9008E-5	SE of Mean (KM)	0.00189
k hat (KM)	0.168	k star (KM)	0.173
nu hat (KM)	9.726	nu star (KM)	10.05
theta hat (KM)	0.0243	theta star (KM)	0.0235
80% gamma percentile (KM)	0.00493	90% gamma percentile (KM)	0.0123
95% gamma percentile (KM)	0.0217	99% gamma percentile (KM)	0.0485
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (10.05, α)	3.975	Adjusted Chi Square Value (10.05, β)	3.749
95% Gamma Approximate KM-UCL (use when n>=50)	0.0103	95% Gamma Adjusted KM-UCL (use when n<50)	0.0109
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.916	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.177	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00409	Mean in Log Scale	-6.88
SD in Original Scale	0.0101	SD in Log Scale	1.437
95% t UCL (assumes normality of ROS data)	0.00729	95% Percentile Bootstrap UCL	0.00709
95% BCA Bootstrap UCL	0.00863	95% Bootstrap t UCL	0.0204
95% H-UCL (Log ROS)	0.00663		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.909	KM Geo Mean	9.9886E-4
KM SD (logged)	1.427	95% Critical H Value (KM-Log)	3.041
KM Standard Error of Mean (logged)	0.276	95% H-UCL (KM -Log)	0.00628
KM SD (logged)	1.427	95% Critical H Value (KM-Log)	3.041
KM Standard Error of Mean (logged)	0.276		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00415	Mean in Log Scale	-6.783
SD in Original Scale	0.0101	SD in Log Scale	1.389
95% t UCL (Assumes normality)	0.00734	95% H-Stat UCL	0.00651
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.0123		
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.			

HEPTACHLOR			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	20
Number of Detects	15	Number of Non-Detects	14
Number of Distinct Detects	15	Number of Distinct Non-Detects	5
Minimum Detect	3.0000E-4	Minimum Non-Detect	9.3000E-4
Maximum Detect	0.0028	Maximum Non-Detect	0.001
Variance Detects	4.9228E-7	Percent Non-Detects	48.28%
Mean Detects	0.00105	SD Detects	7.0163E-4
Median Detects	7.5000E-4	CV Detects	0.669
Skewness Detects	1.414	Kurtosis Detects	1.44
Mean of Logged Detects	-7.04	SD of Logged Detects	0.607
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	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	8.4883E-4	KM Standard Error of Mean	1.0900E-4
KM SD	5.4105E-4	95% KM (BCA) UCL	0.00104
95% KM (t) UCL	0.00103	95% KM (Percentile Bootstrap) UCL	0.00103
95% KM (z) UCL	0.00103	95% KM Bootstrap t UCL	0.00111
90% KM Chebyshev UCL	0.00118	95% KM Chebyshev UCL	0.00132
97.5% KM Chebyshev UCL	0.00153	99% KM Chebyshev UCL	0.00193
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.606	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.212	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.223	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)	2.935	k star (bias corrected MLE)	2.392
Theta hat (MLE)	3.5755E-4	Theta star (bias corrected MLE)	4.3863E-4
nu hat (MLE)	88.04	nu star (bias corrected)	71.77
Mean (detects)	0.00105		
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	3.0000E-4	Mean	0.00537
Maximum	0.01	Median	0.0028
SD	0.00458	CV	0.853
k hat (MLE)	0.915	k star (bias corrected MLE)	0.844
Theta hat (MLE)	0.00587	Theta star (bias corrected MLE)	0.00637
nu hat (MLE)	53.08	nu star (bias corrected)	48.92
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (48.92, α)	33.87	Adjusted Chi Square Value (48.92, β)	33.12
95% Gamma Approximate UCL (use when n>=50)	0.00776	95% Gamma Adjusted UCL (use when n<50)	0.00793

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	8.4883E-4	SD (KM)	5.4105E-4
Variance (KM)	2.9274E-7	SE of Mean (KM)	1.0900E-4
k hat (KM)	2.461	k star (KM)	2.23
nu hat (KM)	142.8	nu star (KM)	129.3
theta hat (KM)	3.4487E-4	theta star (KM)	3.8070E-4
80% gamma percentile (KM)	0.00125	90% gamma percentile (KM)	0.00161
95% gamma percentile (KM)	0.00195	99% gamma percentile (KM)	0.00269
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (129.32, α)	104.1	Adjusted Chi Square Value (129.32, β)	102.7
95% Gamma Approximate KM-UCL (use when n>=50)	0.00105	95% Gamma Adjusted KM-UCL (use when n<50)	0.00107
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	8.6402E-4	Mean in Log Scale	-7.194
SD in Original Scale	5.5031E-4	SD in Log Scale	0.506
95% t UCL (assumes normality of ROS data)	0.00104	95% Percentile Bootstrap UCL	0.00104
95% BCA Bootstrap UCL	0.00107	95% Bootstrap t UCL	0.00114
95% H-UCL (Log ROS)	0.00103		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-7.214	KM Geo Mean	7.3622E-4
KM SD (logged)	0.501	95% Critical H Value (KM-Log)	1.947
KM Standard Error of Mean (logged)	0.113	95% H-UCL (KM -Log)	0.001
KM SD (logged)	0.501	95% Critical H Value (KM-Log)	1.947
KM Standard Error of Mean (logged)	0.113		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	7.8017E-4	Mean in Log Scale	-7.319
SD in Original Scale	5.7148E-4	SD in Log Scale	0.52
95% t UCL (Assumes normality)	9.6070E-4	95% H-Stat UCL	9.2087E-4
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Adjusted Gamma UCL	0.00107	95% GROS Adjusted Gamma UCL	0.00793
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

HEPTACHLOR EPOXIDE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	20
Number of Detects	19	Number of Non-Detects	10
Number of Distinct Detects	18	Number of Distinct Non-Detects	2
Minimum Detect	2.2000E-4	Minimum Non-Detect	0.0019
Maximum Detect	0.0039	Maximum Non-Detect	0.002
Variance Detects	9.1021E-7	Percent Non-Detects	34.48%
Mean Detects	8.5053E-4	SD Detects	9.5405E-4
Median Detects	4.7000E-4	CV Detects	1.122
Skewness Detects	2.348	Kurtosis Detects	5.543
Mean of Logged Detects	-7.457	SD of Logged Detects	0.824
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.667	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.312	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	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	7.5318E-4	KM Standard Error of Mean	1.6223E-4
KM SD	7.9819E-4	95% KM (BCA) UCL	0.00104
95% KM (t) UCL	0.00103	95% KM (Percentile Bootstrap) UCL	0.00104
95% KM (z) UCL	0.00102	95% KM Bootstrap t UCL	0.00122
90% KM Chebyshev UCL	0.00124	95% KM Chebyshev UCL	0.00146
97.5% KM Chebyshev UCL	0.00177	99% KM Chebyshev UCL	0.00237
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.239	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.759	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.232	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.202	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)	1.435	k star (bias corrected MLE)	1.244
Theta hat (MLE)	5.9261E-4	Theta star (bias corrected MLE)	6.8388E-4
nu hat (MLE)	54.54	nu star (bias corrected)	47.26
Mean (detects)	8.5053E-4		
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	2.2000E-4	Mean	0.00401
Maximum	0.01	Median	0.0011
SD	0.00449	CV	1.121
k hat (MLE)	0.642	k star (bias corrected MLE)	0.598
Theta hat (MLE)	0.00624	Theta star (bias corrected MLE)	0.00669
nu hat (MLE)	37.22	nu star (bias corrected)	34.7
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (34.70, α)	22.23	Adjusted Chi Square Value (34.70, β)	21.63
95% Gamma Approximate UCL (use when n>=50)	0.00625	95% Gamma Adjusted UCL (use when n<50)	0.00643

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	7.5318E-4	SD (KM)	7.9819E-4
Variance (KM)	6.3710E-7	SE of Mean (KM)	1.6223E-4
k hat (KM)	0.89	k star (KM)	0.821
nu hat (KM)	51.64	nu star (KM)	47.64
theta hat (KM)	8.4587E-4	theta star (KM)	9.1707E-4
80% gamma percentile (KM)	0.00123	90% gamma percentile (KM)	0.00182
95% gamma percentile (KM)	0.00242	99% gamma percentile (KM)	0.00384
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (47.64, α)	32.79	Adjusted Chi Square Value (47.64, β)	32.06
95% Gamma Approximate KM-UCL (use when n>=50)	0.00109	95% Gamma Adjusted KM-UCL (use when n<50)	0.00112
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	7.5003E-4	Mean in Log Scale	-7.511
SD in Original Scale	7.9464E-4	SD in Log Scale	0.731
95% t UCL (assumes normality of ROS data)	0.001	95% Percentile Bootstrap UCL	0.001
95% BCA Bootstrap UCL	0.00106	95% Bootstrap t UCL	0.00123
95% H-UCL (Log ROS)	9.6333E-4		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-7.526	KM Geo Mean	5.3883E-4
KM SD (logged)	0.738	95% Critical H Value (KM-Log)	2.167
KM Standard Error of Mean (logged)	0.163	95% H-UCL (KM -Log)	9.5735E-4
KM SD (logged)	0.738	95% Critical H Value (KM-Log)	2.167
KM Standard Error of Mean (logged)	0.163		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.9517E-4	Mean in Log Scale	-7.275
SD in Original Scale	7.6764E-4	SD in Log Scale	0.709
95% t UCL (Assumes normality)	0.00114	95% H-Stat UCL	0.00119
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	9.5735E-4		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

1,4-DIOXANE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	21
Number of Detects	24	Number of Non-Detects	5
Number of Distinct Detects	20	Number of Distinct Non-Detects	1
Minimum Detect	0.12	Minimum Non-Detect	0.5
Maximum Detect	130	Maximum Non-Detect	0.5
Variance Detects	812.5	Percent Non-Detects	17.24%
Mean Detects	15.39	SD Detects	28.5
Median Detects	4.25	CV Detects	1.853
Skewness Detects	3.208	Kurtosis Detects	11.71
Mean of Logged Detects	1.223	SD of Logged Detects	1.984
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.575	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.916	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.177	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	12.77	KM Standard Error of Mean	4.936
KM SD	26.02	95% KM (BCA) UCL	21.98
95% KM (t) UCL	21.17	95% KM (Percentile Bootstrap) UCL	21.35
95% KM (z) UCL	20.89	95% KM Bootstrap t UCL	30.98
90% KM Chebyshev UCL	27.58	95% KM Chebyshev UCL	34.29
97.5% KM Chebyshev UCL	43.6	99% KM Chebyshev UCL	61.89
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.789	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.822	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.218	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.19	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.431	k star (bias corrected MLE)	0.405
Theta hat (MLE)	35.73	Theta star (bias corrected MLE)	38.03
nu hat (MLE)	20.67	nu star (bias corrected)	19.42
Mean (detects)	15.39		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	12.73
Maximum	130	Median	1
SD	26.5	CV	2.081
k hat (MLE)	0.297	k star (bias corrected MLE)	0.289
Theta hat (MLE)	42.88	Theta star (bias corrected MLE)	44.03
nu hat (MLE)	17.22	nu star (bias corrected)	16.78
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (16.78, α)	8.512	Adjusted Chi Square Value (16.78, β)	8.161
95% Gamma Approximate UCL (use when n>=50)	25.1	95% Gamma Adjusted UCL (use when n<50)	26.18

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	12.77	SD (KM)	26.02
Variance (KM)	677.1	SE of Mean (KM)	4.936
k hat (KM)	0.241	k star (KM)	0.239
nu hat (KM)	13.98	nu star (KM)	13.87
theta hat (KM)	53	theta star (KM)	53.43
80% gamma percentile (KM)	18.25	90% gamma percentile (KM)	38.45
95% gamma percentile (KM)	62.66	99% gamma percentile (KM)	127.5
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (13.87, α)	6.48	Adjusted Chi Square Value (13.87, β)	6.179
95% Gamma Approximate KM-UCL (use when n>=50)	27.34	95% Gamma Adjusted KM-UCL (use when n<50)	28.67
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.916	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.177	Detected Data Not Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	12.77	Mean in Log Scale	0.703
SD in Original Scale	26.48	SD in Log Scale	2.166
95% t UCL (assumes normality of ROS data)	21.14	95% Percentile Bootstrap UCL	21.78
95% BCA Bootstrap UCL	25.24	95% Bootstrap t UCL	31.08
95% H-UCL (Log ROS)	116.5		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.747	KM Geo Mean	2.11
KM SD (logged)	2.063	95% Critical H Value (KM-Log)	4.009
KM Standard Error of Mean (logged)	0.396	95% H-UCL (KM -Log)	84.5
KM SD (logged)	2.063	95% Critical H Value (KM-Log)	4.009
KM Standard Error of Mean (logged)	0.396		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	12.78	Mean in Log Scale	0.773
SD in Original Scale	26.48	SD in Log Scale	2.059
95% t UCL (Assumes normality)	21.14	95% H-Stat UCL	85.62
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	28.67		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BENZO(A)ANTHRACENE			
General Statistics			
Total Number of Observations	27	Number of Distinct Observations	9
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	24
Number of Distinct Detects	3	Number of Distinct Non-Detects	6
Minimum Detect	0.0078	Minimum Non-Detect	0.091
Maximum Detect	0.034	Maximum Non-Detect	0.1
Variance Detects	1.7188E-4	Percent Non-Detects	88.89%
Mean Detects	0.0206	SD Detects	0.0131
Median Detects	0.02	CV Detects	0.636
Skewness Detects	0.206	Kurtosis Detects	N/A
Mean of Logged Detects	-4.049	SD of Logged Detects	0.746
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.998	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0206	KM Standard Error of Mean	0.00757
KM SD	0.0107	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0335	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0331	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0433	95% KM Chebyshev UCL	0.0536
97.5% KM Chebyshev UCL	0.0679	99% KM Chebyshev UCL	0.0959
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	3.159	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00652	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	18.95	nu star (bias corrected)	N/A
Mean (detects)	0.0206		
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	0.0078	Mean	0.0227
Maximum	0.0614	Median	0.0194
SD	0.0134	CV	0.591
k hat (MLE)	3.428	k star (bias corrected MLE)	3.072
Theta hat (MLE)	0.00663	Theta star (bias corrected MLE)	0.0074
nu hat (MLE)	185.1	nu star (bias corrected)	165.9
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (165.86, α)	137.1	Adjusted Chi Square Value (165.86, β)	135.4

95% Gamma Approximate UCL (use when n>=50)	0.0275	95% Gamma Adjusted UCL (use when n<50)	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0206	SD (KM)	0.0107
Variance (KM)	1.1459E-4	SE of Mean (KM)	0.00757
k hat (KM)	3.703	k star (KM)	3.317
nu hat (KM)	200	nu star (KM)	179.1
theta hat (KM)	0.00556	theta star (KM)	0.00621
80% gamma percentile (KM)	0.029	90% gamma percentile (KM)	0.0358
95% gamma percentile (KM)	0.042	99% gamma percentile (KM)	0.0555
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (179.10, α)	149.1	Adjusted Chi Square Value (179.10, β)	147.4
95% Gamma Approximate KM-UCL (use when n>=50)	0.0247	95% Gamma Adjusted KM-UCL (use when n<50)	0.025
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.024	Mean in Log Scale	-4.049
SD in Original Scale	0.0217	SD in Log Scale	0.817
95% t UCL (assumes normality of ROS data)	0.0311	95% Percentile Bootstrap UCL	0.0312
95% BCA Bootstrap UCL	0.0332	95% Bootstrap t UCL	0.035
95% H-UCL (Log ROS)	0.0352		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.049	KM Geo Mean	0.0174
KM SD (logged)	0.609	95% Critical H Value (KM-Log)	2.07
KM Standard Error of Mean (logged)	0.43	95% H-UCL (KM -Log)	0.0269
KM SD (logged)	0.609	95% Critical H Value (KM-Log)	2.07
KM Standard Error of Mean (logged)	0.43		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0463	Mean in Log Scale	-3.122
SD in Original Scale	0.01	SD in Log Scale	0.393
95% t UCL (Assumes normality)	0.0496	95% H-Stat UCL	0.0551
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0335		
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.			

NAPHTHALENE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	19
Number of Detects	15	Number of Non-Detects	14
Number of Distinct Detects	14	Number of Distinct Non-Detects	5
Minimum Detect	0.0075	Minimum Non-Detect	0.091
Maximum Detect	5.2	Maximum Non-Detect	4.8
Variance Detects	1.784	Percent Non-Detects	48.28%
Mean Detects	0.373	SD Detects	1.335
Median Detects	0.02	CV Detects	3.576
Skewness Detects	3.87	Kurtosis Detects	14.98
Mean of Logged Detects	-3.533	SD of Logged Detects	1.649
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.299	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.512	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	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	0.204	KM Standard Error of Mean	0.182
KM SD	0.944	95% KM (BCA) UCL	0.562
95% KM (t) UCL	0.513	95% KM (Percentile Bootstrap) UCL	0.561
95% KM (z) UCL	0.503	95% KM Bootstrap t UCL	8.643
90% KM Chebyshev UCL	0.749	95% KM Chebyshev UCL	0.996
97.5% KM Chebyshev UCL	1.338	99% KM Chebyshev UCL	2.011
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.359	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.848	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.407	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.241	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)	0.275	k star (bias corrected MLE)	0.264
Theta hat (MLE)	1.36	Theta star (bias corrected MLE)	1.414
nu hat (MLE)	8.236	nu star (bias corrected)	7.922
Mean (detects)	0.373		
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	0.0075	Mean	0.238
Maximum	5.2	Median	0.01
SD	0.966	CV	4.056
k hat (MLE)	0.303	k star (bias corrected MLE)	0.295
Theta hat (MLE)	0.785	Theta star (bias corrected MLE)	0.807
nu hat (MLE)	17.6	nu star (bias corrected)	17.11
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (17.11, α)	8.752	Adjusted Chi Square Value (17.11, β)	8.395
95% Gamma Approximate UCL (use when n>=50)	0.466	95% Gamma Adjusted UCL (use when n<50)	0.485

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.204	SD (KM)	0.944
Variance (KM)	0.892	SE of Mean (KM)	0.182
k hat (KM)	0.0468	k star (KM)	0.0649
nu hat (KM)	2.713	nu star (KM)	3.766
theta hat (KM)	4.366	theta star (KM)	3.146
80% gamma percentile (KM)	0.0609	90% gamma percentile (KM)	0.414
95% gamma percentile (KM)	1.162	99% gamma percentile (KM)	3.981
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.77, α)	0.631	Adjusted Chi Square Value (3.77, β)	0.563
95% Gamma Approximate KM-UCL (use when n>=50)	1.218	95% Gamma Adjusted KM-UCL (use when n<50)	1.367
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.736	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.207	Mean in Log Scale	-3.704
SD in Original Scale	0.961	SD in Log Scale	1.33
95% t UCL (assumes normality of ROS data)	0.511	95% Percentile Bootstrap UCL	0.563
95% BCA Bootstrap UCL	0.742	95% Bootstrap t UCL	9.418
95% H-UCL (Log ROS)	0.124		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.77	KM Geo Mean	0.023
KM SD (logged)	1.269	95% Critical H Value (KM-Log)	2.819
KM Standard Error of Mean (logged)	0.278	95% H-UCL (KM -Log)	0.101
KM SD (logged)	1.269	95% Critical H Value (KM-Log)	2.819
KM Standard Error of Mean (logged)	0.278		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.376	Mean in Log Scale	-3.012
SD in Original Scale	1.103	SD in Log Scale	1.604
95% t UCL (Assumes normality)	0.724	95% H-Stat UCL	0.484
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.996		
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.			

PENTACHLOROPHENOL

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	23
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!

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

The data set for variable PENTACHLOROPHENOL was not processed!

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

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

BIS(2-CHLOROETHYL)ETHER

General Statistics

Total Number of Observations	29	Number of Distinct Observations	6
Number of Detects	1	Number of Non-Detects	28
Number of Distinct Detects	1	Number of Distinct Non-Detects	5

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BIS(2-CHLOROETHYL)ETHER was not processed!

1,1,2-TRICHLOROETHANE

General Statistics

Total Number of Observations	29	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	28
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,1,2-TRICHLOROETHANE was not processed!

1,2-DIBROMO-3-CHLOROPROPANE

General Statistics

Total Number of Observations	29	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	28
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,2-DIBROMO-3-CHLOROPROPANE was not processed!

1,2-DICHLOROETHANE

General Statistics

Total Number of Observations	29	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	28
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,2-DICHLOROETHANE was not processed!

1,4-DICHLOROBENZENE

General Statistics

Total Number of Observations	29	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	23
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.5
Maximum Detect	0.77	Maximum Non-Detect	0.5
Variance Detects	0.0565	Percent Non-Detects	79.31%
Mean Detects	0.328	SD Detects	0.238
Median Detects	0.285	CV Detects	0.724
Skewness Detects	1.548	Kurtosis Detects	2.886
Mean of Logged Detects	-1.318	SD of Logged Detects	0.704

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.258	KM Standard Error of Mean	0.0504
KM SD	0.137	95% KM (BCA) UCL	0.332
95% KM (t) UCL	0.344	95% KM (Percentile Bootstrap) UCL	0.339
95% KM (z) UCL	0.341	95% KM Bootstrap t UCL	0.358
90% KM Chebyshev UCL	0.41	95% KM Chebyshev UCL	0.478
97.5% KM Chebyshev UCL	0.573	99% KM Chebyshev UCL	0.76

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.219	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.702	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.335	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)	2.6	k star (bias corrected MLE)	1.411
Theta hat (MLE)	0.126	Theta star (bias corrected MLE)	0.233
nu hat (MLE)	31.2	nu star (bias corrected)	16.93
Mean (detects)	0.328		

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	0.0465	Mean	0.266
Maximum	0.77	Median	0.245
SD	0.162	CV	0.608
k hat (MLE)	2.855	k star (bias corrected MLE)	2.583
Theta hat (MLE)	0.0931	Theta star (bias corrected MLE)	0.103
nu hat (MLE)	165.6	nu star (bias corrected)	149.8
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (149.79, α)	122.5	Adjusted Chi Square Value (149.79, β)	121
95% Gamma Approximate UCL (use when n>=50)	0.325	95% Gamma Adjusted UCL (use when n<50)	0.329
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.258	SD (KM)	0.137
Variance (KM)	0.0187	SE of Mean (KM)	0.0504
k hat (KM)	3.575	k star (KM)	3.228
nu hat (KM)	207.3	nu star (KM)	187.2
theta hat (KM)	0.0722	theta star (KM)	0.08
80% gamma percentile (KM)	0.365	90% gamma percentile (KM)	0.451
95% gamma percentile (KM)	0.531	99% gamma percentile (KM)	0.703
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (187.23, α)	156.6	Adjusted Chi Square Value (187.23, β)	154.9
95% Gamma Approximate KM-UCL (use when n>=50)	0.309	95% Gamma Adjusted KM-UCL (use when n<50)	0.312
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.259	Mean in Log Scale	-1.506
SD in Original Scale	0.155	SD in Log Scale	0.57
95% t UCL (assumes normality of ROS data)	0.308	95% Percentile Bootstrap UCL	0.306
95% BCA Bootstrap UCL	0.315	95% Bootstrap t UCL	0.324
95% H-UCL (Log ROS)	0.324		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.486	KM Geo Mean	0.226
KM SD (logged)	0.523	95% Critical H Value (KM-Log)	1.965
KM Standard Error of Mean (logged)	0.23	95% H-UCL (KM -Log)	0.315
KM SD (logged)	0.523	95% Critical H Value (KM-Log)	1.965
KM Standard Error of Mean (logged)	0.23		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.266	Mean in Log Scale	-1.372
SD in Original Scale	0.105	SD in Log Scale	0.299
95% t UCL (Assumes normality)	0.3	95% H-Stat UCL	0.294
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			

Suggested UCL to Use			
95% KM (t) UCL	0.344		
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.			

BENZENE

General Statistics

Total Number of Observations	29	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	24
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.5
Maximum Detect	5.9	Maximum Non-Detect	0.5
Variance Detects	6.571	Percent Non-Detects	82.76%
Mean Detects	1.316	SD Detects	2.563
Median Detects	0.19	CV Detects	1.948
Skewness Detects	2.232	Kurtosis Detects	4.986
Mean of Logged Detects	-1.124	SD of Logged Detects	1.666

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.576	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.458	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	0.368	KM Standard Error of Mean	0.22
KM SD	1.048	95% KM (BCA) UCL	0.781
95% KM (t) UCL	0.742	95% KM (Percentile Bootstrap) UCL	0.757
95% KM (z) UCL	0.73	95% KM Bootstrap t UCL	2.841
90% KM Chebyshev UCL	1.028	95% KM Chebyshev UCL	1.327
97.5% KM Chebyshev UCL	1.742	99% KM Chebyshev UCL	2.557

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.932	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.717	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.43	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.373	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)	0.46	k star (bias corrected MLE)	0.317
Theta hat (MLE)	2.859	Theta star (bias corrected MLE)	4.146
nu hat (MLE)	4.602	nu star (bias corrected)	3.174
Mean (detects)	1.316		

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	0.659
Maximum	5.9	Median	0.12
SD	1.26	CV	1.913
k hat (MLE)	0.358	k star (bias corrected MLE)	0.344
Theta hat (MLE)	1.838	Theta star (bias corrected MLE)	1.913
nu hat (MLE)	20.78	nu star (bias corrected)	19.97
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (19.97, α)	10.83	Adjusted Chi Square Value (19.97, β)	10.43
95% Gamma Approximate UCL (use when n>=50)	1.215	95% Gamma Adjusted UCL (use when n<50)	1.262

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.368	SD (KM)	1.048
Variance (KM)	1.097	SE of Mean (KM)	0.22
k hat (KM)	0.123	k star (KM)	0.133
nu hat (KM)	7.141	nu star (KM)	7.736
theta hat (KM)	2.985	theta star (KM)	2.756
80% gamma percentile (KM)	0.36	90% gamma percentile (KM)	1.068
95% gamma percentile (KM)	2.066	99% gamma percentile (KM)	5.035
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.74, α)	2.583	Adjusted Chi Square Value (7.74, β)	2.408
95% Gamma Approximate KM-UCL (use when n>=50)	1.101	95% Gamma Adjusted KM-UCL (use when n<50)	1.181
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.344	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.489	Mean in Log Scale	-1.638
SD in Original Scale	1.091	SD in Log Scale	1.266
95% t UCL (assumes normality of ROS data)	0.834	95% Percentile Bootstrap UCL	0.864
95% BCA Bootstrap UCL	1.097	95% Bootstrap t UCL	1.699
95% H-UCL (Log ROS)	0.849		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.723	KM Geo Mean	0.178
KM SD (logged)	0.764	95% Critical H Value (KM-Log)	2.194
KM Standard Error of Mean (logged)	0.251	95% H-UCL (KM -Log)	0.328
KM SD (logged)	0.764	95% Critical H Value (KM-Log)	2.194
KM Standard Error of Mean (logged)	0.251		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.434	Mean in Log Scale	-1.341
SD in Original Scale	1.052	SD in Log Scale	0.638
95% t UCL (Assumes normality)	0.766	95% H-Stat UCL	0.411
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.327		

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.

CIS-1,2-DICHLOROETHENE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	17
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.073	Minimum Non-Detect	0.5
Maximum Detect	94	Maximum Non-Detect	0.5
Variance Detects	884.5	Percent Non-Detects	58.62%
Mean Detects	12.65	SD Detects	29.74
Median Detects	0.32	CV Detects	2.351
Skewness Detects	2.43	Kurtosis Detects	5.365
Mean of Logged Detects	-0.29	SD of Logged Detects	2.301
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.497	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.473	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	5.354	KM Standard Error of Mean	3.746
KM SD	19.32	95% KM (BCA) UCL	11.82
95% KM (t) UCL	11.73	95% KM (Percentile Bootstrap) UCL	11.88
95% KM (z) UCL	11.52	95% KM Bootstrap t UCL	281.2
90% KM Chebyshev UCL	16.59	95% KM Chebyshev UCL	21.68
97.5% KM Chebyshev UCL	28.75	99% KM Chebyshev UCL	42.63
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.948	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.847	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.355	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.269	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)	0.251	k star (bias corrected MLE)	0.244
Theta hat (MLE)	50.41	Theta star (bias corrected MLE)	51.89
nu hat (MLE)	6.024	nu star (bias corrected)	5.851
Mean (detects)	12.65		
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	5.632
Maximum	94	Median	0.073
SD	19.64	CV	3.487
k hat (MLE)	0.187	k star (bias corrected MLE)	0.19
Theta hat (MLE)	30.17	Theta star (bias corrected MLE)	29.59
nu hat (MLE)	10.83	nu star (bias corrected)	11.04
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (11.04, α)	4.602	Adjusted Chi Square Value (11.04, β)	4.355
95% Gamma Approximate UCL (use when n>=50)	13.51	95% Gamma Adjusted UCL (use when n<50)	14.28

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.354	SD (KM)	19.32
Variance (KM)	373.1	SE of Mean (KM)	3.746
k hat (KM)	0.0768	k star (KM)	0.0919
nu hat (KM)	4.457	nu star (KM)	5.329
theta hat (KM)	69.68	theta star (KM)	58.27
80% gamma percentile (KM)	3.262	90% gamma percentile (KM)	13.72
95% gamma percentile (KM)	31.18	99% gamma percentile (KM)	88.7
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.33, α)	1.307	Adjusted Chi Square Value (5.33, β)	1.194
95% Gamma Approximate KM-UCL (use when n>=50)	21.83	95% Gamma Adjusted KM-UCL (use when n<50)	23.91
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	5.454	Mean in Log Scale	-1.106
SD in Original Scale	19.63	SD in Log Scale	1.906
95% t UCL (assumes normality of ROS data)	11.66	95% Percentile Bootstrap UCL	11.98
95% BCA Bootstrap UCL	15.47	95% Bootstrap t UCL	233
95% H-UCL (Log ROS)	7.9		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.119	KM Geo Mean	0.327
KM SD (logged)	1.623	95% Critical H Value (KM-Log)	3.33
KM Standard Error of Mean (logged)	0.342	95% H-UCL (KM -Log)	3.385
KM SD (logged)	1.623	95% Critical H Value (KM-Log)	3.33
KM Standard Error of Mean (logged)	0.342		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5.382	Mean in Log Scale	-0.933
SD in Original Scale	19.65	SD in Log Scale	1.544
95% t UCL (Assumes normality)	11.59	95% H-Stat UCL	3.305
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	28.75		
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.			

ETHYLBENZENE

General Statistics

Total Number of Observations	29	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	28
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ETHYLBENZENE was not processed!

TRICHLOROETHENE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	24
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.16	Minimum Non-Detect	0.5
Maximum Detect	14	Maximum Non-Detect	0.5
Variance Detects	35.59	Percent Non-Detects	82.76%
Mean Detects	3.85	SD Detects	5.966
Median Detects	0.41	CV Detects	1.55
Skewness Detects	1.777	Kurtosis Detects	2.974
Mean of Logged Detects	-0.0592	SD of Logged Detects	2.019
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.737	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.318	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.871	KM Standard Error of Mean	0.544
KM SD	2.602	95% KM (BCA) UCL	1.957
95% KM (t) UCL	1.796	95% KM (Percentile Bootstrap) UCL	1.816
95% KM (z) UCL	1.765	95% KM Bootstrap t UCL	6.515
90% KM Chebyshev UCL	2.503	95% KM Chebyshev UCL	3.242
97.5% KM Chebyshev UCL	4.268	99% KM Chebyshev UCL	6.283
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.493	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.321	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.373	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.458	k star (bias corrected MLE)	0.316
Theta hat (MLE)	8.412	Theta star (bias corrected MLE)	12.17
nu hat (MLE)	4.577	nu star (bias corrected)	3.164
Mean (detects)	3.85		
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	1.33
Maximum	14	Median	0.154
SD	2.827	CV	2.125
k hat (MLE)	0.285	k star (bias corrected MLE)	0.279
Theta hat (MLE)	4.659	Theta star (bias corrected MLE)	4.769
nu hat (MLE)	16.56	nu star (bias corrected)	16.18
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (16.18, α)	8.088	Adjusted Chi Square Value (16.18, β)	7.747
95% Gamma Approximate UCL (use when n>=50)	2.661	95% Gamma Adjusted UCL (use when n<50)	2.778

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.871	SD (KM)	2.602
Variance (KM)	6.769	SE of Mean (KM)	0.544
k hat (KM)	0.112	k star (KM)	0.123
nu hat (KM)	6.496	nu star (KM)	7.157
theta hat (KM)	7.774	theta star (KM)	7.056
80% gamma percentile (KM)	0.788	90% gamma percentile (KM)	2.485
95% gamma percentile (KM)	4.95	99% gamma percentile (KM)	12.42
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.16, α)	2.257	Adjusted Chi Square Value (7.16, β)	2.096
95% Gamma Approximate KM-UCL (use when n>=50)	2.761	95% Gamma Adjusted KM-UCL (use when n<50)	2.973
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.09	Mean in Log Scale	-1.182
SD in Original Scale	2.656	SD in Log Scale	1.548
95% t UCL (assumes normality of ROS data)	1.929	95% Percentile Bootstrap UCL	2.049
95% BCA Bootstrap UCL	2.468	95% Bootstrap t UCL	4.185
95% H-UCL (Log ROS)	2.605		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.235	KM Geo Mean	0.291
KM SD (logged)	0.998	95% Critical H Value (KM-Log)	2.464
KM Standard Error of Mean (logged)	0.315	95% H-UCL (KM -Log)	0.761
KM SD (logged)	0.998	95% Critical H Value (KM-Log)	2.464
KM Standard Error of Mean (logged)	0.315		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.871	Mean in Log Scale	-1.157
SD in Original Scale	2.646	SD in Log Scale	0.918
95% t UCL (Assumes normality)	1.706	95% H-Stat UCL	0.722
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.796		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

VINYL CHLORIDE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	6
Number of Detects	6	Number of Non-Detects	23
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.14	Minimum Non-Detect	0.5
Maximum Detect	2.2	Maximum Non-Detect	0.5
Variance Detects	0.927	Percent Non-Detects	79.31%
Mean Detects	1.065	SD Detects	0.963
Median Detects	1.025	CV Detects	0.904
Skewness Detects	0.0928	Kurtosis Detects	-3.013
Mean of Logged Detects	-0.5	SD of Logged Detects	1.28
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.786	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.376	KM Standard Error of Mean	0.111
KM SD	0.534	95% KM (BCA) UCL	0.662
95% KM (t) UCL	0.566	95% KM (Percentile Bootstrap) UCL	0.617
95% KM (z) UCL	0.559	95% KM Bootstrap t UCL	0.599
90% KM Chebyshev UCL	0.71	95% KM Chebyshev UCL	0.861
97.5% KM Chebyshev UCL	1.071	99% KM Chebyshev UCL	1.483
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.739	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.715	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.316	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.341	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.023	k star (bias corrected MLE)	0.623
Theta hat (MLE)	1.041	Theta star (bias corrected MLE)	1.71
nu hat (MLE)	12.28	nu star (bias corrected)	7.473
Mean (detects)	1.065		
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	0.478
Maximum	2.2	Median	0.25
SD	0.595	CV	1.244
k hat (MLE)	0.576	k star (bias corrected MLE)	0.54
Theta hat (MLE)	0.829	Theta star (bias corrected MLE)	0.885
nu hat (MLE)	33.43	nu star (bias corrected)	31.31
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (31.31, α)	19.52	Adjusted Chi Square Value (31.31, β)	18.97
95% Gamma Approximate UCL (use when n>=50)	0.766	95% Gamma Adjusted UCL (use when n<50)	0.789

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.376	SD (KM)	0.534
Variance (KM)	0.285	SE of Mean (KM)	0.111
k hat (KM)	0.497	k star (KM)	0.468
nu hat (KM)	28.8	nu star (KM)	27.15
theta hat (KM)	0.758	theta star (KM)	0.804
80% gamma percentile (KM)	0.616	90% gamma percentile (KM)	1.032
95% gamma percentile (KM)	1.48	99% gamma percentile (KM)	2.588
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (27.15, α)	16.27	Adjusted Chi Square Value (27.15, β)	15.77
95% Gamma Approximate KM-UCL (use when n>=50)	0.628	95% Gamma Adjusted KM-UCL (use when n<50)	0.648
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.302	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.449	Mean in Log Scale	-1.36
SD in Original Scale	0.557	SD in Log Scale	1.059
95% t UCL (assumes normality of ROS data)	0.625	95% Percentile Bootstrap UCL	0.628
95% BCA Bootstrap UCL	0.682	95% Bootstrap t UCL	0.719
95% H-UCL (Log ROS)	0.748		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.415	KM Geo Mean	0.243
KM SD (logged)	0.739	95% Critical H Value (KM-Log)	2.168
KM Standard Error of Mean (logged)	0.197	95% H-UCL (KM -Log)	0.432
KM SD (logged)	0.739	95% Critical H Value (KM-Log)	2.168
KM Standard Error of Mean (logged)	0.197		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.419	Mean in Log Scale	-1.203
SD in Original Scale	0.528	SD in Log Scale	0.653
95% t UCL (Assumes normality)	0.585	95% H-Stat UCL	0.481
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.566		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Outside Landfill – Shallow Groundwater

Event 3

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	ALUMINUM	d_ALUMINUM	ANTIMONY	d_ANTIMONY	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	CADMIUM	d_CADMIUM	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	COPPER	d_COPPER
LDCA-MW08-0615	20	0	2	0	0.85	1	159	1	0.26	1	2	0	0.25	1	2	0
LDCA-MW13S-0615	20	0	2	0	0.22	1	165	1	0.06	1	2	0	2.9	1	5.1	1
LDCA-MW14S-0615	46.2	1	2	0	13.3	1	166	1	1	0	2	0	7.4	1	2	0
LDCA-MW15S-0615																
LDCA-MW16S-0615-AVG	13.6	1	2	0	2.3	1	447	1	0.0185	1	1.7	1	13.45	1	0.65	1
LDCA-MW17S-0615-AVG	3.8	1	2	0	0.12	1	50.85	1	0.0325	1	0.4	1	0.066	1	2	0
LDCA-MW18S-0615	15.5	1	2	0	0.11	1	30.9	1	0.25	1	0.15	1	4.8	1	0.37	1
LDCA-MW24-0615	85.3	1	2	0	1.4	1	852	1	0.045	1	1.3	1	1.6	1	1.4	1
LDCA-MW25-0615	5210	1	10	1	15	1	964	1	8.3	1	25.5	1	6.5	1	94.6	1
LDCA-MW26D-0615	29300	1	2	0	11.6	1	380	1	0.29	1	31.3	1	22.7	1	36.5	1
LDCA-MW26S-0615	20	0	2	0	0.49	1	1220	1	1	0	2	0	1	0	2	0
LDCA-MW27-0615	94.8	1	2	0	14.4	1	527	1	1	0	2	0	7.3	1	2	0
LDCA-MW28-0615	20	0	0.14	1	0.37	1	161	1	1.1	1	0.97	1	10.3	1	10.9	1
LDCA-MW29-0615	7.3	1	2	0	0.18	1	78.9	1	0.26	1	0.37	1	1.7	1	0.27	1
LDCA-MW30-0615	20.6	1	2	0	0.22	1	80.9	1	0.19	1	0.17	1	1.3	1	0.6	1
LDCA-MW31-0615	104	1	2	0	0.38	1	58.9	1	0.24	1	2.3	1	4.2	1	2	1
LDCA-MW32-0615	4.7	1	2	0	0.24	1	99.5	1	0.045	1	0.24	1	1.5	1	1.9	1
LDCA-MW33-0615	373	1	2	0	0.24	1	68.9	1	0.083	1	5.2	1	1.3	1	2	0
LDCA-MW35-0615	20	0	2	0	0.19	1	51.3	1	0.19	1	2	0	1.5	1	2	0
LDCA-MW38-0615	415	1	0.17	1	1.3	1	425	1	0.12	1	2.4	1	14	1	5.9	1
LDCA-MW39-0615	53.7	1	2	0	0.19	1	37.1	1	0.057	1	2.8	1	0.58	1	0.51	1
LDCA-MW40-0615	57.9	1	2	0	0.1	1	116	1	0.063	1	3.2	1	0.4	1	2	0
LDCA-MW41D-0615-AVG	25.9	1	0.13	1	0.8	1	498	1	2.15	1	0.99	1	58.25	1	14.35	1
LDCA-MW41S-0615	422	1	0.11	1	84.1	1	173	1	0.06	1	6.1	1	2.3	1	2	0
LDCA-MW42-0615	61.4	1	2	0	0.21	1	190	1	0.14	1	0.28	1	5	1	1.5	1
LDCA-MW43-0615	20	0	2	0	0.97	1	131	1	0.24	1	2	0	4.7	1	2	0
LDCA-MW44-0615	6.9	1	2	0	2.5	1	119	1	0.15	1	0.24	1	2.9	1	1	1
LDCA-MW46-0615	20	0	2	0	0.16	1	73.2	1	0.27	1	2	0	2.8	1	2.7	1
LDCA-MW47-0615	9.6	1	2	0	0.27	1	72.6	1	0.048	1	0.27	1	1.5	1	1.8	1

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	CYANIDE	d_CYANIDE	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	MERCURY	d_MERCURY	SILVER	d_SILVER	VANADIUM	d_VANADIUM	ZINC	d_ZINC	DIELDRIN	d_DIELDRIN
LDCA-MW08-0615	10	0	8350	1	1	0	564	1	0.049	1	1	0	0.15	1	9.5	1	0.00098	0
LDCA-MW13S-0615			200	0	0.07	1	2220	1	0.2	0	1	0	2.6	0	3.7	1	0.00095	0
LDCA-MW14S-0615	10	0	24400	1	1	0	5180	1	0.048	1	1	0	0.62	1	2	0	0.00097	0
LDCA-MW15S-0615																	0.00098	0
LDCA-MW16S-0615-AVG	7.5	1	20550	1	0.0435	1	1215	1	0.022	1	1	0	0.775	1	3.2	1	0.01065	1
LDCA-MW17S-0615-AVG			10.3	1	0.0525	1	11.15	1	0.022	1	1	0	0.43	1	2.65	1	0.000955	0
LDCA-MW18S-0615			22.2	1	0.06	1	1280	1	0.016	1	1	0	0.17	1	32.8	1	0.0564	1
LDCA-MW24-0615			137000	1	7.6	1	7640	1	0.072	1	1	0	2.6	0	15	1	0.00101	0
LDCA-MW25-0615			40000	1	2400	1	334	1	0.28	1	25.3	1	11.3	1	1170	1	0.00403	0
LDCA-MW26D-0615			123000	1	36	1	4450	1	0.2	0	0.032	1	52	1	70.8	1		
LDCA-MW26S-0615			50300	1	2.2	1	313	1	0.2	0	1	0	2.6	0	7.8	1		
LDCA-MW27-0615			18300	1	0.16	1	2120	1	0.2	0	1	0	2.6	0	6.2	1		
LDCA-MW28-0615			200	0	0.089	1	18600	1	0.055	1	1	0	2.6	0	2.1	1	0.00469	1
LDCA-MW29-0615			200	0	0.056	1	137	1	0.054	1	1	0	2.6	0	4.2	1		
LDCA-MW30-0615			200	0	0.057	1	143	1	0.057	1	1	0	2.6	0	2.9	1		
LDCA-MW31-0615			845	1	0.92	1	107	1	0.048	1	1	0	4.4	1	12	1		
LDCA-MW32-0615			200	0	0.042	1	24.2	1	0.075	1	1	0	2.6	0	1.9	1		
LDCA-MW33-0615			443	1	0.34	1	616	1	0.2	0	1	0	2.6	0	12	1		
LDCA-MW35-0615			200	0	1	0	2820	1			1	0	0.27	1	2	0		
LDCA-MW38-0615			4150	1	0.47	1	4990	1	0.11	1	1	0	2.6	0	4.9	1	0.003	0
LDCA-MW39-0615			200	0	0.24	1	4.1	1	0.057	1	1	0	2.6	0	4.7	1	0.0157	1
LDCA-MW40-0615			200	0	1	0	48.6	1			0.022	1	0.45	1	4.4	1		
LDCA-MW41D-0615-AVG	10	0	533	1	0.12	1	36760	1	0.0195	1	1	0	0.21	1	10.6	1	0.003495	0
LDCA-MW41S-0615	16.8	1	62700	1	2	1	3750	1	0.2	0	1	0	1.5	1	25.3	1	0.00096	0
LDCA-MW42-0615			200	0	0.11	1	2560	1	0.058	1	1	0	2.6	0	1.7	1	0.0422	1
LDCA-MW43-0615			2190	1	1	0	2040	1			1	0	0.21	1	6.1	1		
LDCA-MW44-0615			8040	1	0.039	1	10000	1	0.04	1	1	0	2.6	0	2.3	1		
LDCA-MW46-0615			200	0	1	0	3660	1			1	0	0.38	1	2	0		
LDCA-MW47-0615			200	0	0.05	1	16.1	1	0.042	1	1	0	2.6	0	1.6	1	0.00289	0

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	1,4-DIOXANE	d_1,4-DIOXANE	2-METHYLNAPHTHALENE	d_2-METHYLNAPHTHALENE	2,6-DINITROTOLUENE	d_2,6-DINITROTOLUENE
LDCA-MW08-0615	0.95	1				
LDCA-MW13S-0615	4.5	1	0.1	0	8.6	1
LDCA-MW14S-0615	5.7	1				
LDCA-MW15S-0615	1.1	1				
LDCA-MW16S-0615-AVG	45	1	0.1	0	5	0
LDCA-MW17S-0615-AVG	0.5	0				
LDCA-MW18S-0615	1.2	1				
LDCA-MW24-0615	10	1				
LDCA-MW25-0615	2	0	9.3	1	5	0
LDCA-MW26D-0615	0.86	1	0.1	0	5	0
LDCA-MW26S-0615	0.5	0	0.1	0	5	0
LDCA-MW27-0615	0.34	1				
LDCA-MW28-0615	32	1	0.1	0	5	0
LDCA-MW29-0615	0.5	0				
LDCA-MW30-0615	0.54	1				
LDCA-MW31-0615	0.5	0				
LDCA-MW32-0615	21	1				
LDCA-MW33-0615	1.5	1				
LDCA-MW35-0615	2	0	0.1	0	5	0
LDCA-MW38-0615	30	1	0.1	0	5	0
LDCA-MW39-0615	1.4	1				
LDCA-MW40-0615	2	0	0.1	0	5	0
LDCA-MW41D-0615-AVG	270	1	0.1	0	5	0
LDCA-MW41S-0615	0.71	1	0.1	0	5	0
LDCA-MW42-0615	3.1	1				
LDCA-MW43-0615	9.6	1				
LDCA-MW44-0615	0.82	1				
LDCA-MW46-0615	7.6	1				
LDCA-MW47-0615	18	1				

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	BENZO(A)PYRENE	d_BENZO(A)PYRENE	NAPHTHALENE	d_NAPHTHALENE	PENTACHLOROPHENOL	d_PENTACHLOROPHENOL
LDCA-MW08-0615								
LDCA-MW13S-0615	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW14S-0615								
LDCA-MW15S-0615								
LDCA-MW16S-0615-AVG	0.155	1	0.073	1	0.1	0	0.33	1
LDCA-MW17S-0615-AVG								
LDCA-MW18S-0615								
LDCA-MW24-0615								
LDCA-MW25-0615	0.1	0	0.12	1	8	1	0.24	1
LDCA-MW26D-0615	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW26S-0615	0.1	0	0.1	0	0.065	1	0.2	0
LDCA-MW27-0615								
LDCA-MW28-0615	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW29-0615								
LDCA-MW30-0615								
LDCA-MW31-0615								
LDCA-MW32-0615								
LDCA-MW33-0615								
LDCA-MW35-0615	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW38-0615	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW39-0615								
LDCA-MW40-0615	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW41D-0615-AVG	0.1	0	0.1	0	0.1	0	0.2	0
LDCA-MW41S-0615	0.1	0	0.1	0	0.1	0	0.094	1
LDCA-MW42-0615								
LDCA-MW43-0615								
LDCA-MW44-0615								
LDCA-MW46-0615								
LDCA-MW47-0615								

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	1,4-DICHLOROBENZENE	d_1,4-DICHLOROBENZENE	BENZENE	d_BENZENE	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE	ETHYLBENZENE	d_ETHYLBENZENE
LDCA-MW08-0615	0.5	0	0.5	0	1.6	1	0.5	0
LDCA-MW13S-0615	0.5	0	0.5	0	12	1	0.5	0
LDCA-MW14S-0615	0.5	0	0.5	0	0.24	1	0.5	0
LDCA-MW15S-0615	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW16S-0615-AVG	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW17S-0615-AVG								
LDCA-MW18S-0615								
LDCA-MW24-0615	0.5	0	0.5	0	0.31	1	0.5	0
LDCA-MW25-0615	0.61	1	3.5	1	0.5	0	3.4	1
LDCA-MW26D-0615	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW26S-0615	0.92	1	0.5	0	0.5	0	0.5	0
LDCA-MW27-0615	0.41	1	0.5	0	0.5	0	0.5	0
LDCA-MW28-0615								
LDCA-MW29-0615								
LDCA-MW30-0615								
LDCA-MW31-0615								
LDCA-MW32-0615								
LDCA-MW33-0615								
LDCA-MW35-0615								
LDCA-MW38-0615	0.5	0	0.5	0	42	1	0.5	0
LDCA-MW39-0615	0.5	0	0.5	0	3.4	1	0.5	0
LDCA-MW40-0615								
LDCA-MW41D-0615-AVG	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW41S-0615	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW42-0615								
LDCA-MW43-0615								
LDCA-MW44-0615								
LDCA-MW46-0615	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW47-0615								

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	M+P-XYLENES	d_M+P-XYLENES	TRICHLOROETHENE	d_TRICHLOROETHENE	VINYL CHLORIDE	d_VINYL CHLORIDE
LDCA-MW08-0615	0.5	0	0.27	1	0.5	0
LDCA-MW13S-0615	0.5	0	5.6	1	0.5	0
LDCA-MW14S-0615	0.5	0	0.5	0	0.5	0
LDCA-MW15S-0615	0.5	0	0.5	0	0.5	0
LDCA-MW16S-0615-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW17S-0615-AVG						
LDCA-MW18S-0615						
LDCA-MW24-0615	0.5	0	0.5	0	0.5	0
LDCA-MW25-0615	26	1	0.5	0	0.5	0
LDCA-MW26D-0615	0.5	0	0.5	0	0.5	0
LDCA-MW26S-0615	0.5	0	0.5	0	0.5	0
LDCA-MW27-0615	0.5	0	0.5	0	0.5	0
LDCA-MW28-0615						
LDCA-MW29-0615						
LDCA-MW30-0615						
LDCA-MW31-0615						
LDCA-MW32-0615						
LDCA-MW33-0615						
LDCA-MW35-0615						
LDCA-MW38-0615	0.5	0	8.4	1	2.8	1
LDCA-MW39-0615	0.5	0	0.79	1	0.5	0
LDCA-MW40-0615						
LDCA-MW41D-0615-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW41S-0615	0.5	0	0.5	0	0.5	0
LDCA-MW42-0615						
LDCA-MW43-0615						
LDCA-MW44-0615						
LDCA-MW46-0615	0.5	0	0.5	0	0.5	0
LDCA-MW47-0615						

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 3

Samples	PENTADECAFLUOROOCTANOIC ACID	d_PENTADECAFLUOROOCTANOIC ACID	PERFLUOROOCTANE SULFONIC ACID	d_PERFLUOROOCTANE SULFONIC ACID
LDCA-MW08-0615	0.15	1	0.45	1
LDCA-MW13S-0615	0.031	1	0.04	1
LDCA-MW14S-0615	2.7	1	0.28	1
LDCA-MW15S-0615	0.074	1	0.014	1
LDCA-MW16S-0615-AVG	0.14	1	0.25	1
LDCA-MW17S-0615-AVG				
LDCA-MW18S-0615				
LDCA-MW24-0615				
LDCA-MW25-0615				
LDCA-MW26D-0615				
LDCA-MW26S-0615				
LDCA-MW27-0615				
LDCA-MW28-0615				
LDCA-MW29-0615				
LDCA-MW30-0615				
LDCA-MW31-0615				
LDCA-MW32-0615				
LDCA-MW33-0615				
LDCA-MW35-0615				
LDCA-MW38-0615	0.16	1	0.14	1
LDCA-MW39-0615				
LDCA-MW40-0615				
LDCA-MW41D-0615-AVG	0.23	1	0.076	1
LDCA-MW41S-0615	0.038	1	0.041	0
LDCA-MW42-0615				
LDCA-MW43-0615				
LDCA-MW44-0615				
LDCA-MW46-0615				
LDCA-MW47-0615				

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 8:01:55 AM
From File	ProUCL Data Outside Shallow-Event 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ARSENIC

General Statistics

Total Number of Observations	28	Number of Distinct Observations	25
		Number of Missing Observations	1
Minimum	0.1	Mean	5.436
Maximum	84.1	Median	0.375
SD	16.11	Std. Error of Mean	3.045
Coefficient of Variation	2.964	Skewness	4.639

Normal GOF Test

Shapiro Wilk Test Statistic	0.362	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.394	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	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	10.62	95% Adjusted-CLT UCL (Chen-1995)	13.3
		95% Modified-t UCL (Johnson-1978)	11.07

Gamma GOF Test

A-D Test Statistic	3.197	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.845	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.271	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.179	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.34	k star (bias corrected MLE)	0.328
Theta hat (MLE)	15.97	Theta star (bias corrected MLE)	16.58
nu hat (MLE)	19.07	nu star (bias corrected)	18.36
MLE Mean (bias corrected)	5.436	MLE Sd (bias corrected)	9.495
		Approximate Chi Square Value (0.05)	9.648
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	9.258

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	10.34	95% Adjusted Gamma UCL (use when n<50)	10.78

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.164	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	-2.303	Mean of logged Data	-0.291
Maximum of Logged Data	4.432	SD of logged Data	1.805
Assuming Lognormal Distribution			
95% H-UCL	13.23	90% Chebyshev (MVUE) UCL	7.775
95% Chebyshev (MVUE) UCL	9.787	97.5% Chebyshev (MVUE) UCL	12.58
99% Chebyshev (MVUE) UCL	18.07		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	10.44	95% Jackknife UCL	10.62
95% Standard Bootstrap UCL	10.33	95% Bootstrap-t UCL	22.78
95% Hall's Bootstrap UCL	26.05	95% Percentile Bootstrap UCL	11.14
95% BCA Bootstrap UCL	14.78		
90% Chebyshev(Mean, Sd) UCL	14.57	95% Chebyshev(Mean, Sd) UCL	18.71
97.5% Chebyshev(Mean, Sd) UCL	24.45	99% Chebyshev(Mean, Sd) UCL	35.73
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	18.71		
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.			

BARIUM

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	28
		Number of Missing Observations	1
Minimum	30.9	Mean	264.1
Maximum	1220	Median	145
SD	304.7	Std. Error of Mean	57.58
Coefficient of Variation	1.153	Skewness	1.914
Normal GOF Test			
Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.164	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	362.2	95% Adjusted-CLT UCL (Chen-1995)	381.1
		95% Modified-t UCL (Johnson-1978)	365.7
Gamma GOF Test			
A-D Test Statistic	1.164	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.772	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.214	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.17	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.102	k star (bias corrected MLE)	1.008
Theta hat (MLE)	239.8	Theta star (bias corrected MLE)	262.2
nu hat (MLE)	61.7	nu star (bias corrected)	56.42
MLE Mean (bias corrected)	264.1	MLE Sd (bias corrected)	263.2
		Approximate Chi Square Value (0.05)	40.16
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	39.31
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	371.1	95% Adjusted Gamma UCL (use when n<50)	379.1
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.141	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.431	Mean of logged Data	5.058
Maximum of Logged Data	7.107	SD of logged Data	1.009
Assuming Lognormal Distribution			
95% H-UCL	422.2	90% Chebyshev (MVUE) UCL	421.9
95% Chebyshev (MVUE) UCL	497.6	97.5% Chebyshev (MVUE) UCL	602.6
99% Chebyshev (MVUE) UCL	808.9		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	358.9	95% Jackknife UCL	362.2
95% Standard Bootstrap UCL	356.7	95% Bootstrap-t UCL	408.4
95% Hall's Bootstrap UCL	384.5	95% Percentile Bootstrap UCL	365.7
95% BCA Bootstrap UCL	377		
90% Chebyshev(Mean, Sd) UCL	436.9	95% Chebyshev(Mean, Sd) UCL	515.1
97.5% Chebyshev(Mean, Sd) UCL	623.7	99% Chebyshev(Mean, Sd) UCL	837
Suggested UCL to Use			
95% H-UCL	422.2		
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.			
ProUCL computes and outputs H-statistic based UCLs for historical reasons only.			
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.			
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.			
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.			

MANGANESE			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	28
		Number of Missing Observations	1
Minimum	4.1	Mean	3986
Maximum	36760	Median	1660
SD	7557	Std. Error of Mean	1428
Coefficient of Variation	1.896	Skewness	3.5
Normal GOF Test			
Shapiro Wilk Test Statistic	0.549	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.164	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	6418	95% Adjusted-CLT UCL (Chen-1995)	7344
		95% Modified-t UCL (Johnson-1978)	6576
Gamma GOF Test			
A-D Test Statistic	0.281	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.832	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.101	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.177	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.399	k star (bias corrected MLE)	0.38
Theta hat (MLE)	9983	Theta star (bias corrected MLE)	10481
nu hat (MLE)	22.36	nu star (bias corrected)	21.3
MLE Mean (bias corrected)	3986	MLE Sd (bias corrected)	6463
		Approximate Chi Square Value (0.05)	11.81
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	11.38
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	7186	95% Adjusted Gamma UCL (use when n<50)	7462
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.161	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.411	Mean of logged Data	6.642
Maximum of Logged Data	10.51	SD of logged Data	2.357
Assuming Lognormal Distribution			
95% H-UCL	92945	90% Chebyshev (MVUE) UCL	25542
95% Chebyshev (MVUE) UCL	32983	97.5% Chebyshev (MVUE) UCL	43312
99% Chebyshev (MVUE) UCL	63601		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	6335	95% Jackknife UCL	6418
95% Standard Bootstrap UCL	6265	95% Bootstrap-t UCL	10152
95% Hall's Bootstrap UCL	16484	95% Percentile Bootstrap UCL	6579
95% BCA Bootstrap UCL	7601		
90% Chebyshev(Mean, Sd) UCL	8270	95% Chebyshev(Mean, Sd) UCL	10211
97.5% Chebyshev(Mean, Sd) UCL	12905	99% Chebyshev(Mean, Sd) UCL	18196
Suggested UCL to Use			
95% Adjusted Gamma UCL	7462		
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.			

PENTADECAFLUOROOCTANOIC ACID

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	16
Minimum	0.031	Mean	0.44
Maximum	2.7	Median	0.145
SD	0.916	Std. Error of Mean	0.324
Coefficient of Variation	2.079	Skewness	2.798

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	0.488	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.466	**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	1.054	95% Adjusted-CLT UCL (Chen-1995)	1.315
		95% Modified-t UCL (Johnson-1978)	1.107

Gamma GOF Test

A-D Test Statistic	1.091	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.364	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.308	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.558	k star (bias corrected MLE)	0.432
Theta hat (MLE)	0.79	Theta star (bias corrected MLE)	1.02
nu hat (MLE)	8.925	nu star (bias corrected)	6.911
MLE Mean (bias corrected)	0.44	MLE Sd (bias corrected)	0.67
		Approximate Chi Square Value (0.05)	2.122
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	1.516

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.434	95% Adjusted Gamma UCL (use when n<50)	2.007

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.242	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.474	Mean of logged Data	-1.94
Maximum of Logged Data	0.993	SD of logged Data	1.384

Assuming Lognormal Distribution			
95% H-UCL	3.784	90% Chebyshev (MVUE) UCL	0.773
95% Chebyshev (MVUE) UCL	0.983	97.5% Chebyshev (MVUE) UCL	1.274
99% Chebyshev (MVUE) UCL	1.845		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.973	95% Jackknife UCL	1.054
95% Standard Bootstrap UCL	0.934	95% Bootstrap-t UCL	6.246
95% Hall's Bootstrap UCL	4.736	95% Percentile Bootstrap UCL	1.077
95% BCA Bootstrap UCL	1.125		
90% Chebyshev(Mean, Sd) UCL	1.411	95% Chebyshev(Mean, Sd) UCL	1.851
97.5% Chebyshev(Mean, Sd) UCL	2.462	99% Chebyshev(Mean, Sd) UCL	3.661
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	1.851		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 7:59:33 AM
From File	ProUCL Data Outside Shallow-Event 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ALUMINUM

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	22
		Number of Missing Observations	1
Number of Detects	21	Number of Non-Detects	7
Number of Distinct Detects	21	Number of Distinct Non-Detects	1
Minimum Detect	3.8	Minimum Non-Detect	20
Maximum Detect	29300	Maximum Non-Detect	20
Variance Detects	41165473	Percent Non-Detects	25%
Mean Detects	1730	SD Detects	6416
Median Detects	53.7	CV Detects	3.709
Skewness Detects	4.376	Kurtosis Detects	19.53
Mean of Logged Detects	4.151	SD of Logged Detects	2.261

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.294	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.486	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.188	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	1300	KM Standard Error of Mean	1060
KM SD	5474	95% KM (BCA) UCL	3228
95% KM (t) UCL	3105	95% KM (Percentile Bootstrap) UCL	3203
95% KM (z) UCL	3043	95% KM Bootstrap t UCL	58185
90% KM Chebyshev UCL	4480	95% KM Chebyshev UCL	5920
97.5% KM Chebyshev UCL	7919	99% KM Chebyshev UCL	11846

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	3.165	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.886	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.339	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.209	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)	0.219	k star (bias corrected MLE)	0.22
Theta hat (MLE)	7884	Theta star (bias corrected MLE)	7870
nu hat (MLE)	9.216	nu star (bias corrected)	9.233
Mean (detects)	1730		

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	1298
Maximum	29300	Median	18.05
SD	5574	CV	4.296
k hat (MLE)	0.148	k star (bias corrected MLE)	0.156
Theta hat (MLE)	8772	Theta star (bias corrected MLE)	8324
nu hat (MLE)	8.284	nu star (bias corrected)	8.729
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (8.73, α)	3.164	Adjusted Chi Square Value (8.73, β)	2.96
95% Gamma Approximate UCL (use when n>=50)	3579	95% Gamma Adjusted UCL (use when n<50)	3827

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1300	SD (KM)	5474
Variance (KM)	29959443	SE of Mean (KM)	1060
k hat (KM)	0.0564	k star (KM)	0.0742
nu hat (KM)	3.158	nu star (KM)	4.153
theta hat (KM)	23050	theta star (KM)	17527
80% gamma percentile (KM)	529.5	90% gamma percentile (KM)	2929
95% gamma percentile (KM)	7520	99% gamma percentile (KM)	23852

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.15, α)	0.783	Adjusted Chi Square Value (4.15, β)	0.7
95% Gamma Approximate KM-UCL (use when n>=50)	6894	95% Gamma Adjusted KM-UCL (use when n<50)	7710
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.188	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Approximate Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1300	Mean in Log Scale	3.556
SD in Original Scale	5574	SD in Log Scale	2.276
95% t UCL (assumes normality of ROS data)	3094	95% Percentile Bootstrap UCL	3369
95% BCA Bootstrap UCL	5299	95% Bootstrap t UCL	59504
95% H-UCL (Log ROS)	3101		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	3.628	KM Geo Mean	37.64
KM SD (logged)	2.128	95% Critical H Value (KM-Log)	4.087
KM Standard Error of Mean (logged)	0.417	95% H-UCL (KM -Log)	1933
KM SD (logged)	2.128	95% Critical H Value (KM-Log)	4.087
KM Standard Error of Mean (logged)	0.417		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1300	Mean in Log Scale	3.689
SD in Original Scale	5574	SD in Log Scale	2.11
95% t UCL (Assumes normality)	3094	95% H-Stat UCL	1924
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	7919		
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.			

ANTIMONY			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	6
		Number of Missing Observations	1
Number of Detects	5	Number of Non-Detects	23
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	2
Maximum Detect	10	Maximum Non-Detect	2
Variance Detects	19.45	Percent Non-Detects	82.14%
Mean Detects	2.11	SD Detects	4.411
Median Detects	0.14	CV Detects	2.09
Skewness Detects	2.236	Kurtosis Detects	5
Mean of Logged Detects	-1.137	SD of Logged Detects	1.929
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.557	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.47	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	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	0.49	KM Standard Error of Mean	0.387
KM SD	1.83	95% KM (BCA) UCL	1.543
95% KM (t) UCL	1.149	95% KM (Percentile Bootstrap) UCL	1.196
95% KM (z) UCL	1.126	95% KM Bootstrap t UCL	23.43
90% KM Chebyshev UCL	1.65	95% KM Chebyshev UCL	2.176
97.5% KM Chebyshev UCL	2.906	99% KM Chebyshev UCL	4.339
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.182	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.731	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.485	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.378	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)	0.276
Theta hat (MLE)	5.926	Theta star (bias corrected MLE)	7.652
nu hat (MLE)	3.561	nu star (bias corrected)	2.758
Mean (detects)	2.11		
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	0.985
Maximum	10	Median	0.116
SD	2.125	CV	2.157
k hat (MLE)	0.299	k star (bias corrected MLE)	0.291
Theta hat (MLE)	3.293	Theta star (bias corrected MLE)	3.386
nu hat (MLE)	16.75	nu star (bias corrected)	16.29
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (16.29, α)	8.169	Adjusted Chi Square Value (16.29, β)	7.813
95% Gamma Approximate UCL (use when n>=50)	1.965	95% Gamma Adjusted UCL (use when n<50)	2.054

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.49	SD (KM)	1.83
Variance (KM)	3.35	SE of Mean (KM)	0.387
k hat (KM)	0.0716	k star (KM)	0.0877
nu hat (KM)	4.009	nu star (KM)	4.913
theta hat (KM)	6.841	theta star (KM)	5.582
80% gamma percentile (KM)	0.276	90% gamma percentile (KM)	1.225
95% gamma percentile (KM)	2.854	99% gamma percentile (KM)	8.298
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.91, α)	1.112	Adjusted Chi Square Value (4.91, β)	1.007
95% Gamma Approximate KM-UCL (use when n>=50)	2.163	95% Gamma Adjusted KM-UCL (use when n<50)	2.39
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.63	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.429	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.645	Mean in Log Scale	-1.691
SD in Original Scale	1.869	SD in Log Scale	1.402
95% t UCL (assumes normality of ROS data)	1.246	95% Percentile Bootstrap UCL	1.307
95% BCA Bootstrap UCL	1.744	95% Bootstrap t UCL	3.666
95% H-UCL (Log ROS)	1.102		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.843	KM Geo Mean	0.158
KM SD (logged)	0.812	95% Critical H Value (KM-Log)	2.238
KM Standard Error of Mean (logged)	0.188	95% H-UCL (KM -Log)	0.313
KM SD (logged)	0.812	95% Critical H Value (KM-Log)	2.238
KM Standard Error of Mean (logged)	0.188		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.198	Mean in Log Scale	-0.203
SD in Original Scale	1.752	SD in Log Scale	0.865
95% t UCL (Assumes normality)	1.762	95% H-Stat UCL	1.739
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	2.176		
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.			

CADMIUM			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	21
		Number of Missing Observations	1
Number of Detects	25	Number of Non-Detects	3
Number of Distinct Detects	20	Number of Distinct Non-Detects	1
Minimum Detect	0.0185	Minimum Non-Detect	1
Maximum Detect	8.3	Maximum Non-Detect	1
Variance Detects	2.781	Percent Non-Detects	10.71%
Mean Detects	0.586	SD Detects	1.668
Median Detects	0.15	CV Detects	2.844
Skewness Detects	4.498	Kurtosis Detects	21.13
Mean of Logged Detects	-1.848	SD of Logged Detects	1.354
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.345	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.451	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.173	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	0.539	KM Standard Error of Mean	0.299
KM SD	1.55	95% KM (BCA) UCL	1.12
95% KM (t) UCL	1.048	95% KM (Percentile Bootstrap) UCL	1.12
95% KM (z) UCL	1.031	95% KM Bootstrap t UCL	3.476
90% KM Chebyshev UCL	1.436	95% KM Chebyshev UCL	1.843
97.5% KM Chebyshev UCL	2.407	99% KM Chebyshev UCL	3.515
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.904	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.81	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.357	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.185	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)	0.485	k star (bias corrected MLE)	0.454
Theta hat (MLE)	1.208	Theta star (bias corrected MLE)	1.292
nu hat (MLE)	24.27	nu star (bias corrected)	22.69
Mean (detects)	0.586		
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	0.544
Maximum	8.3	Median	0.145
SD	1.58	CV	2.904
k hat (MLE)	0.462	k star (bias corrected MLE)	0.436
Theta hat (MLE)	1.177	Theta star (bias corrected MLE)	1.246
nu hat (MLE)	25.87	nu star (bias corrected)	24.43
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (24.43, α)	14.18	Adjusted Chi Square Value (24.43, β)	13.7
95% Gamma Approximate UCL (use when n>=50)	0.937	95% Gamma Adjusted UCL (use when n<50)	0.97

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.539	SD (KM)	1.55
Variance (KM)	2.404	SE of Mean (KM)	0.299
k hat (KM)	0.121	k star (KM)	0.132
nu hat (KM)	6.763	nu star (KM)	7.372
theta hat (KM)	4.461	theta star (KM)	4.093
80% gamma percentile (KM)	0.521	90% gamma percentile (KM)	1.561
95% gamma percentile (KM)	3.034	99% gamma percentile (KM)	7.432
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.37, α)	2.377	Adjusted Chi Square Value (7.37, β)	2.205
95% Gamma Approximate KM-UCL (use when n>=50)	1.671	95% Gamma Adjusted KM-UCL (use when n<50)	1.801
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.206	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.173	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.54	Mean in Log Scale	-1.875
SD in Original Scale	1.579	SD in Log Scale	1.298
95% t UCL (assumes normality of ROS data)	1.048	95% Percentile Bootstrap UCL	1.095
95% BCA Bootstrap UCL	1.59	95% Bootstrap t UCL	3.454
95% H-UCL (Log ROS)	0.725		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.89	KM Geo Mean	0.151
KM SD (logged)	1.287	95% Critical H Value (KM-Log)	2.829
KM Standard Error of Mean (logged)	0.254	95% H-UCL (KM -Log)	0.697
KM SD (logged)	1.287	95% Critical H Value (KM-Log)	2.829
KM Standard Error of Mean (logged)	0.254		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.577	Mean in Log Scale	-1.725
SD in Original Scale	1.573	SD in Log Scale	1.327
95% t UCL (Assumes normality)	1.083	95% H-Stat UCL	0.899
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.843		
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.			

CHROMIUM			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	20
		Number of Missing Observations	1
Number of Detects	20	Number of Non-Detects	8
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	0.15	Minimum Non-Detect	2
Maximum Detect	31.3	Maximum Non-Detect	2
Variance Detects	71.67	Percent Non-Detects	28.57%
Mean Detects	4.294	SD Detects	8.466
Median Detects	1.145	CV Detects	1.971
Skewness Detects	2.755	Kurtosis Detects	6.822
Mean of Logged Detects	0.189	SD of Logged Detects	1.586
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.521	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.351	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	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	3.236	KM Standard Error of Mean	1.393
KM SD	7.176	95% KM (BCA) UCL	5.715
95% KM (t) UCL	5.608	95% KM (Percentile Bootstrap) UCL	5.713
95% KM (z) UCL	5.527	95% KM Bootstrap t UCL	13.43
90% KM Chebyshev UCL	7.415	95% KM Chebyshev UCL	9.308
97.5% KM Chebyshev UCL	11.94	99% KM Chebyshev UCL	17.1
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.23	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.802	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.205	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.501	k star (bias corrected MLE)	0.459
Theta hat (MLE)	8.576	Theta star (bias corrected MLE)	9.357
nu hat (MLE)	20.03	nu star (bias corrected)	18.36
Mean (detects)	4.294		
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	3.187
Maximum	31.3	Median	0.684
SD	7.334	CV	2.302
k hat (MLE)	0.341	k star (bias corrected MLE)	0.328
Theta hat (MLE)	9.352	Theta star (bias corrected MLE)	9.714
nu hat (MLE)	19.08	nu star (bias corrected)	18.37
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (18.37, α)	9.659	Adjusted Chi Square Value (18.37, β)	9.269
95% Gamma Approximate UCL (use when n>=50)	6.06	95% Gamma Adjusted UCL (use when n<50)	6.316

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.236	SD (KM)	7.176
Variance (KM)	51.5	SE of Mean (KM)	1.393
k hat (KM)	0.203	k star (KM)	0.205
nu hat (KM)	11.38	nu star (KM)	11.5
theta hat (KM)	15.92	theta star (KM)	15.76
80% gamma percentile (KM)	4.322	90% gamma percentile (KM)	9.787
95% gamma percentile (KM)	16.56	99% gamma percentile (KM)	35.12
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.50, α)	4.898	Adjusted Chi Square Value (11.50, β)	4.634
95% Gamma Approximate KM-UCL (use when n>=50)	7.595	95% Gamma Adjusted KM-UCL (use when n<50)	8.029
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.246	Mean in Log Scale	-0.0969
SD in Original Scale	7.304	SD in Log Scale	1.489
95% t UCL (assumes normality of ROS data)	5.597	95% Percentile Bootstrap UCL	5.693
95% BCA Bootstrap UCL	6.575	95% Bootstrap t UCL	14.19
95% H-UCL (Log ROS)	6.717		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.109	KM Geo Mean	0.896
KM SD (logged)	1.453	95% Critical H Value (KM-Log)	3.061
KM Standard Error of Mean (logged)	0.301	95% H-UCL (KM -Log)	6.058
KM SD (logged)	1.453	95% Critical H Value (KM-Log)	3.061
KM Standard Error of Mean (logged)	0.301		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.353	Mean in Log Scale	0.135
SD in Original Scale	7.261	SD in Log Scale	1.334
95% t UCL (Assumes normality)	5.69	95% H-Stat UCL	5.853
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	8.029		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

COBALT			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	24
		Number of Missing Observations	1
Number of Detects	27	Number of Non-Detects	1
Number of Distinct Detects	23	Number of Distinct Non-Detects	1
Minimum Detect	0.066	Minimum Non-Detect	1
Maximum Detect	58.25	Maximum Non-Detect	1
Variance Detects	133.1	Percent Non-Detects	3.571%
Mean Detects	6.711	SD Detects	11.54
Median Detects	2.9	CV Detects	1.719
Skewness Detects	3.772	Kurtosis Detects	16.16
Mean of Logged Detects	1.035	SD of Logged Detects	1.429
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.538	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.923	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.167	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	6.483	KM Standard Error of Mean	2.153
KM SD	11.18	95% KM (BCA) UCL	10.38
95% KM (t) UCL	10.15	95% KM (Percentile Bootstrap) UCL	10.4
95% KM (z) UCL	10.02	95% KM Bootstrap t UCL	14.83
90% KM Chebyshev UCL	12.94	95% KM Chebyshev UCL	15.87
97.5% KM Chebyshev UCL	19.93	99% KM Chebyshev UCL	27.9
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.635	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.789	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.133	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.176	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.696	k star (bias corrected MLE)	0.644
Theta hat (MLE)	9.639	Theta star (bias corrected MLE)	10.43
nu hat (MLE)	37.6	nu star (bias corrected)	34.75
Mean (detects)	6.711		
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	6.472
Maximum	58.25	Median	2.85
SD	11.39	CV	1.76
k hat (MLE)	0.598	k star (bias corrected MLE)	0.558
Theta hat (MLE)	10.82	Theta star (bias corrected MLE)	11.6
nu hat (MLE)	33.49	nu star (bias corrected)	31.23
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (31.23, α)	19.46	Adjusted Chi Square Value (31.23, β)	18.89
95% Gamma Approximate UCL (use when n>=50)	10.38	95% Gamma Adjusted UCL (use when n<50)	10.7

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	6.483	SD (KM)	11.18
Variance (KM)	125	SE of Mean (KM)	2.153
k hat (KM)	0.336	k star (KM)	0.324
nu hat (KM)	18.83	nu star (KM)	18.15
theta hat (KM)	19.28	theta star (KM)	20
80% gamma percentile (KM)	10.12	90% gamma percentile (KM)	18.93
95% gamma percentile (KM)	28.92	99% gamma percentile (KM)	54.64
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (18.15, α)	9.499	Adjusted Chi Square Value (18.15, β)	9.112
95% Gamma Approximate KM-UCL (use when n>=50)	12.39	95% Gamma Adjusted KM-UCL (use when n<50)	12.91
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.923	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.167	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	6.483	Mean in Log Scale	0.958
SD in Original Scale	11.38	SD in Log Scale	1.46
95% t UCL (assumes normality of ROS data)	10.15	95% Percentile Bootstrap UCL	10.23
95% BCA Bootstrap UCL	12.47	95% Bootstrap t UCL	15.06
95% H-UCL (Log ROS)	17.94		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.948	KM Geo Mean	2.582
KM SD (logged)	1.457	95% Critical H Value (KM-Log)	3.067
KM Standard Error of Mean (logged)	0.283	95% H-UCL (KM -Log)	17.63
KM SD (logged)	1.457	95% Critical H Value (KM-Log)	3.067
KM Standard Error of Mean (logged)	0.283		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.489	Mean in Log Scale	0.973
SD in Original Scale	11.38	SD in Log Scale	1.44
95% t UCL (Assumes normality)	10.15	95% H-Stat UCL	17.33
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	12.91		
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.			

COPPER			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	18	Number of Non-Detects	10
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	0.27	Minimum Non-Detect	2
Maximum Detect	94.6	Maximum Non-Detect	2
Variance Detects	520.6	Percent Non-Detects	35.71%
Mean Detects	10.11	SD Detects	22.82
Median Detects	1.85	CV Detects	2.256
Skewness Detects	3.413	Kurtosis Detects	12.32
Mean of Logged Detects	0.908	SD of Logged Detects	1.6
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.476	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.351	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	6.859	KM Standard Error of Mean	3.562
KM SD	18.31	95% KM (BCA) UCL	13.16
95% KM (t) UCL	12.93	95% KM (Percentile Bootstrap) UCL	12.98
95% KM (z) UCL	12.72	95% KM Bootstrap t UCL	33.13
90% KM Chebyshev UCL	17.54	95% KM Chebyshev UCL	22.38
97.5% KM Chebyshev UCL	29.1	99% KM Chebyshev UCL	42.3
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.382	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.809	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.251	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.216	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)	0.458	k star (bias corrected MLE)	0.419
Theta hat (MLE)	22.08	Theta star (bias corrected MLE)	24.15
nu hat (MLE)	16.49	nu star (bias corrected)	15.07
Mean (detects)	10.11		
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	6.699
Maximum	94.6	Median	1.129
SD	18.71	CV	2.793
k hat (MLE)	0.272	k star (bias corrected MLE)	0.267
Theta hat (MLE)	24.62	Theta star (bias corrected MLE)	25.11
nu hat (MLE)	15.24	nu star (bias corrected)	14.94
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (14.94, α)	7.219	Adjusted Chi Square Value (14.94, β)	6.888
95% Gamma Approximate UCL (use when n>=50)	13.86	95% Gamma Adjusted UCL (use when n<50)	14.53

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	6.859	SD (KM)	18.31
Variance (KM)	335.3	SE of Mean (KM)	3.562
k hat (KM)	0.14	k star (KM)	0.149
nu hat (KM)	7.858	nu star (KM)	8.349
theta hat (KM)	48.88	theta star (KM)	46
80% gamma percentile (KM)	7.429	90% gamma percentile (KM)	20.32
95% gamma percentile (KM)	37.8	99% gamma percentile (KM)	88.56
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (8.35, α)	2.939	Adjusted Chi Square Value (8.35, β)	2.743
95% Gamma Approximate KM-UCL (use when n>=50)	19.49	95% Gamma Adjusted KM-UCL (use when n<50)	20.87
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	6.916	Mean in Log Scale	0.508
SD in Original Scale	18.63	SD in Log Scale	1.491
95% t UCL (assumes normality of ROS data)	12.91	95% Percentile Bootstrap UCL	13.67
95% BCA Bootstrap UCL	18.52	95% Bootstrap t UCL	37.63
95% H-UCL (Log ROS)	12.36		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.514	KM Geo Mean	1.672
KM SD (logged)	1.409	95% Critical H Value (KM-Log)	2.999
KM Standard Error of Mean (logged)	0.294	95% H-UCL (KM -Log)	10.18
KM SD (logged)	1.409	95% Critical H Value (KM-Log)	2.999
KM Standard Error of Mean (logged)	0.294		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.859	Mean in Log Scale	0.584
SD in Original Scale	18.64	SD in Log Scale	1.345
95% t UCL (Assumes normality)	12.86	95% H-Stat UCL	9.395
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	22.38		
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.			

CYANIDE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	3
		Number of Missing Observations	19
Number of Detects	2	Number of Non-Detects	3
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	7.5	Minimum Non-Detect	10
Maximum Detect	16.8	Maximum Non-Detect	10
Variance Detects	43.25	Percent Non-Detects	60%
Mean Detects	12.15	SD Detects	6.576
Median Detects	12.15	CV Detects	0.541
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.418	SD of Logged Detects	0.57

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	9.36	KM Standard Error of Mean	2.353
KM SD	3.72	95% KM (BCA) UCL	N/A
95% KM (t) UCL	14.38	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	13.23	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	16.42	95% KM Chebyshev UCL	19.62
97.5% KM Chebyshev UCL	24.05	99% KM Chebyshev UCL	32.77

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	6.476	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.876	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	25.9	nu star (bias corrected)	N/A
Mean (detects)	12.15		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.36	SD (KM)	3.72
Variance (KM)	13.84	SE of Mean (KM)	2.353
k hat (KM)	6.331	k star (KM)	2.666
nu hat (KM)	63.31	nu star (KM)	26.66
theta hat (KM)	1.478	theta star (KM)	3.511
80% gamma percentile (KM)	13.54	90% gamma percentile (KM)	17.04
95% gamma percentile (KM)	20.33	99% gamma percentile (KM)	27.5

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0086
Approximate Chi Square Value (26.66, α)	15.89	Adjusted Chi Square Value (26.66, β)	12.4
95% Gamma Approximate KM-UCL (use when n>=50)	15.71	95% Gamma Adjusted KM-UCL (use when n<50)	20.12

Lognormal GOF Test on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	9.419	Mean in Log Scale	2.168
SD in Original Scale	4.396	SD in Log Scale	0.418
95% t UCL (assumes normality of ROS data)	13.61	95% Percentile Bootstrap UCL	12.68
95% BCA Bootstrap UCL	13.14	95% Bootstrap t UCL	20.35
95% H-UCL (Log ROS)	16.78		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.176	KM Geo Mean	8.813
KM SD (logged)	0.323	95% Critical H Value (KM-Log)	2.454
KM Standard Error of Mean (logged)	0.204	95% H-UCL (KM -Log)	13.79
KM SD (logged)	0.323	95% Critical H Value (KM-Log)	2.454
KM Standard Error of Mean (logged)	0.204		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	7.86	Mean in Log Scale	1.933
SD in Original Scale	5.114	SD in Log Scale	0.527
95% t UCL (Assumes normality)	12.74	95% H-Stat UCL	17.65
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	19.62		
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

IRON			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	17	Number of Non-Detects	11
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	10.3	Minimum Non-Detect	200
Maximum Detect	137000	Maximum Non-Detect	200
Variance Detects	1.795E+9	Percent Non-Detects	39.29%
Mean Detects	29461	SD Detects	42363
Median Detects	8350	CV Detects	1.438
Skewness Detects	1.796	Kurtosis Detects	2.47
Mean of Logged Detects	8.497	SD of Logged Detects	2.81
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.722	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	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	17893	KM Standard Error of Mean	6838
KM SD	35104	95% KM (BCA) UCL	30220
95% KM (t) UCL	29541	95% KM (Percentile Bootstrap) UCL	29615
95% KM (z) UCL	29141	95% KM Bootstrap t UCL	39054
90% KM Chebyshev UCL	38408	95% KM Chebyshev UCL	47701
97.5% KM Chebyshev UCL	60598	99% KM Chebyshev UCL	85933
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.159	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.826	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0865	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.225	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.371	k star (bias corrected MLE)	0.345
Theta hat (MLE)	79341	Theta star (bias corrected MLE)	85392
nu hat (MLE)	12.62	nu star (bias corrected)	11.73
Mean (detects)	29461		
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	17887
Maximum	137000	Median	488
SD	35752	CV	1.999
k hat (MLE)	0.123	k star (bias corrected MLE)	0.133
Theta hat (MLE)	145745	Theta star (bias corrected MLE)	134097
nu hat (MLE)	6.873	nu star (bias corrected)	7.47
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (7.47, α)	2.432	Adjusted Chi Square Value (7.47, β)	2.258
95% Gamma Approximate UCL (use when n>=50)	54940	95% Gamma Adjusted UCL (use when n<50)	59179

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	17893	SD (KM)	35104
Variance (KM)	1.232E+9	SE of Mean (KM)	6838
k hat (KM)	0.26	k star (KM)	0.256
nu hat (KM)	14.55	nu star (KM)	14.32
theta hat (KM)	68870	theta star (KM)	69954
80% gamma percentile (KM)	26194	90% gamma percentile (KM)	53617
95% gamma percentile (KM)	86020	99% gamma percentile (KM)	172005

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (14.32, α)	6.794	Adjusted Chi Square Value (14.32, β)	6.474
95% Gamma Approximate KM-UCL (use when n>=50)	37726	95% Gamma Adjusted KM-UCL (use when n<50)	39590

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	17919	Mean in Log Scale	6.471
SD in Original Scale	35735	SD in Log Scale	3.547
95% t UCL (assumes normality of ROS data)	29422	95% Percentile Bootstrap UCL	29768
95% BCA Bootstrap UCL	33540	95% Bootstrap t UCL	41456
95% H-UCL (Log ROS)	27921574		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	6.226	KM Geo Mean	505.8
KM SD (logged)	3.541	95% Critical H Value (KM-Log)	6.409
KM Standard Error of Mean (logged)	0.7	95% H-UCL (KM -Log)	21088088
KM SD (logged)	3.541	95% Critical H Value (KM-Log)	6.409
KM Standard Error of Mean (logged)	0.7		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	17926	Mean in Log Scale	6.968
SD in Original Scale	35731	SD in Log Scale	2.903
95% t UCL (Assumes normality)	29428	95% H-Stat UCL	1417879
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	39590		

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.

LEAD			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	23
		Number of Missing Observations	1
Number of Detects	22	Number of Non-Detects	6
Number of Distinct Detects	22	Number of Distinct Non-Detects	1
Minimum Detect	0.039	Minimum Non-Detect	1
Maximum Detect	2400	Maximum Non-Detect	1
Variance Detects	261351	Percent Non-Detects	21.43%
Mean Detects	111.4	SD Detects	511.2
Median Detects	0.115	CV Detects	4.589
Skewness Detects	4.689	Kurtosis Detects	21.99
Mean of Logged Detects	-1.08	SD of Logged Detects	2.716
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.227	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.513	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	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	87.56	KM Standard Error of Mean	86.09
KM SD	445.1	95% KM (BCA) UCL	258.9
95% KM (t) UCL	234.2	95% KM (Percentile Bootstrap) UCL	258.1
95% KM (z) UCL	229.2	95% KM Bootstrap t UCL	27791
90% KM Chebyshev UCL	345.8	95% KM Chebyshev UCL	462.8
97.5% KM Chebyshev UCL	625.2	99% KM Chebyshev UCL	944.2
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	5.069	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.957	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.384	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.21	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)	0.135	k star (bias corrected MLE)	0.147
Theta hat (MLE)	826.8	Theta star (bias corrected MLE)	759.6
nu hat (MLE)	5.928	nu star (bias corrected)	6.453
Mean (detects)	111.4		
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	87.53
Maximum	2400	Median	0.065
SD	453.3	CV	5.178
k hat (MLE)	0.125	k star (bias corrected MLE)	0.135
Theta hat (MLE)	700.1	Theta star (bias corrected MLE)	646.2
nu hat (MLE)	7.002	nu star (bias corrected)	7.585
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (7.58, α)	2.497	Adjusted Chi Square Value (7.58, β)	2.32
95% Gamma Approximate UCL (use when n>=50)	265.9	95% Gamma Adjusted UCL (use when n<50)	286.2

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	87.56	SD (KM)	445.1
Variance (KM)	198096	SE of Mean (KM)	86.09
k hat (KM)	0.0387	k star (KM)	0.0584
nu hat (KM)	2.167	nu star (KM)	3.269
theta hat (KM)	2262	theta star (KM)	1500
80% gamma percentile (KM)	19.53	90% gamma percentile (KM)	160.2
95% gamma percentile (KM)	487.7	99% gamma percentile (KM)	1787
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.27, α)	0.456	Adjusted Chi Square Value (3.27, β)	0.401
95% Gamma Approximate KM-UCL (use when n>=50)	627.3	95% Gamma Adjusted KM-UCL (use when n<50)	713.4
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.762	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	87.59	Mean in Log Scale	-1.27
SD in Original Scale	453.2	SD in Log Scale	2.513
95% t UCL (assumes normality of ROS data)	233.5	95% Percentile Bootstrap UCL	258.3
95% BCA Bootstrap UCL	428.9	95% Bootstrap t UCL	27853
95% H-UCL (Log ROS)	64.28		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.336	KM Geo Mean	0.263
KM SD (logged)	2.439	95% Critical H Value (KM-Log)	4.584
KM Standard Error of Mean (logged)	0.481	95% H-UCL (KM -Log)	44.3
KM SD (logged)	2.439	95% Critical H Value (KM-Log)	4.584
KM Standard Error of Mean (logged)	0.481		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	87.63	Mean in Log Scale	-0.997
SD in Original Scale	453.2	SD in Log Scale	2.401
95% t UCL (Assumes normality)	233.5	95% H-Stat UCL	53.17
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	944.2		
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.			

MERCURY			
General Statistics			
Total Number of Observations	24	Number of Distinct Observations	16
		Number of Missing Observations	5
Number of Detects	18	Number of Non-Detects	6
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	0.016	Minimum Non-Detect	0.2
Maximum Detect	0.28	Maximum Non-Detect	0.2
Variance Detects	0.00346	Percent Non-Detects	25%
Mean Detects	0.0625	SD Detects	0.0588
Median Detects	0.0515	CV Detects	0.942
Skewness Detects	3.27	Kurtosis Detects	12.19
Mean of Logged Detects	-3.016	SD of Logged Detects	0.667
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.6	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.308	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	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	0.0593	KM Standard Error of Mean	0.0111
KM SD	0.0511	95% KM (BCA) UCL	0.0795
95% KM (t) UCL	0.0783	95% KM (Percentile Bootstrap) UCL	0.0781
95% KM (z) UCL	0.0775	95% KM Bootstrap t UCL	0.0991
90% KM Chebyshev UCL	0.0925	95% KM Chebyshev UCL	0.108
97.5% KM Chebyshev UCL	0.128	99% KM Chebyshev UCL	0.17
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.975	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.751	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.231	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.206	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)	2.213	k star (bias corrected MLE)	1.881
Theta hat (MLE)	0.0282	Theta star (bias corrected MLE)	0.0332
nu hat (MLE)	79.68	nu star (bias corrected)	67.73
Mean (detects)	0.0625		
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	0.06
Maximum	0.28	Median	0.0515
SD	0.0534	CV	0.891
k hat (MLE)	2.169	k star (bias corrected MLE)	1.926
Theta hat (MLE)	0.0276	Theta star (bias corrected MLE)	0.0311
nu hat (MLE)	104.1	nu star (bias corrected)	92.44
Adjusted Level of Significance (β)	0.0392		
Approximate Chi Square Value (92.44, α)	71.27	Adjusted Chi Square Value (92.44, β)	69.96
95% Gamma Approximate UCL (use when n>=50)	0.0778	95% Gamma Adjusted UCL (use when n<50)	0.0792

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0593	SD (KM)	0.0511
Variance (KM)	0.00261	SE of Mean (KM)	0.0111
k hat (KM)	1.346	k star (KM)	1.205
nu hat (KM)	64.59	nu star (KM)	57.85
theta hat (KM)	0.044	theta star (KM)	0.0492
80% gamma percentile (KM)	0.0938	90% gamma percentile (KM)	0.13
95% gamma percentile (KM)	0.166	99% gamma percentile (KM)	0.249
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (57.85, α)	41.37	Adjusted Chi Square Value (57.85, β)	40.39
95% Gamma Approximate KM-UCL (use when n>=50)	0.0829	95% Gamma Adjusted KM-UCL (use when n<50)	0.0849
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0594	Mean in Log Scale	-3.034
SD in Original Scale	0.0521	SD in Log Scale	0.62
95% t UCL (assumes normality of ROS data)	0.0777	95% Percentile Bootstrap UCL	0.078
95% BCA Bootstrap UCL	0.0887	95% Bootstrap t UCL	0.0976
95% H-UCL (Log ROS)	0.0764		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.041	KM Geo Mean	0.0478
KM SD (logged)	0.618	95% Critical H Value (KM-Log)	2.091
KM Standard Error of Mean (logged)	0.144	95% H-UCL (KM -Log)	0.0757
KM SD (logged)	0.618	95% Critical H Value (KM-Log)	2.091
KM Standard Error of Mean (logged)	0.144		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0719	Mean in Log Scale	-2.837
SD in Original Scale	0.0532	SD in Log Scale	0.655
95% t UCL (Assumes normality)	0.0905	95% H-Stat UCL	0.0971
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.0757		
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.			

SILVER			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	4
		Number of Missing Observations	1
Number of Detects	3	Number of Non-Detects	25
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.022	Minimum Non-Detect	1
Maximum Detect	25.3	Maximum Non-Detect	1
Variance Detects	212.9	Percent Non-Detects	89.29%
Mean Detects	8.451	SD Detects	14.59
Median Detects	0.032	CV Detects	1.727
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-1.343	SD of Logged Detects	3.965
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.93	KM Standard Error of Mean	1.086
KM SD	4.69	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.779	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.715	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	4.186	95% KM Chebyshev UCL	5.661
97.5% KM Chebyshev UCL	7.709	99% KM Chebyshev UCL	11.73
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.21	k star (bias corrected MLE)	N/A
Theta hat (MLE)	40.24	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.26	nu star (bias corrected)	N/A
Mean (detects)	8.451		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.213
Maximum	25.3	Median	0.01
SD	5.275	CV	2.384
k hat (MLE)	0.229	k star (bias corrected MLE)	0.229
Theta hat (MLE)	9.648	Theta star (bias corrected MLE)	9.68
nu hat (MLE)	12.84	nu star (bias corrected)	12.8
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (12.80, α)	5.759	Adjusted Chi Square Value (12.80, β)	5.468
95% Gamma Approximate UCL (use when n>=50)	4.918	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.93	SD (KM)	4.69
Variance (KM)	22	SE of Mean (KM)	1.086
k hat (KM)	0.0393	k star (KM)	0.0589
nu hat (KM)	2.2	nu star (KM)	3.298
theta hat (KM)	23.66	theta star (KM)	15.79
80% gamma percentile (KM)	0.213	90% gamma percentile (KM)	1.716
95% gamma percentile (KM)	5.188	99% gamma percentile (KM)	18.91
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.30, α)	0.466	Adjusted Chi Square Value (3.30, β)	0.41
95% Gamma Approximate KM-UCL (use when n>=50)	6.581	95% Gamma Adjusted KM-UCL (use when n<50)	7.481
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.79	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.368	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.139	Mean in Log Scale	-3.261
SD in Original Scale	4.767	SD in Log Scale	2.665
95% t UCL (assumes normality of ROS data)	2.674	95% Percentile Bootstrap UCL	2.914
95% BCA Bootstrap UCL	3.855	95% Bootstrap t UCL	18.57
95% H-UCL (Log ROS)	16.97		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.384	KM Geo Mean	0.0339
KM SD (logged)	1.286	95% Critical H Value (KM-Log)	2.828
KM Standard Error of Mean (logged)	0.334	95% H-UCL (KM -Log)	0.156
KM SD (logged)	1.286	95% Critical H Value (KM-Log)	2.828
KM Standard Error of Mean (logged)	0.334		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.352	Mean in Log Scale	-0.763
SD in Original Scale	4.695	SD in Log Scale	1.098
95% t UCL (Assumes normality)	2.863	95% H-Stat UCL	1.471
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.779		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

VANADIUM			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	14
		Number of Missing Observations	1
Number of Detects	14	Number of Non-Detects	14
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.15	Minimum Non-Detect	2.6
Maximum Detect	52	Maximum Non-Detect	2.6
Variance Detects	190.4	Percent Non-Detects	50%
Mean Detects	5.205	SD Detects	13.8
Median Detects	0.44	CV Detects	2.652
Skewness Detects	3.466	Kurtosis Detects	12.36
Mean of Logged Detects	-0.227	SD of Logged Detects	1.733
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.42	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.392	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	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	2.837	KM Standard Error of Mean	1.904
KM SD	9.7	95% KM (BCA) UCL	6.374
95% KM (t) UCL	6.08	95% KM (Percentile Bootstrap) UCL	6.267
95% KM (z) UCL	5.969	95% KM Bootstrap t UCL	29.46
90% KM Chebyshev UCL	8.549	95% KM Chebyshev UCL	11.14
97.5% KM Chebyshev UCL	14.73	99% KM Chebyshev UCL	21.78
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.89	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.821	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.326	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.246	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)	0.357	k star (bias corrected MLE)	0.328
Theta hat (MLE)	14.57	Theta star (bias corrected MLE)	15.86
nu hat (MLE)	10	nu star (bias corrected)	9.19
Mean (detects)	5.205		
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	3.324
Maximum	52	Median	0.325
SD	9.95	CV	2.993
k hat (MLE)	0.268	k star (bias corrected MLE)	0.263
Theta hat (MLE)	12.42	Theta star (bias corrected MLE)	12.65
nu hat (MLE)	14.99	nu star (bias corrected)	14.72
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (14.72, α)	7.065	Adjusted Chi Square Value (14.72, β)	6.738
95% Gamma Approximate UCL (use when n>=50)	6.924	95% Gamma Adjusted UCL (use when n<50)	7.26

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.837	SD (KM)	9.7
Variance (KM)	94.1	SE of Mean (KM)	1.904
k hat (KM)	0.0855	k star (KM)	0.1
nu hat (KM)	4.79	nu star (KM)	5.61
theta hat (KM)	33.17	theta star (KM)	28.32
80% gamma percentile (KM)	1.974	90% gamma percentile (KM)	7.557
95% gamma percentile (KM)	16.47	99% gamma percentile (KM)	45.02
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.61, α)	1.444	Adjusted Chi Square Value (5.61, β)	1.319
95% Gamma Approximate KM-UCL (use when n>=50)	11.02	95% Gamma Adjusted KM-UCL (use when n<50)	12.07
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.221	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.973	Mean in Log Scale	-0.542
SD in Original Scale	9.856	SD in Log Scale	1.493
95% t UCL (assumes normality of ROS data)	6.146	95% Percentile Bootstrap UCL	6.329
95% BCA Bootstrap UCL	8.907	95% Bootstrap t UCL	28.59
95% H-UCL (Log ROS)	4.343		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.615	KM Geo Mean	0.541
KM SD (logged)	1.331	95% Critical H Value (KM-Log)	2.89
KM Standard Error of Mean (logged)	0.297	95% H-UCL (KM -Log)	2.748
KM SD (logged)	1.331	95% Critical H Value (KM-Log)	2.89
KM Standard Error of Mean (logged)	0.297		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.252	Mean in Log Scale	0.0176
SD in Original Scale	9.78	SD in Log Scale	1.228
95% t UCL (Assumes normality)	6.4	95% H-Stat UCL	4.142
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	11.14		
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.			

ZINC			
General Statistics			
Total Number of Observations	28	Number of Distinct Observations	25
		Number of Missing Observations	1
Number of Detects	25	Number of Non-Detects	3
Number of Distinct Detects	24	Number of Distinct Non-Detects	1
Minimum Detect	1.6	Minimum Non-Detect	2
Maximum Detect	1170	Maximum Non-Detect	2
Variance Detects	54006	Percent Non-Detects	10.71%
Mean Detects	56.73	SD Detects	232.4
Median Detects	4.9	CV Detects	4.096
Skewness Detects	4.968	Kurtosis Detects	24.78
Mean of Logged Detects	1.992	SD of Logged Detects	1.43
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.242	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.461	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.173	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	50.84	KM Standard Error of Mean	41.63
KM SD	215.8	95% KM (BCA) UCL	134.5
95% KM (t) UCL	121.7	95% KM (Percentile Bootstrap) UCL	132.7
95% KM (z) UCL	119.3	95% KM Bootstrap t UCL	1355
90% KM Chebyshev UCL	175.7	95% KM Chebyshev UCL	232.3
97.5% KM Chebyshev UCL	310.8	99% KM Chebyshev UCL	465
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	4.64	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.845	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.351	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.189	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)	0.332	k star (bias corrected MLE)	0.318
Theta hat (MLE)	171.1	Theta star (bias corrected MLE)	178.2
nu hat (MLE)	16.58	nu star (bias corrected)	15.92
Mean (detects)	56.73		
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	50.66
Maximum	1170	Median	4.55
SD	219.8	CV	4.34
k hat (MLE)	0.266	k star (bias corrected MLE)	0.262
Theta hat (MLE)	190.2	Theta star (bias corrected MLE)	193.6
nu hat (MLE)	14.91	nu star (bias corrected)	14.65
Adjusted Level of Significance (β)	0.0404		
Approximate Chi Square Value (14.65, α)	7.019	Adjusted Chi Square Value (14.65, β)	6.693
95% Gamma Approximate UCL (use when n>=50)	105.7	95% Gamma Adjusted UCL (use when n<50)	110.9

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	50.84	SD (KM)	215.8
Variance (KM)	46581	SE of Mean (KM)	41.63
k hat (KM)	0.0555	k star (KM)	0.0734
nu hat (KM)	3.108	nu star (KM)	4.108
theta hat (KM)	916.2	theta star (KM)	693.1
80% gamma percentile (KM)	20.23	90% gamma percentile (KM)	113.7
95% gamma percentile (KM)	293.9	99% gamma percentile (KM)	937.7
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.11, α)	0.765	Adjusted Chi Square Value (4.11, β)	0.683
95% Gamma Approximate KM-UCL (use when n>=50)	273.1	95% Gamma Adjusted KM-UCL (use when n<50)	305.7
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.173	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	50.75	Mean in Log Scale	1.761
SD in Original Scale	219.8	SD in Log Scale	1.515
95% t UCL (assumes normality of ROS data)	121.5	95% Percentile Bootstrap UCL	132.9
95% BCA Bootstrap UCL	178.3	95% Bootstrap t UCL	1472
95% H-UCL (Log ROS)	45.99		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.837	KM Geo Mean	6.28
KM SD (logged)	1.398	95% Critical H Value (KM-Log)	2.983
KM Standard Error of Mean (logged)	0.27	95% H-UCL (KM -Log)	37.2
KM SD (logged)	1.398	95% Critical H Value (KM-Log)	2.983
KM Standard Error of Mean (logged)	0.27		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	50.76	Mean in Log Scale	1.779
SD in Original Scale	219.8	SD in Log Scale	1.487
95% t UCL (Assumes normality)	121.5	95% H-Stat UCL	43.6
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
KM H-UCL	37.2		
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.			

DIELDRIN			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	13
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	10
Minimum Detect	0.00469	Minimum Non-Detect	9.5000E-4
Maximum Detect	0.0564	Maximum Non-Detect	0.00403
Variance Detects	4.9560E-4	Percent Non-Detects	68.75%
Mean Detects	0.0259	SD Detects	0.0223
Median Detects	0.0157	CV Detects	0.859
Skewness Detects	0.694	Kurtosis Detects	-1.887
Mean of Logged Detects	-4.02	SD of Logged Detects	1.017
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00876	KM Standard Error of Mean	0.00449
KM SD	0.0161	95% KM (BCA) UCL	0.0161
95% KM (t) UCL	0.0166	95% KM (Percentile Bootstrap) UCL	0.0157
95% KM (z) UCL	0.0161	95% KM Bootstrap t UCL	0.0222
90% KM Chebyshev UCL	0.0222	95% KM Chebyshev UCL	0.0283
97.5% KM Chebyshev UCL	0.0368	99% KM Chebyshev UCL	0.0534
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.279	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.686	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.22	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.506	k star (bias corrected MLE)	0.736
Theta hat (MLE)	0.0172	Theta star (bias corrected MLE)	0.0352
nu hat (MLE)	15.06	nu star (bias corrected)	7.357
Mean (detects)	0.0259		
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	0.00469	Mean	0.015
Maximum	0.0564	Median	0.01
SD	0.0138	CV	0.921
k hat (MLE)	2.416	k star (bias corrected MLE)	2.004
Theta hat (MLE)	0.0062	Theta star (bias corrected MLE)	0.00747
nu hat (MLE)	77.3	nu star (bias corrected)	64.14
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (64.14, α)	46.71	Adjusted Chi Square Value (64.14, β)	45.02
95% Gamma Approximate UCL (use when n>=50)	0.0206	95% Gamma Adjusted UCL (use when n<50)	0.0213

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00876	SD (KM)	0.0161
Variance (KM)	2.5794E-4	SE of Mean (KM)	0.00449
k hat (KM)	0.297	k star (KM)	0.283
nu hat (KM)	9.511	nu star (KM)	9.061
theta hat (KM)	0.0295	theta star (KM)	0.0309
80% gamma percentile (KM)	0.0132	90% gamma percentile (KM)	0.026
95% gamma percentile (KM)	0.0408	99% gamma percentile (KM)	0.0795
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.06, α)	3.364	Adjusted Chi Square Value (9.06, β)	2.979
95% Gamma Approximate KM-UCL (use when n>=50)	0.0236	95% Gamma Adjusted KM-UCL (use when n<50)	0.0266
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00841	Mean in Log Scale	-6.593
SD in Original Scale	0.0168	SD in Log Scale	1.89
95% t UCL (assumes normality of ROS data)	0.0158	95% Percentile Bootstrap UCL	0.016
95% BCA Bootstrap UCL	0.0183	95% Bootstrap t UCL	0.0325
95% H-UCL (Log ROS)	0.0654		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.041	KM Geo Mean	0.00238
KM SD (logged)	1.454	95% Critical H Value (KM-Log)	3.462
KM Standard Error of Mean (logged)	0.406	95% H-UCL (KM -Log)	0.0251
KM SD (logged)	1.454	95% Critical H Value (KM-Log)	3.462
KM Standard Error of Mean (logged)	0.406		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00873	Mean in Log Scale	-6.194
SD in Original Scale	0.0166	SD in Log Scale	1.682
95% t UCL (Assumes normality)	0.016	95% H-Stat UCL	0.0452
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0166		
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.			

1,4-DIOXANE			
General Statistics			
Total Number of Observations	29	Number of Distinct Observations	24
Number of Detects	22	Number of Non-Detects	7
Number of Distinct Detects	22	Number of Distinct Non-Detects	2
Minimum Detect	0.34	Minimum Non-Detect	0.5
Maximum Detect	270	Maximum Non-Detect	2
Variance Detects	3241	Percent Non-Detects	24.14%
Mean Detects	21.18	SD Detects	56.93
Median Detects	3.8	CV Detects	2.688
Skewness Detects	4.348	Kurtosis Detects	19.67
Mean of Logged Detects	1.443	SD of Logged Detects	1.75
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.378	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.357	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	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	16.19	KM Standard Error of Mean	9.36
KM SD	49.25	95% KM (BCA) UCL	34.64
95% KM (t) UCL	32.12	95% KM (Percentile Bootstrap) UCL	34.32
95% KM (z) UCL	31.59	95% KM Bootstrap t UCL	83.73
90% KM Chebyshev UCL	44.27	95% KM Chebyshev UCL	56.99
97.5% KM Chebyshev UCL	74.65	99% KM Chebyshev UCL	109.3
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.421	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.824	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.191	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.198	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.408	k star (bias corrected MLE)	0.382
Theta hat (MLE)	51.96	Theta star (bias corrected MLE)	55.39
nu hat (MLE)	17.93	nu star (bias corrected)	16.82
Mean (detects)	21.18		
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	16.07
Maximum	270	Median	1.2
SD	50.16	CV	3.122
k hat (MLE)	0.254	k star (bias corrected MLE)	0.25
Theta hat (MLE)	63.34	Theta star (bias corrected MLE)	64.17
nu hat (MLE)	14.71	nu star (bias corrected)	14.52
Adjusted Level of Significance (β)	0.0407		
Approximate Chi Square Value (14.52, α)	6.932	Adjusted Chi Square Value (14.52, β)	6.619
95% Gamma Approximate UCL (use when n>=50)	33.67	95% Gamma Adjusted UCL (use when n<50)	35.26

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	16.19	SD (KM)	49.25
Variance (KM)	2425	SE of Mean (KM)	9.36
k hat (KM)	0.108	k star (KM)	0.12
nu hat (KM)	6.27	nu star (KM)	6.955
theta hat (KM)	149.8	theta star (KM)	135
80% gamma percentile (KM)	14.19	90% gamma percentile (KM)	45.87
95% gamma percentile (KM)	92.41	99% gamma percentile (KM)	234.5
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.96, α)	2.146	Adjusted Chi Square Value (6.96, β)	1.99
95% Gamma Approximate KM-UCL (use when n>=50)	52.48	95% Gamma Adjusted KM-UCL (use when n<50)	56.59
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	16.17	Mean in Log Scale	0.744
SD in Original Scale	50.13	SD in Log Scale	2.042
95% t UCL (assumes normality of ROS data)	32	95% Percentile Bootstrap UCL	33.67
95% BCA Bootstrap UCL	51.8	95% Bootstrap t UCL	86.79
95% H-UCL (Log ROS)	78.62		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.904	KM Geo Mean	2.469
KM SD (logged)	1.787	95% Critical H Value (KM-Log)	3.579
KM Standard Error of Mean (logged)	0.342	95% H-UCL (KM -Log)	40.79
KM SD (logged)	1.787	95% Critical H Value (KM-Log)	3.579
KM Standard Error of Mean (logged)	0.342		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	16.2	Mean in Log Scale	0.904
SD in Original Scale	50.12	SD in Log Scale	1.834
95% t UCL (Assumes normality)	32.04	95% H-Stat UCL	47.05
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	56.59		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

2-METHYLNAPHTHALENE

General Statistics

Total Number of Observations	11	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2-METHYLNAPHTHALENE was not processed!

2,6-DINITROTOLUENE

General Statistics

Total Number of Observations	11	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,6-DINITROTOLUENE was not processed!

BENZO(A)ANTHRACENE

General Statistics

Total Number of Observations	11	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZO(A)ANTHRACENE was not processed!

BENZO(A)PYRENE

General Statistics

Total Number of Observations	11	Number of Distinct Observations	3
		Number of Missing Observations	13
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.073	Minimum Non-Detect	0.1
Maximum Detect	0.12	Maximum Non-Detect	0.1
Variance Detects	0.0011	Percent Non-Detects	81.82%
Mean Detects	0.0965	SD Detects	0.0332
Median Detects	0.0965	CV Detects	0.344
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.369	SD of Logged Detects	0.351

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0773	KM Standard Error of Mean	0.00576
KM SD	0.0135	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0877	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0867	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0946	95% KM Chebyshev UCL	0.102
97.5% KM Chebyshev UCL	0.113	99% KM Chebyshev UCL	0.135

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	16.52	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00584	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	66.09	nu star (bias corrected)	N/A
Mean (detects)	0.0965		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0773	SD (KM)	0.0135
Variance (KM)	1.8256E-4	SE of Mean (KM)	0.00576
k hat (KM)	32.71	k star (KM)	23.85
nu hat (KM)	719.6	nu star (KM)	524.6
theta hat (KM)	0.00236	theta star (KM)	0.00324
80% gamma percentile (KM)	0.0902	90% gamma percentile (KM)	0.0981
95% gamma percentile (KM)	0.105	99% gamma percentile (KM)	0.119

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (524.65, α)	472.5	Adjusted Chi Square Value (524.65, β)	464.5
95% Gamma Approximate KM-UCL (use when n>=50)	0.0858	95% Gamma Adjusted KM-UCL (use when n<50)	0.0873

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0778	Mean in Log Scale	-2.58
SD in Original Scale	0.0191	SD in Log Scale	0.235
95% t UCL (assumes normality of ROS data)	0.0882	95% Percentile Bootstrap UCL	0.0868
95% BCA Bootstrap UCL	0.0894	95% Bootstrap t UCL	0.0911
95% H-UCL (Log ROS)	0.0897		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.572	KM Geo Mean	0.0764
KM SD (logged)	0.143	95% Critical H Value (KM-Log)	1.816
KM Standard Error of Mean (logged)	0.0609	95% H-UCL (KM -Log)	0.0838
KM SD (logged)	0.143	95% Critical H Value (KM-Log)	1.816
KM Standard Error of Mean (logged)	0.0609		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0585	Mean in Log Scale	-2.882
SD in Original Scale	0.0215	SD in Log Scale	0.277
95% t UCL (Assumes normality)	0.0702	95% H-Stat UCL	0.0689
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0877	KM H-UCL	0.0838
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
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.			

NAPHTHALENE

General Statistics

Total Number of Observations	11	Number of Distinct Observations	3
		Number of Missing Observations	13
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.065	Minimum Non-Detect	0.1
Maximum Detect	8	Maximum Non-Detect	0.1
Variance Detects	31.48	Percent Non-Detects	81.82%
Mean Detects	4.033	SD Detects	5.611
Median Detects	4.033	CV Detects	1.391
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.327	SD of Logged Detects	3.403

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.786	KM Standard Error of Mean	0.973
KM SD	2.281	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.549	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.386	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.704	95% KM Chebyshev UCL	5.026
97.5% KM Chebyshev UCL	6.861	99% KM Chebyshev UCL	10.46

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.385	k star (bias corrected MLE)	N/A
Theta hat (MLE)	10.48	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.539	nu star (bias corrected)	N/A
Mean (detects)	4.033		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.786	SD (KM)	2.281
Variance (KM)	5.204	SE of Mean (KM)	0.973
k hat (KM)	0.119	k star (KM)	0.147
nu hat (KM)	2.614	nu star (KM)	3.235
theta hat (KM)	6.617	theta star (KM)	5.348
80% gamma percentile (KM)	0.842	90% gamma percentile (KM)	2.325
95% gamma percentile (KM)	4.345	99% gamma percentile (KM)	10.23

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.23, α)	0.445	Adjusted Chi Square Value (3.23, β)	0.315
95% Gamma Approximate KM-UCL (use when n>=50)	5.713	95% Gamma Adjusted KM-UCL (use when n<50)	8.075

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.906	Mean in Log Scale	-2.37
SD in Original Scale	2.371	SD in Log Scale	2.278
95% t UCL (assumes normality of ROS data)	2.202	95% Percentile Bootstrap UCL	2.291
95% BCA Bootstrap UCL	3.036	95% Bootstrap t UCL	15.58
95% H-UCL (Log ROS)	81.45		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.296	KM Geo Mean	0.101
KM SD (logged)	1.384	95% Critical H Value (KM-Log)	3.781
KM Standard Error of Mean (logged)	0.59	95% H-UCL (KM -Log)	1.371
KM SD (logged)	1.384	95% Critical H Value (KM-Log)	3.781
KM Standard Error of Mean (logged)	0.59		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.774	Mean in Log Scale	-2.511
SD in Original Scale	2.397	SD in Log Scale	1.524
95% t UCL (Assumes normality)	2.084	95% H-Stat UCL	1.861
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
KM Bootstrap t UCL	N/A		
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.			

PENTACHLOROPHENOL			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	4
		Number of Missing Observations	13
Number of Detects	3	Number of Non-Detects	8
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.094	Minimum Non-Detect	0.2
Maximum Detect	0.33	Maximum Non-Detect	0.2
Variance Detects	0.0142	Percent Non-Detects	72.73%
Mean Detects	0.221	SD Detects	0.119
Median Detects	0.24	CV Detects	0.538
Skewness Detects	-0.688	Kurtosis Detects	N/A
Mean of Logged Detects	-1.633	SD of Logged Detects	0.653
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.982	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.129	KM Standard Error of Mean	0.0281
KM SD	0.0761	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.18	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.175	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.213	95% KM Chebyshev UCL	0.251
97.5% KM Chebyshev UCL	0.304	99% KM Chebyshev UCL	0.408
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	4.149	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0533	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	24.89	nu star (bias corrected)	N/A
Mean (detects)	0.221		
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	0.127
Maximum	0.33	Median	0.101
SD	0.0945	CV	0.744
k hat (MLE)	1.654	k star (bias corrected MLE)	1.263
Theta hat (MLE)	0.0768	Theta star (bias corrected MLE)	0.101
nu hat (MLE)	36.38	nu star (bias corrected)	27.79
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (27.79, α)	16.77	Adjusted Chi Square Value (27.79, β)	15.39
95% Gamma Approximate UCL (use when n>=50)	0.211	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.129	SD (KM)	0.0761
Variance (KM)	0.0058	SE of Mean (KM)	0.0281
k hat (KM)	2.859	k star (KM)	2.14
nu hat (KM)	62.91	nu star (KM)	47.08
theta hat (KM)	0.045	theta star (KM)	0.0601
80% gamma percentile (KM)	0.191	90% gamma percentile (KM)	0.246
95% gamma percentile (KM)	0.299	99% gamma percentile (KM)	0.415
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (47.08, α)	32.34	Adjusted Chi Square Value (47.08, β)	30.36
95% Gamma Approximate KM-UCL (use when n>=50)	0.187	95% Gamma Adjusted KM-UCL (use when n<50)	0.2
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.132	Mean in Log Scale	-2.195
SD in Original Scale	0.0859	SD in Log Scale	0.6
95% t UCL (assumes normality of ROS data)	0.179	95% Percentile Bootstrap UCL	0.175
95% BCA Bootstrap UCL	0.183	95% Bootstrap t UCL	0.219
95% H-UCL (Log ROS)	0.207		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.165	KM Geo Mean	0.115
KM SD (logged)	0.428	95% Critical H Value (KM-Log)	2.087
KM Standard Error of Mean (logged)	0.158	95% H-UCL (KM -Log)	0.167
KM SD (logged)	0.428	95% Critical H Value (KM-Log)	2.087
KM Standard Error of Mean (logged)	0.158		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.133	Mean in Log Scale	-2.12
SD in Original Scale	0.0778	SD in Log Scale	0.428
95% t UCL (Assumes normality)	0.176	95% H-Stat UCL	0.174
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.18		
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.			

1,4-DICHLOROBENZENE			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	4
		Number of Missing Observations	13
Number of Detects	3	Number of Non-Detects	12
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.41	Minimum Non-Detect	0.5
Maximum Detect	0.92	Maximum Non-Detect	0.5
Variance Detects	0.066	Percent Non-Detects	80%
Mean Detects	0.647	SD Detects	0.257
Median Detects	0.61	CV Detects	0.397
Skewness Detects	0.629	Kurtosis Detects	N/A
Mean of Logged Detects	-0.49	SD of Logged Detects	0.404
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.457	KM Standard Error of Mean	0.0421
KM SD	0.133	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.532	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.527	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.584	95% KM Chebyshev UCL	0.641
97.5% KM Chebyshev UCL	0.721	99% KM Chebyshev UCL	0.877
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	9.451	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0684	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	56.71	nu star (bias corrected)	N/A
Mean (detects)	0.647		
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	0.163	Mean	0.437
Maximum	0.92	Median	0.41
SD	0.189	CV	0.432
k hat (MLE)	5.94	k star (bias corrected MLE)	4.796
Theta hat (MLE)	0.0736	Theta star (bias corrected MLE)	0.0911
nu hat (MLE)	178.2	nu star (bias corrected)	143.9
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (143.89, α)	117.2	Adjusted Chi Square Value (143.89, β)	114.2
95% Gamma Approximate UCL (use when n>=50)	0.537	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.457	SD (KM)	0.133
Variance (KM)	0.0178	SE of Mean (KM)	0.0421
k hat (KM)	11.77	k star (KM)	9.462
nu hat (KM)	353.2	nu star (KM)	283.9
theta hat (KM)	0.0388	theta star (KM)	0.0483
80% gamma percentile (KM)	0.576	90% gamma percentile (KM)	0.655
95% gamma percentile (KM)	0.726	99% gamma percentile (KM)	0.872
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (283.87, α)	245.9	Adjusted Chi Square Value (283.87, β)	241.5
95% Gamma Approximate KM-UCL (use when n>=50)	0.528	95% Gamma Adjusted KM-UCL (use when n<50)	0.538
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.453	Mean in Log Scale	-0.849
SD in Original Scale	0.169	SD in Log Scale	0.341
95% t UCL (assumes normality of ROS data)	0.529	95% Percentile Bootstrap UCL	0.525
95% BCA Bootstrap UCL	0.54	95% Bootstrap t UCL	0.553
95% H-UCL (Log ROS)	0.54		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.811	KM Geo Mean	0.444
KM SD (logged)	0.218	95% Critical H Value (KM-Log)	1.821
KM Standard Error of Mean (logged)	0.069	95% H-UCL (KM -Log)	0.506
KM SD (logged)	0.218	95% Critical H Value (KM-Log)	1.821
KM Standard Error of Mean (logged)	0.069		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.329	Mean in Log Scale	-1.207
SD in Original Scale	0.191	SD in Log Scale	0.401
95% t UCL (Assumes normality)	0.416	95% H-Stat UCL	0.4
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.532		
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.			

BENZENE

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZENE was not processed!

CIS-1,2-DICHLOROETHENE			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	7
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	9
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.24	Minimum Non-Detect	0.5
Maximum Detect	42	Maximum Non-Detect	0.5
Variance Detects	266.2	Percent Non-Detects	60%
Mean Detects	9.925	SD Detects	16.32
Median Detects	2.5	CV Detects	1.644
Skewness Detects	2.096	Kurtosis Detects	4.439
Mean of Logged Detects	0.886	SD of Logged Detects	2.028
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.689	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	4.135	KM Standard Error of Mean	2.981
KM SD	10.54	95% KM (BCA) UCL	9.925
95% KM (t) UCL	9.386	95% KM (Percentile Bootstrap) UCL	8.986
95% KM (z) UCL	9.039	95% KM Bootstrap t UCL	43.93
90% KM Chebyshev UCL	13.08	95% KM Chebyshev UCL	17.13
97.5% KM Chebyshev UCL	22.75	99% KM Chebyshev UCL	33.8
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.32	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.206	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.35	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.457	k star (bias corrected MLE)	0.34
Theta hat (MLE)	21.71	Theta star (bias corrected MLE)	29.21
nu hat (MLE)	5.487	nu star (bias corrected)	4.077
Mean (detects)	9.925		
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	4.06
Maximum	42	Median	0.01
SD	10.94	CV	2.695
k hat (MLE)	0.21	k star (bias corrected MLE)	0.212
Theta hat (MLE)	19.38	Theta star (bias corrected MLE)	19.15
nu hat (MLE)	6.286	nu star (bias corrected)	6.362
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (6.36, α)	1.828	Adjusted Chi Square Value (6.36, β)	1.545
95% Gamma Approximate UCL (use when n>=50)	14.13	95% Gamma Adjusted UCL (use when n<50)	16.72

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.135	SD (KM)	10.54
Variance (KM)	111.1	SE of Mean (KM)	2.981
k hat (KM)	0.154	k star (KM)	0.168
nu hat (KM)	4.617	nu star (KM)	5.027
theta hat (KM)	26.87	theta star (KM)	24.68
80% gamma percentile (KM)	4.894	90% gamma percentile (KM)	12.41
95% gamma percentile (KM)	22.24	99% gamma percentile (KM)	50.14
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.03, α)	1.165	Adjusted Chi Square Value (5.03, β)	0.955
95% Gamma Approximate KM-UCL (use when n>=50)	17.85	95% Gamma Adjusted KM-UCL (use when n<50)	21.77
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.232	Mean in Log Scale	-0.539
SD in Original Scale	10.88	SD in Log Scale	1.998
95% t UCL (assumes normality of ROS data)	9.179	95% Percentile Bootstrap UCL	9.53
95% BCA Bootstrap UCL	12.54	95% Bootstrap t UCL	48.69
95% H-UCL (Log ROS)	48.93		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.425	KM Geo Mean	0.654
KM SD (logged)	1.59	95% Critical H Value (KM-Log)	3.778
KM Standard Error of Mean (logged)	0.454	95% H-UCL (KM -Log)	11.51
KM SD (logged)	1.59	95% Critical H Value (KM-Log)	3.778
KM Standard Error of Mean (logged)	0.454		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.12	Mean in Log Scale	-0.477
SD in Original Scale	10.92	SD in Log Scale	1.672
95% t UCL (Assumes normality)	9.084	95% H-Stat UCL	14.57
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	9.386		

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

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

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

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

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

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

ETHYLBENZENE

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ETHYLBENZENE was not processed!

M+P-XYLENES

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable M+P-XYLENES was not processed!

TRICHLOROETHENE			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	5
		Number of Missing Observations	13
Number of Detects	4	Number of Non-Detects	11
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.27	Minimum Non-Detect	0.5
Maximum Detect	8.4	Maximum Non-Detect	0.5
Variance Detects	15.31	Percent Non-Detects	73.33%
Mean Detects	3.765	SD Detects	3.912
Median Detects	3.195	CV Detects	1.039
Skewness Detects	0.409	Kurtosis Detects	-3.534
Mean of Logged Detects	0.576	SD of Logged Detects	1.627
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1.202	KM Standard Error of Mean	0.696
KM SD	2.334	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.428	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.347	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.29	95% KM Chebyshev UCL	4.236
97.5% KM Chebyshev UCL	5.549	99% KM Chebyshev UCL	8.127
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.354	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.67	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.272	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.405	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.793	k star (bias corrected MLE)	0.365
Theta hat (MLE)	4.748	Theta star (bias corrected MLE)	10.32
nu hat (MLE)	6.344	nu star (bias corrected)	2.919
Mean (detects)	3.765		
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	1.215
Maximum	8.4	Median	0.01
SD	2.457	CV	2.022
k hat (MLE)	0.277	k star (bias corrected MLE)	0.266
Theta hat (MLE)	4.388	Theta star (bias corrected MLE)	4.568
nu hat (MLE)	8.305	nu star (bias corrected)	7.978
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (7.98, α)	2.722	Adjusted Chi Square Value (7.98, β)	2.358
95% Gamma Approximate UCL (use when n>=50)	3.56	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.202	SD (KM)	2.334
Variance (KM)	5.45	SE of Mean (KM)	0.696
k hat (KM)	0.265	k star (KM)	0.257
nu hat (KM)	7.953	nu star (KM)	7.696
theta hat (KM)	4.534	theta star (KM)	4.686
80% gamma percentile (KM)	1.761	90% gamma percentile (KM)	3.601
95% gamma percentile (KM)	5.773	99% gamma percentile (KM)	11.54
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.70, α)	2.56	Adjusted Chi Square Value (7.70, β)	2.21
95% Gamma Approximate KM-UCL (use when n>=50)	3.613	95% Gamma Adjusted KM-UCL (use when n<50)	4.185
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.245	Mean in Log Scale	-1.051
SD in Original Scale	2.414	SD in Log Scale	1.613
95% t UCL (assumes normality of ROS data)	2.343	95% Percentile Bootstrap UCL	2.353
95% BCA Bootstrap UCL	2.798	95% Bootstrap t UCL	8.63
95% H-UCL (Log ROS)	6.677		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.806	KM Geo Mean	0.446
KM SD (logged)	1.107	95% Critical H Value (KM-Log)	2.917
KM Standard Error of Mean (logged)	0.33	95% H-UCL (KM -Log)	1.952
KM SD (logged)	1.107	95% Critical H Value (KM-Log)	2.917
KM Standard Error of Mean (logged)	0.33		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.187	Mean in Log Scale	-0.863
SD in Original Scale	2.422	SD in Log Scale	1.172
95% t UCL (Assumes normality)	2.289	95% H-Stat UCL	2.166
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.428		
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.			

VINYL CHLORIDE

General Statistics

Total Number of Observations	15	Number of Distinct Observations	2
		Number of Missing Observations	13
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable VINYL CHLORIDE was not processed!

PERFLUOROOCTANE SULFONIC ACID

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	16
Number of Detects	7	Number of Non-Detects	1
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.014	Minimum Non-Detect	0.041
Maximum Detect	0.45	Maximum Non-Detect	0.041
Variance Detects	0.0246	Percent Non-Detects	12.5%
Mean Detects	0.179	SD Detects	0.157
Median Detects	0.14	CV Detects	0.878
Skewness Detects	0.797	Kurtosis Detects	-0.158
Mean of Logged Detects	-2.213	SD of Logged Detects	1.225

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.16	KM Standard Error of Mean	0.0553
KM SD	0.145	95% KM (BCA) UCL	0.251
95% KM (t) UCL	0.264	95% KM (Percentile Bootstrap) UCL	0.249
95% KM (z) UCL	0.251	95% KM Bootstrap t UCL	0.314
90% KM Chebyshev UCL	0.326	95% KM Chebyshev UCL	0.401
97.5% KM Chebyshev UCL	0.505	99% KM Chebyshev UCL	0.71

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.192	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.183	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.159	k star (bias corrected MLE)	0.757
Theta hat (MLE)	0.154	Theta star (bias corrected MLE)	0.236
nu hat (MLE)	16.23	nu star (bias corrected)	10.6
Mean (detects)	0.179		

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	0.013	Mean	0.158
Maximum	0.45	Median	0.108
SD	0.156	CV	0.991
k hat (MLE)	0.921	k star (bias corrected MLE)	0.659
Theta hat (MLE)	0.171	Theta star (bias corrected MLE)	0.24
nu hat (MLE)	14.74	nu star (bias corrected)	10.55
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (10.55, α)	4.286	Adjusted Chi Square Value (10.55, β)	3.336
95% Gamma Approximate UCL (use when n>=50)	0.388	95% Gamma Adjusted UCL (use when n<50)	0.499
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.16	SD (KM)	0.145
Variance (KM)	0.021	SE of Mean (KM)	0.0553
k hat (KM)	1.216	k star (KM)	0.843
nu hat (KM)	19.46	nu star (KM)	13.49
theta hat (KM)	0.131	theta star (KM)	0.189
80% gamma percentile (KM)	0.26	90% gamma percentile (KM)	0.383
95% gamma percentile (KM)	0.508	99% gamma percentile (KM)	0.802
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (13.49, α)	6.226	Adjusted Chi Square Value (13.49, β)	5.033
95% Gamma Approximate KM-UCL (use when n>=50)	0.346	95% Gamma Adjusted KM-UCL (use when n<50)	0.428
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.159	Mean in Log Scale	-2.396
SD in Original Scale	0.155	SD in Log Scale	1.247
95% t UCL (assumes normality of ROS data)	0.263	95% Percentile Bootstrap UCL	0.243
95% BCA Bootstrap UCL	0.266	95% Bootstrap t UCL	0.313
95% H-UCL (Log ROS)	1.342		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.404	KM Geo Mean	0.0904
KM SD (logged)	1.19	95% Critical H Value (KM-Log)	3.909
KM Standard Error of Mean (logged)	0.463	95% H-UCL (KM -Log)	1.064
KM SD (logged)	1.19	95% Critical H Value (KM-Log)	3.909
KM Standard Error of Mean (logged)	0.463		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.159	Mean in Log Scale	-2.422
SD in Original Scale	0.155	SD in Log Scale	1.279
95% t UCL (Assumes normality)	0.263	95% H-Stat UCL	1.492
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.264		
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.			

Outside Landfill – Shallow Groundwater

Event 4

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 4

Samples	1,1-DICHLOROETHANE	d_1,1-DICHLOROETHANE	1,2-DICHLOROBENZENE	d_1,2-DICHLOROBENZENE	1,3-DICHLOROBENZENE	d_1,3-DICHLOROBENZENE
LDCA-MW13S-0416-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW14S-0416						
LDCA-MW15S-0416						
LDCA-MW24-0416	0.5	0	0.5	0	0.5	0
LDCA-MW25-0416	0.5	0	4.7	1	0.18	1
LDCA-MW26D-0416	0.5	0	0.5	0	0.5	0
LDCA-MW26S-0416	0.5	0	0.33	1	0.5	0
LDCA-MW27-0416	0.5	0	0.5	0	0.5	0
LDCA-MW33-0416	0.5	0	0.5	0	0.5	0
LDCA-MW38-0416	0.11	1	0.5	0	0.5	0
LDCA-MW39-0416	0.5	0	0.5	0	0.5	0
LDCA-MW41D-0416						
LDCA-MW41S-0416						

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 4

Samples	1,4-DICHLOROBENZENE	d_1,4-DICHLOROBENZENE	2-HEXANONE	d_2-HEXANONE	BENZENE	d_BENZENE	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE
LDCA-MW13S-0416-AVG	0.5	0	5	0	0.5	0	0.455	1
LDCA-MW14S-0416								
LDCA-MW15S-0416								
LDCA-MW24-0416	0.5	0	5	0	0.5	0	0.16	1
LDCA-MW25-0416	0.76	1	5.6	1	5.8	1	0.21	1
LDCA-MW26D-0416	0.5	0	5	0	0.5	0	0.5	0
LDCA-MW26S-0416	0.83	1	5	0	0.5	0	0.5	0
LDCA-MW27-0416	0.32	1	5	0	0.5	0	0.13	1
LDCA-MW33-0416	0.5	0	5	0	0.5	0	0.11	1
LDCA-MW38-0416	0.5	0	5	0	0.5	0	54	1
LDCA-MW39-0416	0.5	0	5	0	0.5	0	4.4	1
LDCA-MW41D-0416								
LDCA-MW41S-0416								

PROUCL DATA - OUTSIDE LANDFILL SHALLOW WELLS - EVENT 4

Samples	CYCLOHEXANE	d_CYCLOHEXANE	ETHYLBENZENE	d_ETHYLBENZENE	TRICHLOROETHENE	d_TRICHLOROETHENE	VINYL CHLORIDE	d_VINYL CHLORIDE
LDCA-MW13S-0416-AVG	0.5	0	0.5	0	0.12	1	0.5	0
LDCA-MW14S-0416								
LDCA-MW15S-0416								
LDCA-MW24-0416	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW25-0416	4	1	4.4	1	0.5	0	0.25	1
LDCA-MW26D-0416	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW26S-0416	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW27-0416	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW33-0416	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW38-0416	0.5	0	0.5	0	6.2	1	0.4	1
LDCA-MW39-0416	0.5	0	0.5	0	0.86	1	0.5	0
LDCA-MW41D-0416								
LDCA-MW41S-0416								

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.17/14/2016 2:14:13 PM
From File	ProUCL Data - Outside Deep-Event 4.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

CIS-1,2-DICHLOROETHENE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	2
Minimum	2.4	Mean	389.8
Maximum	1750	Median	74
SD	762	Std. Error of Mean	340.8
Coefficient of Variation	1.955	Skewness	2.212

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	0.609	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.438	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	1116	95% Adjusted-CLT UCL (Chen-1995)	1311
		95% Modified-t UCL (Johnson-1978)	1172

Gamma GOF Test

A-D Test Statistic	0.429	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.266	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.38	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.299	k star (bias corrected MLE)	0.253
Theta hat (MLE)	1302	Theta star (bias corrected MLE)	1540
nu hat (MLE)	2.994	nu star (bias corrected)	2.531
MLE Mean (bias corrected)	389.8	MLE Sd (bias corrected)	774.7
		Approximate Chi Square Value (0.05)	0.248
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	0.0963

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3974	95% Adjusted Gamma UCL (use when n<50)	10249

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.875	Mean of logged Data	3.662
Maximum of Logged Data	7.467	SD of logged Data	2.815
Assuming Lognormal Distribution			
95% H-UCL	2.122E+11	90% Chebyshev (MVUE) UCL	1410
95% Chebyshev (MVUE) UCL	1873	97.5% Chebyshev (MVUE) UCL	2515
99% Chebyshev (MVUE) UCL	3776		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	950.3	95% Jackknife UCL	1116
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1412	95% Chebyshev(Mean, Sd) UCL	1875
97.5% Chebyshev(Mean, Sd) UCL	2518	99% Chebyshev(Mean, Sd) UCL	3781
Suggested UCL to Use			
95% Adjusted Gamma UCL	10249		
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

TRICHLOROETHENE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	2
Minimum	0.13	Mean	68.6
Maximum	295	Median	3.7
SD	127.9	Std. Error of Mean	57.2
Coefficient of Variation	1.865	Skewness	2.125

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	0.652	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	190.5	95% Adjusted-CLT UCL (Chen-1995)	220.8
		95% Modified-t UCL (Johnson-1978)	199.6

Gamma GOF Test

A-D Test Statistic	0.354	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.23	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.384	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.249	k star (bias corrected MLE)	0.233
Theta hat (MLE)	275.9	Theta star (bias corrected MLE)	294.7
nu hat (MLE)	2.486	nu star (bias corrected)	2.328
MLE Mean (bias corrected)	68.6	MLE Sd (bias corrected)	142.2
		Approximate Chi Square Value (0.05)	0.205
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	0.0838

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	779.9	95% Adjusted Gamma UCL (use when n<50)	1906

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.23	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.04	Mean of logged Data	1.368
Maximum of Logged Data	5.687	SD of logged Data	3.42

Assuming Lognormal Distribution			
95% H-UCL	8.700E+14	90% Chebyshev (MVUE) UCL	333.4
95% Chebyshev (MVUE) UCL	444.6	97.5% Chebyshev (MVUE) UCL	599
99% Chebyshev (MVUE) UCL	902.2		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	162.7	95% Jackknife UCL	190.5
95% Standard Bootstrap UCL	151.8	95% Bootstrap-t UCL	4462
95% Hall's Bootstrap UCL	1889	95% Percentile Bootstrap UCL	144.4
95% BCA Bootstrap UCL	186.5		
90% Chebyshev(Mean, Sd) UCL	240.2	95% Chebyshev(Mean, Sd) UCL	317.9
97.5% Chebyshev(Mean, Sd) UCL	425.8	99% Chebyshev(Mean, Sd) UCL	637.8
Suggested UCL to Use			
95% Adjusted Gamma UCL	1906		
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/14/2016 2:13:16 PM
From File	ProUCL Data - Outside Deep-Event 4.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1-DICHLOROETHANE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	2
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.28	Minimum Non-Detect	0.5
Maximum Detect	3.6	Maximum Non-Detect	0.5
Variance Detects	3.577	Percent Non-Detects	40%
Mean Detects	1.417	SD Detects	1.891
Median Detects	0.37	CV Detects	1.335
Skewness Detects	1.728	Kurtosis Detects	N/A
Mean of Logged Detects	-0.329	SD of Logged Detects	1.401

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.98	KM Standard Error of Mean	0.718
KM SD	1.311	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.511	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.161	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.135	95% KM Chebyshev UCL	4.111
97.5% KM Chebyshev UCL	5.465	99% KM Chebyshev UCL	8.126

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.867	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.633	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.205	nu star (bias corrected)	N/A
Mean (detects)	1.417		

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	1.001
Maximum	3.6	Median	0.37
SD	1.476	CV	1.475
k hat (MLE)	0.534	k star (bias corrected MLE)	0.347
Theta hat (MLE)	1.876	Theta star (bias corrected MLE)	2.887
nu hat (MLE)	5.338	nu star (bias corrected)	3.468
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (3.47, α)	0.524	Adjusted Chi Square Value (3.47, β)	0.202
95% Gamma Approximate UCL (use when n>=50)	6.63	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.98	SD (KM)	1.311
Variance (KM)	1.718	SE of Mean (KM)	0.718
k hat (KM)	0.559	k star (KM)	0.357
nu hat (KM)	5.591	nu star (KM)	3.57
theta hat (KM)	1.753	theta star (KM)	2.745
80% gamma percentile (KM)	1.557	90% gamma percentile (KM)	2.821
95% gamma percentile (KM)	4.233	99% gamma percentile (KM)	7.828

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.57, α)	0.56	Adjusted Chi Square Value (3.57, β)	0.219
95% Gamma Approximate KM-UCL (use when n>=50)	6.253	95% Gamma Adjusted KM-UCL (use when n<50)	16.01

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.007	Mean in Log Scale	-0.618
SD in Original Scale	1.456	SD in Log Scale	1.123
95% t UCL (assumes normality of ROS data)	2.395	95% Percentile Bootstrap UCL	2.277
95% BCA Bootstrap UCL	2.348	95% Bootstrap t UCL	16.22
95% H-UCL (Log ROS)	21.45		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.651	KM Geo Mean	0.522
KM SD (logged)	0.974	95% Critical H Value (KM-Log)	4.792
KM Standard Error of Mean (logged)	0.538	95% H-UCL (KM -Log)	8.644
KM SD (logged)	0.974	95% Critical H Value (KM-Log)	4.792
KM Standard Error of Mean (logged)	0.538		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.95	Mean in Log Scale	-0.752
SD in Original Scale	1.482	SD in Log Scale	1.148
95% t UCL (Assumes normality)	2.363	95% H-Stat UCL	21.96
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.511		
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.			

BENZENE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	4
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZENE was not processed!

VINYL CHLORIDE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	2
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.38	Minimum Non-Detect	0.5
Maximum Detect	9.7	Maximum Non-Detect	0.5
Variance Detects	27.37	Percent Non-Detects	40%
Mean Detects	3.667	SD Detects	5.232
Median Detects	0.92	CV Detects	1.427
Skewness Detects	1.711	Kurtosis Detects	N/A
Mean of Logged Detects	0.407	SD of Logged Detects	1.675

Warning: Data set has only 3 Detected Values.

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.367	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	2.352	KM Standard Error of Mean	2.016
KM SD	3.68	95% KM (BCA) UCL	N/A
95% KM (t) UCL	6.649	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	5.667	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	8.399	95% KM Chebyshev UCL	11.14
97.5% KM Chebyshev UCL	14.94	99% KM Chebyshev UCL	22.41

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.68	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.391	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.081	nu star (bias corrected)	N/A
Mean (detects)	3.667		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.204
Maximum	9.7	Median	0.38
SD	4.207	CV	1.909
k hat (MLE)	0.29	k star (bias corrected MLE)	0.249
Theta hat (MLE)	7.592	Theta star (bias corrected MLE)	8.835
nu hat (MLE)	2.903	nu star (bias corrected)	2.495
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (2.49, α)	0.24	Adjusted Chi Square Value (2.49, β)	0.0938
95% Gamma Approximate UCL (use when n>=50)	22.92	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.352	SD (KM)	3.68
Variance (KM)	13.54	SE of Mean (KM)	2.016
k hat (KM)	0.408	k star (KM)	0.297
nu hat (KM)	4.085	nu star (KM)	2.967
theta hat (KM)	5.758	theta star (KM)	7.926
80% gamma percentile (KM)	3.597	90% gamma percentile (KM)	6.946
95% gamma percentile (KM)	10.8	99% gamma percentile (KM)	20.82

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (2.97, α)	0.363	Adjusted Chi Square Value (2.97, β)	0.135
95% Gamma Approximate KM-UCL (use when n>=50)	19.24	95% Gamma Adjusted KM-UCL (use when n<50)	51.52

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.282	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.328	Mean in Log Scale	-0.264
SD in Original Scale	4.13	SD in Log Scale	1.543
95% t UCL (assumes normality of ROS data)	6.266	95% Percentile Bootstrap UCL	5.929
95% BCA Bootstrap UCL	6.08	95% Bootstrap t UCL	62.39
95% H-UCL (Log ROS)	712.9		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.143	KM Geo Mean	0.867
KM SD (logged)	1.255	95% Critical H Value (KM-Log)	6.024
KM Standard Error of Mean (logged)	0.687	95% H-UCL (KM -Log)	83.5
KM SD (logged)	1.255	95% Critical H Value (KM-Log)	6.024
KM Standard Error of Mean (logged)	0.687		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.3	Mean in Log Scale	-0.31
SD in Original Scale	4.146	SD in Log Scale	1.539
95% t UCL (Assumes normality)	6.253	95% H-Stat UCL	654.3
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	6.649		
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.			

Outside Landfill – Deep Groundwater

Event 1

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 1

Samples	ALUMINUM	d_ALUMINUM	ARSENIC	d_ARSENIC	CADMIUM	d_CADMIUM	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	CYANIDE	d_CYANIDE	IRON	d_IRON	MANGANESE	d_MANGANESE
LDCA-MW13D-0314	3050	1	1.6	1	0.097	1	62.6	1	1	1			1980	1	58.4	1
LDCA-MW13I-0314	161	1	0.18	1	1.4	1	3.3	1	6.9	1	0.9	1	234	1	411	1
LDCA-MW14D-0314	263	1	2	1	1	0	3.3	1	0.073	1			689	1	19.3	1
LDCA-MW15D-0314-AVG	6.15	1	0.26	1	1	0	5.4	1	0.6	1	10	0	5100	1	146.5	1
LDCA-MW16D-0314-AVG	53.45	1	1	0	1	0	2	1	0.655	1	10	0	878.5	1	62.65	1
LDCA-MW17D-0314	11.2	1	1	0	0.19	1	2.2	1	1.6	1	10	0	328	1	97.9	1
LDCA-MW18D-0314	33.5	1	1	0	1	0	2.1	1	0.89	1	10	0	1970	1	170	1
LDCA-MW19-0314	20	0	1	0	1	0	36.3	1	0.82	1	10	0	13000	1	1290	1
LDCA-MW21D-0314	7.6	1	0.93	1	1	0	1.9	1	28.9	1	10	0	6650	1	3710	1
LDCA-MW21S-0314	7.2	1	1	0	1	0	3.9	1	37.7	1	10	0	4980	1	4090	1
LDCA-MW22-0314	37.2	1	1	0	1	0	2	0	1.4	1	10	0	2050	1	64.4	1
LDCA-MW23D-0314	35.6	1	1	0	1	0	2	0	3.5	1	10	0	4210	1	538	1
LDCA-MW23I-0314	20	0	7.8	1	1	0	5.1	1	10.5	1	10	0	42600	1	3590	1
LDCA-MW23S-0314	20.5	1	2.8	1	1	0	2	0	8.7	1	10	0	39100	1	2890	1

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 1

Samples	DELTA-BHC	d_DELTA-BHC	1,4-DIOXANE	d_1,4-DIOXANE	BIS(2-ETHYLHEXYL)PHTHALATE	d_BIS(2-ETHYLHEXYL)PHTHALATE	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE
LDCA-MW13D-0314	0.05	0	7.3	1	7	1	100	1
LDCA-MW13I-0314	0.05	0	6.2	1	2.8	1	68	1
LDCA-MW14D-0314	0.013	1	2	0	3.7	1	0.5	0
LDCA-MW15D-0314-AVG	0.05	0	2	0	5	0	5	0
LDCA-MW16D-0314-AVG	0.05	0	2	0	5	0	5	0
LDCA-MW17D-0314	0.05	0	2	0	5	0	5	0
LDCA-MW18D-0314	0.05	0	2	0	5	0	5	0
LDCA-MW19-0314	0.05	0	22	1	5	0	1000	1
LDCA-MW21D-0314	0.05	0	2	0	5	0	5	0
LDCA-MW21S-0314	0.05	0	2	0	5	0	5	0
LDCA-MW22-0314	0.05	0	2	0	5	0	0.5	0
LDCA-MW23D-0314	0.05	0	2	0	5	0	0.5	0
LDCA-MW23I-0314	0.05	0	2	0	5	0	0.5	0
LDCA-MW23S-0314	0.05	0	2	0	5	0	0.21	1

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 1

Samples	TRICHLOROETHENE	d_TRICHLOROETHENE
LDCA-MW13D-0314	2.5	1
LDCA-MW13I-0314	44	1
LDCA-MW14D-0314	0.5	0
LDCA-MW15D-0314-AVG	5	0
LDCA-MW16D-0314-AVG	5	0
LDCA-MW17D-0314	5	0
LDCA-MW18D-0314	5	0
LDCA-MW19-0314	260	1
LDCA-MW21D-0314	5	0
LDCA-MW21S-0314	5	0
LDCA-MW22-0314	0.25	1
LDCA-MW23D-0314	0.5	0
LDCA-MW23I-0314	0.5	0
LDCA-MW23S-0314	0.5	0

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 6:57:22 AM
From File	ProUCL Data Outside Deep-Event 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

COBALT

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	0.073	Mean	7.374
Maximum	37.7	Median	1.5
SD	11.6	Std. Error of Mean	3.1
Coefficient of Variation	1.573	Skewness	2.049

Normal GOF Test

Shapiro Wilk Test Statistic	0.658	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	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	12.86	95% Adjusted-CLT UCL (Chen-1995)	14.29
		95% Modified-t UCL (Johnson-1978)	13.15

Gamma GOF Test

A-D Test Statistic	0.654	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.79	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.538	k star (bias corrected MLE)	0.47
Theta hat (MLE)	13.7	Theta star (bias corrected MLE)	15.67
nu hat (MLE)	15.07	nu star (bias corrected)	13.17
MLE Mean (bias corrected)	7.374	MLE Sd (bias corrected)	10.75
		Approximate Chi Square Value (0.05)	6.009
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	5.379

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	16.17	95% Adjusted Gamma UCL (use when n<50)	18.06

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.155	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	-2.617	Mean of logged Data	0.831
Maximum of Logged Data	3.63	SD of logged Data	1.71
Assuming Lognormal Distribution			
95% H-UCL	69.12	90% Chebyshev (MVUE) UCL	20.57
95% Chebyshev (MVUE) UCL	26.24	97.5% Chebyshev (MVUE) UCL	34.1
99% Chebyshev (MVUE) UCL	49.56		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	12.47	95% Jackknife UCL	12.86
95% Standard Bootstrap UCL	12.3	95% Bootstrap-t UCL	23.11
95% Hall's Bootstrap UCL	37.15	95% Percentile Bootstrap UCL	12.74
95% BCA Bootstrap UCL	14.76		
90% Chebyshev(Mean, Sd) UCL	16.67	95% Chebyshev(Mean, Sd) UCL	20.89
97.5% Chebyshev(Mean, Sd) UCL	26.73	99% Chebyshev(Mean, Sd) UCL	38.22
Suggested UCL to Use			
95% Adjusted Gamma UCL	18.06		
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.			

IRON

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	234	Mean	8841
Maximum	42600	Median	3130
SD	13990	Std. Error of Mean	3739
Coefficient of Variation	1.583	Skewness	2.057

Normal GOF Test		
Shapiro Wilk Test Statistic	0.624	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	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	15462	95% Adjusted-CLT UCL (Chen-1995)	17188
		95% Modified-t UCL (Johnson-1978)	15805

Gamma GOF Test		
A-D Test Statistic	0.607	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.786	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.19	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.24	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.581	k star (bias corrected MLE)	0.504
Theta hat (MLE)	15209	Theta star (bias corrected MLE)	17529
nu hat (MLE)	16.28	nu star (bias corrected)	14.12
MLE Mean (bias corrected)	8841	MLE Sd (bias corrected)	12449
		Approximate Chi Square Value (0.05)	6.655
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	5.986

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	18761	95% Adjusted Gamma UCL (use when n<50)	20854

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.107	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	5.455	Mean of logged Data	8.019
Maximum of Logged Data	10.66	SD of logged Data	1.585

Assuming Lognormal Distribution			
95% H-UCL	57974	90% Chebyshev (MVUE) UCL	21988
95% Chebyshev (MVUE) UCL	27859	97.5% Chebyshev (MVUE) UCL	36009
99% Chebyshev (MVUE) UCL	52018		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	14991	95% Jackknife UCL	15462
95% Standard Bootstrap UCL	14811	95% Bootstrap-t UCL	32054
95% Hall's Bootstrap UCL	44547	95% Percentile Bootstrap UCL	15302
95% BCA Bootstrap UCL	17251		
90% Chebyshev(Mean, Sd) UCL	20058	95% Chebyshev(Mean, Sd) UCL	25139
97.5% Chebyshev(Mean, Sd) UCL	32191	99% Chebyshev(Mean, Sd) UCL	46044
Suggested UCL to Use			
95% Adjusted Gamma UCL	20854		
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.			

MANGANESE

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	19.3	Mean	1224
Maximum	4090	Median	290.5
SD	1592	Std. Error of Mean	425.5
Coefficient of Variation	1.3	Skewness	1.014

Normal GOF Test		
Shapiro Wilk Test Statistic	0.731	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	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	1978	95% Adjusted-CLT UCL (Chen-1995)	2047
		95% Modified-t UCL (Johnson-1978)	1997

Gamma GOF Test		
A-D Test Statistic	0.786	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.792	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.511	k star (bias corrected MLE)	0.449
Theta hat (MLE)	2396	Theta star (bias corrected MLE)	2726
nu hat (MLE)	14.31	nu star (bias corrected)	12.57
MLE Mean (bias corrected)	1224	MLE Sd (bias corrected)	1827
		Approximate Chi Square Value (0.05)	5.608
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	5.004

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	2745	95% Adjusted Gamma UCL (use when n<50)	3077

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	2.96	Mean of logged Data	5.871
Maximum of Logged Data	8.316	SD of logged Data	1.834

Assuming Lognormal Distribution			
95% H-UCL	17367	90% Chebyshev (MVUE) UCL	3951
95% Chebyshev (MVUE) UCL	5070	97.5% Chebyshev (MVUE) UCL	6622
99% Chebyshev (MVUE) UCL	9672		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1924	95% Jackknife UCL	1978
95% Standard Bootstrap UCL	1891	95% Bootstrap-t UCL	2242
95% Hall's Bootstrap UCL	1787	95% Percentile Bootstrap UCL	1924
95% BCA Bootstrap UCL	2098		
90% Chebyshev(Mean, Sd) UCL	2501	95% Chebyshev(Mean, Sd) UCL	3079
97.5% Chebyshev(Mean, Sd) UCL	3881	99% Chebyshev(Mean, Sd) UCL	5458
Suggested UCL to Use			
95% Adjusted Gamma UCL	3077		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 6:56:25 AM
From File	ProUCL Data Outside Deep-Event 1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ALUMINUM

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	2
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	6.15	Minimum Non-Detect	20
Maximum Detect	3050	Maximum Non-Detect	20
Variance Detects	752041	Percent Non-Detects	14.29%
Mean Detects	307.2	SD Detects	867.2
Median Detects	34.55	CV Detects	2.823
Skewness Detects	3.416	Kurtosis Detects	11.75
Mean of Logged Detects	3.718	SD of Logged Detects	1.801

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.39	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.437	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	264.5	KM Standard Error of Mean	216.6
KM SD	775.8	95% KM (BCA) UCL	688.8
95% KM (t) UCL	648	95% KM (Percentile Bootstrap) UCL	685.7
95% KM (z) UCL	620.7	95% KM Bootstrap t UCL	4947
90% KM Chebyshev UCL	914.1	95% KM Chebyshev UCL	1208
97.5% KM Chebyshev UCL	1617	99% KM Chebyshev UCL	2419

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.581	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.817	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.325	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.264	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)	0.337	k star (bias corrected MLE)	0.308
Theta hat (MLE)	912.5	Theta star (bias corrected MLE)	997.2
nu hat (MLE)	8.08	nu star (bias corrected)	7.393
Mean (detects)	307.2		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	263.3
Maximum	3050	Median	27
SD	805.5	CV	3.059
k hat (MLE)	0.236	k star (bias corrected MLE)	0.233
Theta hat (MLE)	1118	Theta star (bias corrected MLE)	1132
nu hat (MLE)	6.595	nu star (bias corrected)	6.515
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (6.51, α)	1.908	Adjusted Chi Square Value (6.51, β)	1.597
95% Gamma Approximate UCL (use when n>=50)	898.9	95% Gamma Adjusted UCL (use when n<50)	1074

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	264.5	SD (KM)	775.8
Variance (KM)	601849	SE of Mean (KM)	216.6
k hat (KM)	0.116	k star (KM)	0.139
nu hat (KM)	3.254	nu star (KM)	3.89
theta hat (KM)	2276	theta star (KM)	1904
80% gamma percentile (KM)	269.3	90% gamma percentile (KM)	774.7
95% gamma percentile (KM)	1476	99% gamma percentile (KM)	3546

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.89, α)	0.679	Adjusted Chi Square Value (3.89, β)	0.526
95% Gamma Approximate KM-UCL (use when n>=50)	1516	95% Gamma Adjusted KM-UCL (use when n<50)	1955

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	264.4	Mean in Log Scale	3.455
SD in Original Scale	805.1	SD in Log Scale	1.795
95% t UCL (assumes normality of ROS data)	645.4	95% Percentile Bootstrap UCL	688.4
95% BCA Bootstrap UCL	897.7	95% Bootstrap t UCL	4932
95% H-UCL (Log ROS)	1327		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	3.481	KM Geo Mean	32.48
KM SD (logged)	1.7	95% Critical H Value (KM-Log)	4.078
KM Standard Error of Mean (logged)	0.476	95% H-UCL (KM -Log)	943.6
KM SD (logged)	1.7	95% Critical H Value (KM-Log)	4.078
KM Standard Error of Mean (logged)	0.476		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	264.7	Mean in Log Scale	3.515
SD in Original Scale	805	SD in Log Scale	1.734
95% t UCL (Assumes normality)	645.7	95% H-Stat UCL	1111
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	1617	99% KM (Chebyshev) UCL	2419
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.			

ARSENIC

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	7
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.18	Minimum Non-Detect	1
Maximum Detect	7.8	Maximum Non-Detect	1
Variance Detects	6.929	Percent Non-Detects	50%
Mean Detects	2.224	SD Detects	2.632
Median Detects	1.6	CV Detects	1.183
Skewness Detects	1.983	Kurtosis Detects	4.339
Mean of Logged Detects	0.159	SD of Logged Detects	1.327

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.773	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level
Detected Data appear Approximate Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1.34	KM Standard Error of Mean	0.577
KM SD	1.951	95% KM (BCA) UCL	2.386
95% KM (t) UCL	2.362	95% KM (Percentile Bootstrap) UCL	2.294
95% KM (z) UCL	2.29	95% KM Bootstrap t UCL	3.424
90% KM Chebyshev UCL	3.072	95% KM Chebyshev UCL	3.856
97.5% KM Chebyshev UCL	4.944	99% KM Chebyshev UCL	7.082

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.23	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.158	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.321	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.911	k star (bias corrected MLE)	0.616
Theta hat (MLE)	2.441	Theta star (bias corrected MLE)	3.611
nu hat (MLE)	12.76	nu star (bias corrected)	8.624
Mean (detects)	2.224		

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	1.273
Maximum	7.8	Median	0.499
SD	2.068	CV	1.624
k hat (MLE)	0.415	k star (bias corrected MLE)	0.374
Theta hat (MLE)	3.07	Theta star (bias corrected MLE)	3.409
nu hat (MLE)	11.62	nu star (bias corrected)	10.46
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (10.46, α)	4.232	Adjusted Chi Square Value (10.46, β)	3.72
95% Gamma Approximate UCL (use when n>=50)	3.148	95% Gamma Adjusted UCL (use when n<50)	3.581

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.34	SD (KM)	1.951
Variance (KM)	3.807	SE of Mean (KM)	0.577
k hat (KM)	0.472	k star (KM)	0.418
nu hat (KM)	13.22	nu star (KM)	11.72
theta hat (KM)	2.84	theta star (KM)	3.203
80% gamma percentile (KM)	2.174	90% gamma percentile (KM)	3.756
95% gamma percentile (KM)	5.483	99% gamma percentile (KM)	9.807
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.72, α)	5.041	Adjusted Chi Square Value (11.72, β)	4.473
95% Gamma Approximate KM-UCL (use when n>=50)	3.116	95% Gamma Adjusted KM-UCL (use when n<50)	3.511
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.322	Mean in Log Scale	-0.489
SD in Original Scale	2.029	SD in Log Scale	1.263
95% t UCL (assumes normality of ROS data)	2.283	95% Percentile Bootstrap UCL	2.286
95% BCA Bootstrap UCL	2.728	95% Bootstrap t UCL	4.174
95% H-UCL (Log ROS)	4.245		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.443	KM Geo Mean	0.642
KM SD (logged)	1.168	95% Critical H Value (KM-Log)	3.079
KM Standard Error of Mean (logged)	0.427	95% H-UCL (KM -Log)	3.444
KM SD (logged)	1.168	95% Critical H Value (KM-Log)	3.079
KM Standard Error of Mean (logged)	0.427		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.362	Mean in Log Scale	-0.267
SD in Original Scale	2	SD in Log Scale	1.004
95% t UCL (Assumes normality)	2.309	95% H-Stat UCL	2.763
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.362		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

CADMIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.097	Minimum Non-Detect	1
Maximum Detect	1.4	Maximum Non-Detect	1
Variance Detects	0.528	Percent Non-Detects	78.57%
Mean Detects	0.562	SD Detects	0.727
Median Detects	0.19	CV Detects	1.293
Skewness Detects	1.7	Kurtosis Detects	N/A
Mean of Logged Detects	-1.219	SD of Logged Detects	1.388

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.803	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.233	KM Standard Error of Mean	0.112
KM SD	0.327	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.432	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.418	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.57	95% KM Chebyshev UCL	0.723
97.5% KM Chebyshev UCL	0.935	99% KM Chebyshev UCL	1.351

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.908	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.62	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.446	nu star (bias corrected)	N/A
Mean (detects)	0.562		

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	0.29
Maximum	1.4	Median	0.161
SD	0.384	CV	1.325
k hat (MLE)	0.638	k star (bias corrected MLE)	0.549
Theta hat (MLE)	0.454	Theta star (bias corrected MLE)	0.528
nu hat (MLE)	17.86	nu star (bias corrected)	15.37
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (15.37, α)	7.517	Adjusted Chi Square Value (15.37, β)	6.8
95% Gamma Approximate UCL (use when n>=50)	0.592	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.233	SD (KM)	0.327
Variance (KM)	0.107	SE of Mean (KM)	0.112
k hat (KM)	0.51	k star (KM)	0.448
nu hat (KM)	14.27	nu star (KM)	12.55
theta hat (KM)	0.458	theta star (KM)	0.52
80% gamma percentile (KM)	0.381	90% gamma percentile (KM)	0.645
95% gamma percentile (KM)	0.931	99% gamma percentile (KM)	1.643
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (12.55, α)	5.59	Adjusted Chi Square Value (12.55, β)	4.987
95% Gamma Approximate KM-UCL (use when n>=50)	0.524	95% Gamma Adjusted KM-UCL (use when n<50)	0.587
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.27	Mean in Log Scale	-1.83
SD in Original Scale	0.354	SD in Log Scale	1.014
95% t UCL (assumes normality of ROS data)	0.437	95% Percentile Bootstrap UCL	0.435
95% BCA Bootstrap UCL	0.513	95% Bootstrap t UCL	0.719
95% H-UCL (Log ROS)	0.592		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.83	KM Geo Mean	0.16
KM SD (logged)	0.683	95% Critical H Value (KM-Log)	2.318
KM Standard Error of Mean (logged)	0.334	95% H-UCL (KM -Log)	0.314
KM SD (logged)	0.683	95% Critical H Value (KM-Log)	2.318
KM Standard Error of Mean (logged)	0.334		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.513	Mean in Log Scale	-0.806
SD in Original Scale	0.286	SD in Log Scale	0.589
95% t UCL (Assumes normality)	0.649	95% H-Stat UCL	0.758
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.432		
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.			

CHROMIUM

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	10
Number of Detects	11	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	1.9	Minimum Non-Detect	2
Maximum Detect	62.6	Maximum Non-Detect	2
Variance Detects	385.4	Percent Non-Detects	21.43%
Mean Detects	11.65	SD Detects	19.63
Median Detects	3.3	CV Detects	1.686
Skewness Detects	2.288	Kurtosis Detects	4.674
Mean of Logged Detects	1.605	SD of Logged Detects	1.18

Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.563	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.443	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	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	9.557	KM Standard Error of Mean	4.784
KM SD	17.07	95% KM (BCA) UCL	17.91
95% KM (t) UCL	18.03	95% KM (Percentile Bootstrap) UCL	18.1
95% KM (z) UCL	17.43	95% KM Bootstrap t UCL	111.1
90% KM Chebyshev UCL	23.91	95% KM Chebyshev UCL	30.41
97.5% KM Chebyshev UCL	39.43	99% KM Chebyshev UCL	57.15

Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.671	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.765	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.381	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.266	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)	0.71	k star (bias corrected MLE)	0.577
Theta hat (MLE)	16.4	Theta star (bias corrected MLE)	20.19
nu hat (MLE)	15.62	nu star (bias corrected)	12.69
Mean (detects)	11.65		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	9.152
Maximum	62.6	Median	2.75
SD	17.92	CV	1.958
k hat (MLE)	0.347	k star (bias corrected MLE)	0.32
Theta hat (MLE)	26.36	Theta star (bias corrected MLE)	28.57
nu hat (MLE)	9.721	nu star (bias corrected)	8.971
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (8.97, α)	3.309	Adjusted Chi Square Value (8.97, β)	2.869
95% Gamma Approximate UCL (use when n>=50)	24.81	95% Gamma Adjusted UCL (use when n<50)	28.62

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	9.557	SD (KM)	17.07
Variance (KM)	291.3	SE of Mean (KM)	4.784
k hat (KM)	0.314	k star (KM)	0.294
nu hat (KM)	8.781	nu star (KM)	8.233
theta hat (KM)	30.47	theta star (KM)	32.5
80% gamma percentile (KM)	14.58	90% gamma percentile (KM)	28.25
95% gamma percentile (KM)	44	99% gamma percentile (KM)	85.03
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (8.23, α)	2.87	Adjusted Chi Square Value (8.23, β)	2.467
95% Gamma Approximate KM-UCL (use when n>=50)	27.41	95% Gamma Adjusted KM-UCL (use when n<50)	31.89
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.764	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	9.311	Mean in Log Scale	1.185
SD in Original Scale	17.83	SD in Log Scale	1.343
95% t UCL (assumes normality of ROS data)	17.75	95% Percentile Bootstrap UCL	17.73
95% BCA Bootstrap UCL	21.93	95% Bootstrap t UCL	90.74
95% H-UCL (Log ROS)	28.52		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.399	KM Geo Mean	4.051
KM SD (logged)	1.073	95% Critical H Value (KM-Log)	2.914
KM Standard Error of Mean (logged)	0.301	95% H-UCL (KM -Log)	17.15
KM SD (logged)	1.073	95% Critical H Value (KM-Log)	2.914
KM Standard Error of Mean (logged)	0.301		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.364	Mean in Log Scale	1.261
SD in Original Scale	17.8	SD in Log Scale	1.241
95% t UCL (Assumes normality)	17.79	95% H-Stat UCL	22.99
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	30.41		
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.			

CYANIDE

General Statistics

Total Number of Observations	12	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	11
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CYANIDE was not processed!

DELTA-BHC

General Statistics

Total Number of Observations	14	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable DELTA-BHC was not processed!

1,4-DIOXANE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	6.2	Minimum Non-Detect	2
Maximum Detect	22	Maximum Non-Detect	2
Variance Detects	77.82	Percent Non-Detects	78.57%
Mean Detects	11.83	SD Detects	8.822
Median Detects	7.3	CV Detects	0.746
Skewness Detects	1.702	Kurtosis Detects	N/A
Mean of Logged Detects	2.301	SD of Logged Detects	0.689

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.363	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

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

KM Mean	4.107	KM Standard Error of Mean	1.713
KM SD	5.234	95% KM (BCA) UCL	N/A
95% KM (t) UCL	7.141	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	6.925	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	9.247	95% KM Chebyshev UCL	11.58
97.5% KM Chebyshev UCL	14.81	99% KM Chebyshev UCL	21.15

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.102	k star (bias corrected MLE)	N/A
Theta hat (MLE)	3.815	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	18.61	nu star (bias corrected)	N/A
Mean (detects)	11.83		

Gamma ROS Statistics using Imputed Non-Detects

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

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

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

This is especially true when the sample size is small.

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

Minimum	0.01	Mean	2.544
Maximum	22	Median	0.01
SD	6.109	CV	2.402
k hat (MLE)	0.184	k star (bias corrected MLE)	0.192
Theta hat (MLE)	13.85	Theta star (bias corrected MLE)	13.25
nu hat (MLE)	5.144	nu star (bias corrected)	5.375
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (5.37, α)	1.329	Adjusted Chi Square Value (5.37, β)	1.083
95% Gamma Approximate UCL (use when n>=50)	10.29	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.107	SD (KM)	5.234
Variance (KM)	27.4	SE of Mean (KM)	1.713
k hat (KM)	0.616	k star (KM)	0.531
nu hat (KM)	17.24	nu star (KM)	14.88
theta hat (KM)	6.671	theta star (KM)	7.729
80% gamma percentile (KM)	6.76	90% gamma percentile (KM)	10.97
95% gamma percentile (KM)	15.44	99% gamma percentile (KM)	26.36
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (14.88, α)	7.177	Adjusted Chi Square Value (14.88, β)	6.479
95% Gamma Approximate KM-UCL (use when n>=50)	8.514	95% Gamma Adjusted KM-UCL (use when n<50)	9.432
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.049	Mean in Log Scale	-0.384
SD in Original Scale	5.919	SD in Log Scale	1.914
95% t UCL (assumes normality of ROS data)	5.85	95% Percentile Bootstrap UCL	5.688
95% BCA Bootstrap UCL	7.1	95% Bootstrap t UCL	10.82
95% H-UCL (Log ROS)	46.48		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.038	KM Geo Mean	2.823
KM SD (logged)	0.709	95% Critical H Value (KM-Log)	2.349
KM Standard Error of Mean (logged)	0.232	95% H-UCL (KM -Log)	5.763
KM SD (logged)	0.709	95% Critical H Value (KM-Log)	2.349
KM Standard Error of Mean (logged)	0.232		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.321	Mean in Log Scale	0.493
SD in Original Scale	5.767	SD in Log Scale	1.016
95% t UCL (Assumes normality)	6.051	95% H-Stat UCL	6.077
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	7.141		
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.			

BIS(2-ETHYLHEXYL)PHTHALATE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	2.8	Minimum Non-Detect	5
Maximum Detect	7	Maximum Non-Detect	5
Variance Detects	4.89	Percent Non-Detects	78.57%
Mean Detects	4.5	SD Detects	2.211
Median Detects	3.7	CV Detects	0.491
Skewness Detects	1.415	Kurtosis Detects	N/A
Mean of Logged Detects	1.428	SD of Logged Detects	0.47
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.308	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	3.518	KM Standard Error of Mean	0.481
KM SD	1.059	95% KM (BCA) UCL	N/A
95% KM (t) UCL	4.369	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	4.308	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	4.959	95% KM Chebyshev UCL	5.612
97.5% KM Chebyshev UCL	6.519	99% KM Chebyshev UCL	8.299
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	6.731	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.669	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	40.38	nu star (bias corrected)	N/A
Mean (detects)	4.5		
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	1.554	Mean	3.569
Maximum	7	Median	3.409
SD	1.425	CV	0.399
k hat (MLE)	7.123	k star (bias corrected MLE)	5.644
Theta hat (MLE)	0.501	Theta star (bias corrected MLE)	0.632
nu hat (MLE)	199.4	nu star (bias corrected)	158
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (158.04, α)	130	Adjusted Chi Square Value (158.04, β)	126.6
95% Gamma Approximate UCL (use when n>=50)	4.34	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.518	SD (KM)	1.059
Variance (KM)	1.121	SE of Mean (KM)	0.481
k hat (KM)	11.04	k star (KM)	8.723
nu hat (KM)	309.2	nu star (KM)	244.3
theta hat (KM)	0.319	theta star (KM)	0.403
80% gamma percentile (KM)	4.461	90% gamma percentile (KM)	5.104
95% gamma percentile (KM)	5.678	99% gamma percentile (KM)	6.862
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (244.26, α)	209.1	Adjusted Chi Square Value (244.26, β)	204.8
95% Gamma Approximate KM-UCL (use when n>=50)	4.11	95% Gamma Adjusted KM-UCL (use when n<50)	4.197
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.587	Mean in Log Scale	1.22
SD in Original Scale	1.327	SD in Log Scale	0.344
95% t UCL (assumes normality of ROS data)	4.215	95% Percentile Bootstrap UCL	4.149
95% BCA Bootstrap UCL	4.272	95% Bootstrap t UCL	4.431
95% H-UCL (Log ROS)	4.324		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.224	KM Geo Mean	3.402
KM SD (logged)	0.241	95% Critical H Value (KM-Log)	1.847
KM Standard Error of Mean (logged)	0.13	95% H-UCL (KM -Log)	3.963
KM SD (logged)	0.241	95% Critical H Value (KM-Log)	1.847
KM Standard Error of Mean (logged)	0.13		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.929	Mean in Log Scale	1.026
SD in Original Scale	1.216	SD in Log Scale	0.285
95% t UCL (Assumes normality)	3.504	95% H-Stat UCL	3.372
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	4.369		
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.			

CIS-1,2-DICHLOROETHENE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	6
Number of Detects	4	Number of Non-Detects	10
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.21	Minimum Non-Detect	0.5
Maximum Detect	1000	Maximum Non-Detect	5
Variance Detects	224482	Percent Non-Detects	71.43%
Mean Detects	292.1	SD Detects	473.8
Median Detects	84	CV Detects	1.622
Skewness Detects	1.953	Kurtosis Detects	3.852
Mean of Logged Detects	3.543	SD of Logged Detects	3.603
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.712	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.407	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	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	83.59	KM Standard Error of Mean	78.97
KM SD	255.9	95% KM (BCA) UCL	N/A
95% KM (t) UCL	223.4	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	213.5	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	320.5	95% KM Chebyshev UCL	427.8
97.5% KM Chebyshev UCL	576.8	99% KM Chebyshev UCL	869.4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.281	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.702	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.228	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.417	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.32	k star (bias corrected MLE)	0.247
Theta hat (MLE)	913.3	Theta star (bias corrected MLE)	1184
nu hat (MLE)	2.558	nu star (bias corrected)	1.973
Mean (detects)	292.1		
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	83.45
Maximum	1000	Median	0.01
SD	265.6	CV	3.183
k hat (MLE)	0.119	k star (bias corrected MLE)	0.141
Theta hat (MLE)	704	Theta star (bias corrected MLE)	592.9
nu hat (MLE)	3.319	nu star (bias corrected)	3.941
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (3.94, α)	0.699	Adjusted Chi Square Value (3.94, β)	0.543
95% Gamma Approximate UCL (use when n>=50)	470.8	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	83.59	SD (KM)	255.9
Variance (KM)	65485	SE of Mean (KM)	78.97
k hat (KM)	0.107	k star (KM)	0.131
nu hat (KM)	2.988	nu star (KM)	3.681
theta hat (KM)	783.4	theta star (KM)	635.9
80% gamma percentile (KM)	80.76	90% gamma percentile (KM)	242.2
95% gamma percentile (KM)	470.9	99% gamma percentile (KM)	1154
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.68, α)	0.6	Adjusted Chi Square Value (3.68, β)	0.461
95% Gamma Approximate KM-UCL (use when n>=50)	513	95% Gamma Adjusted KM-UCL (use when n<50)	667.2
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	84.18	Mean in Log Scale	-0.246
SD in Original Scale	265.4	SD in Log Scale	3.658
95% t UCL (assumes normality of ROS data)	209.8	95% Percentile Bootstrap UCL	222.2
95% BCA Bootstrap UCL	293.7	95% Bootstrap t UCL	1242
95% H-UCL (Log ROS)	2424374		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.102	KM Geo Mean	0.903
KM SD (logged)	2.846	95% Critical H Value (KM-Log)	6.418
KM Standard Error of Mean (logged)	0.878	95% H-UCL (KM -Log)	8203
KM SD (logged)	2.846	95% Critical H Value (KM-Log)	6.418
KM Standard Error of Mean (logged)	0.878		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	84.59	Mean in Log Scale	1.009
SD in Original Scale	265.2	SD in Log Scale	2.596
95% t UCL (Assumes normality)	210.1	95% H-Stat UCL	5579
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	N/A	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	667.2
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.			

TRICHLOROETHENE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	6
Number of Detects	4	Number of Non-Detects	10
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.25	Minimum Non-Detect	0.5
Maximum Detect	260	Maximum Non-Detect	5
Variance Detects	15339	Percent Non-Detects	71.43%
Mean Detects	76.69	SD Detects	123.9
Median Detects	23.25	CV Detects	1.615
Skewness Detects	1.849	Kurtosis Detects	3.425
Mean of Logged Detects	2.219	SD of Logged Detects	3.072
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.747	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	22.25	KM Standard Error of Mean	20.64
KM SD	66.88	95% KM (BCA) UCL	N/A
95% KM (t) UCL	58.8	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	56.2	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	84.17	95% KM Chebyshev UCL	112.2
97.5% KM Chebyshev UCL	151.2	99% KM Chebyshev UCL	227.6
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.243	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.702	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.242	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.417	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.321	k star (bias corrected MLE)	0.247
Theta hat (MLE)	238.6	Theta star (bias corrected MLE)	310.4
nu hat (MLE)	2.572	nu star (bias corrected)	1.976
Mean (detects)	76.69		
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	22.64
Maximum	260	Median	0.01
SD	69.32	CV	3.061
k hat (MLE)	0.146	k star (bias corrected MLE)	0.162
Theta hat (MLE)	155	Theta star (bias corrected MLE)	139.4
nu hat (MLE)	4.091	nu star (bias corrected)	4.548
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (4.55, α)	0.949	Adjusted Chi Square Value (4.55, β)	0.754
95% Gamma Approximate UCL (use when n>=50)	108.5	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	22.25	SD (KM)	66.88
Variance (KM)	4473	SE of Mean (KM)	20.64
k hat (KM)	0.111	k star (KM)	0.135
nu hat (KM)	3.099	nu star (KM)	3.768
theta hat (KM)	201	theta star (KM)	165.3
80% gamma percentile (KM)	22	90% gamma percentile (KM)	64.78
95% gamma percentile (KM)	124.9	99% gamma percentile (KM)	303.3
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.77, α)	0.632	Adjusted Chi Square Value (3.77, β)	0.488
95% Gamma Approximate KM-UCL (use when n>=50)	132.6	95% Gamma Adjusted KM-UCL (use when n<50)	171.8
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	22.47	Mean in Log Scale	-0.52
SD in Original Scale	69.34	SD in Log Scale	2.84
95% t UCL (assumes normality of ROS data)	55.29	95% Percentile Bootstrap UCL	59.27
95% BCA Bootstrap UCL	80.71	95% Bootstrap t UCL	1242
95% H-UCL (Log ROS)	5216		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.192	KM Geo Mean	0.825
KM SD (logged)	2.165	95% Critical H Value (KM-Log)	5.009
KM Standard Error of Mean (logged)	0.712	95% H-UCL (KM -Log)	174.1
KM SD (logged)	2.165	95% Critical H Value (KM-Log)	5.009
KM Standard Error of Mean (logged)	0.712		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	23.05	Mean in Log Scale	0.631
SD in Original Scale	69.14	SD in Log Scale	2.06
95% t UCL (Assumes normality)	55.78	95% H-Stat UCL	242.8
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	58.8		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Outside Landfill – Deep Groundwater

Event 2

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 2

Samples	TCDD-TEQ	d_TCDD_TEQ	ARSENIC	d_ARSENIC	BARIUM	d_BARIUM	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	CYANIDE	d_CYANIDE	IRON	d_IRON	MANGANESE	d_MANGANESE
LDCA-MW13D-1014	0.080	1	0.55	1	299	1	28.7	1	0.83	1	10	0	272	1	3.1	1
LDCA-MW13I-1014	0.215	0	0.52	1	64.5	1	2	0	1	0	10	0	200	0	163	1
LDCA-MW14D-1014	0.065	1	1.2	1	39.2	1	2	0	1	0	10	0	517	1	13.5	1
LDCA-MW15D-1014-AVG	0.012	1	5.25	0	32.1	1	1.4	1	25.5	0	1.6	1	4885	1	145	1
LDCA-MW16D-1014-AVG	0.081	1	10	0	36.1	1	1.4	1	50	0	10	0	1130	1	75	0
LDCA-MW17D-1014	0.306	0	0.097	1	36.8	1	2	0	0.79	1	10	0	200	0	85.6	1
LDCA-MW18D-1014	0.950	1	0.29	1	59.2	1	0.17	1	0.053	1	10	0	2390	1	169	1
LDCA-MW19-1014	1.90	1	0.61	1	381	1	1	1	1	0	10	0	19400	1	2090	1
LDCA-MW21D-1014	3.44	0	10	0	87.7	1	1.9	1	50	0	10	0	14100	1	2300	1
LDCA-MW21S-1014			0.5	0	131	1	2	0	37	1	10	0	6370	1	4490	1
LDCA-MW22-1014	0.218	1	0.98	1	13.2	1	0.41	1	0.088	1	10	0	230	1	4.1	1
LDCA-MW23D-1014	0.031	1	3.4	1	62	1	2	0	13.8	1	10	0	11400	1	979	1
LDCA-MW23I-1014			10	1	220	1	0.22	1	50	0	10	0	68400	1	4190	1
LDCA-MW23S-1014			3.2	1	215	1	2	0	50	0	10	0	51000	1	2840	1

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 2

Samples	DIOXIN-LIKE PCB_TEQ	d_DIOXIN-LIKE PCB_TEQ	1,4-DIOXANE	d_1,4-DIOXANE	DIBENZO(A,H)ANTHRACENE	d_DIBENZO(A,H)ANTHRACENE	INDENO(1,2,3-CD)PYRENE	d_INDENO(1,2,3-CD)PYRENE
LDCA-MW13D-1014	0.012	1	6.2	1	0.1	0	0.1	0
LDCA-MW13I-1014	20	0	14	1	0.1	0	0.1	0
LDCA-MW14D-1014	0.00059	1	0.5	0	0.1	0	0.1	0
LDCA-MW15D-1014-AVG	21	0	0.086	1	0.091	0	0.091	0
LDCA-MW16D-1014-AVG	20	0	0.082	1	0.32	1	0.39	1
LDCA-MW17D-1014	21	0	0.5	0	0.1	0	0.1	0
LDCA-MW18D-1014	0.00019	1	0.5	0	0.1	0	0.1	0
LDCA-MW19-1014	0.00018	1	29	1	0.1	0	0.1	0
LDCA-MW21D-1014	20	0	1.2	1	0.0057	1	0.006	1
LDCA-MW21S-1014			1.1	1	0.1	0	0.1	0
LDCA-MW22-1014	0.00058	1	0.5	0	0.1	0	0.1	0
LDCA-MW23D-1014	0.010	1	0.5	0	0.1	0	0.1	0
LDCA-MW23I-1014			0.16	1	0.097	0	0.097	0
LDCA-MW23S-1014			0.2	1	0.098	0	0.098	0

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 2

Samples	NAPHTHALENE	d_NAPHTHALENE	1,1-DICHLOROETHANE	d_1,1-DICHLOROETHANE	BENZENE	d_BENZENE
LDCA-MW13D-1014	0.36	1	0.35	1	0.17	1
LDCA-MW13I-1014	0.0097	1	0.31	1	0.26	1
LDCA-MW14D-1014	0.1	0	0.5	0	0.5	0
LDCA-MW15D-1014-AVG	0.011	1	0.5	0	0.5	0
LDCA-MW16D-1014-AVG	0.017	1	0.5	0	0.5	0
LDCA-MW17D-1014	0.0063	1	0.5	0	0.5	0
LDCA-MW18D-1014	0.0081	1	0.5	0	0.5	0
LDCA-MW19-1014	0.1	0	3.7	1	0.88	1
LDCA-MW21D-1014	0.1	0	0.5	0	0.089	1
LDCA-MW21S-1014	0.1	0	0.5	0	0.11	1
LDCA-MW22-1014	0.0078	1	0.5	0	0.5	0
LDCA-MW23D-1014	0.1	0	0.5	0	0.5	0
LDCA-MW23I-1014	0.097	0	0.5	0	0.5	0
LDCA-MW23S-1014	0.098	0	0.5	0	0.5	0

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 2

Samples	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE	TRICHLOROETHENE	d_TRICHLOROETHENE	VINYL CHLORIDE	d_VINYL CHLORIDE
LDCA-MW13D-1014	120	1	5.9	1	0.69	1
LDCA-MW13I-1014	85	1	53	1	0.51	1
LDCA-MW14D-1014	0.5	0	0.5	0	0.5	0
LDCA-MW15D-1014-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW16D-1014-AVG	0.5	0	0.5	0	0.5	0
LDCA-MW17D-1014	0.5	0	0.5	0	0.5	0
LDCA-MW18D-1014	0.5	0	0.5	0	0.5	0
LDCA-MW19-1014	1800	1	420	1	11	1
LDCA-MW21D-1014	1.8	1	0.15	1	0.5	0
LDCA-MW21S-1014	2	1	0.15	1	0.5	0
LDCA-MW22-1014	0.5	0	0.5	0	0.5	0
LDCA-MW23D-1014	0.5	0	0.5	0	0.5	0
LDCA-MW23I-1014	0.5	0	0.5	0	0.5	0
LDCA-MW23S-1014	0.22	1	0.2	1	0.5	0

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 2

Samples	PENTADECAFLUOROOCTANOIC ACID	d_PENTADECAFLUOROOCTANOIC ACID	PERFLUOROOCTANE SULFONIC ACID	d_PERFLUOROOCTANE SULFONIC ACID
LDCA-MW13D-1014	0.027	1	0.017	1
LDCA-MW13I-1014	0.044	1	0.016	1
LDCA-MW14D-1014	0.02	0	0.039	0
LDCA-MW15D-1014-AVG	0.02	0	0.0405	0
LDCA-MW16D-1014-AVG	0.019	0	0.039	0
LDCA-MW17D-1014	0.02	0	0.04	0
LDCA-MW18D-1014	0.02	0	0.041	0
LDCA-MW19-1014	0.15	1	0.14	1
LDCA-MW21D-1014	0.014	1	0.041	0
LDCA-MW21S-1014	0.019	1	0.04	0
LDCA-MW22-1014	0.02	0	0.04	0
LDCA-MW23D-1014	0.015	1	0.039	0
LDCA-MW23I-1014	0.017	1	0.04	0
LDCA-MW23S-1014	0.068	1	0.041	0

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 6:55:06 AM
From File	ProUCL Data Outside Deep-Event 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BARIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	13.2	Mean	119.8
Maximum	381	Median	63.25
SD	114.4	Std. Error of Mean	30.57
Coefficient of Variation	0.955	Skewness	1.275

Normal GOF Test

Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	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	173.9	95% Adjusted-CLT UCL (Chen-1995)	181.2
		95% Modified-t UCL (Johnson-1978)	175.6

Gamma GOF Test

A-D Test Statistic	0.519	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.234	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.317	k star (bias corrected MLE)	1.082
Theta hat (MLE)	90.97	Theta star (bias corrected MLE)	110.7
nu hat (MLE)	36.86	nu star (bias corrected)	30.3
MLE Mean (bias corrected)	119.8	MLE Sd (bias corrected)	115.1
		Approximate Chi Square Value (0.05)	18.73
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	17.53

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	193.8	95% Adjusted Gamma UCL (use when n<50)	207

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.15	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	2.58	Mean of logged Data	4.36
Maximum of Logged Data	5.943	SD of logged Data	0.979

Assuming Lognormal Distribution			
95% H-UCL	266.9	90% Chebyshev (MVUE) UCL	223.1
95% Chebyshev (MVUE) UCL	269.5	97.5% Chebyshev (MVUE) UCL	333.9
99% Chebyshev (MVUE) UCL	460.5		

Nonparametric Distribution Free UCL Statistics

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

Nonparametric Distribution Free UCLs			
95% CLT UCL	170.1	95% Jackknife UCL	173.9
95% Standard Bootstrap UCL	167.8	95% Bootstrap-t UCL	196.1
95% Hall's Bootstrap UCL	183.1	95% Percentile Bootstrap UCL	172.7
95% BCA Bootstrap UCL	179.2		
90% Chebyshev(Mean, Sd) UCL	211.5	95% Chebyshev(Mean, Sd) UCL	253
97.5% Chebyshev(Mean, Sd) UCL	310.7	99% Chebyshev(Mean, Sd) UCL	424

Suggested UCL to Use			
95% Adjusted Gamma UCL	207		

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 7:47:23 AM
From File	ProUCL Data Outside Deep-Event 2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

TCDD-TEQ			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	1
Number of Detects	8	Number of Non-Detects	3
Number of Distinct Detects	8	Number of Distinct Non-Detects	3
Minimum Detect	0.0122	Minimum Non-Detect	0.215
Maximum Detect	1.896	Maximum Non-Detect	3.44
Variance Detects	0.453	Percent Non-Detects	27.27%
Mean Detects	0.416	SD Detects	0.673
Median Detects	0.0806	CV Detects	1.617
Skewness Detects	1.958	Kurtosis Detects	3.372
Mean of Logged Detects	-2.076	SD of Logged Detects	1.692
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.669	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.366	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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	0.346	KM Standard Error of Mean	0.197
KM SD	0.581	95% KM (BCA) UCL	0.672
95% KM (t) UCL	0.703	95% KM (Percentile Bootstrap) UCL	0.685
95% KM (z) UCL	0.67	95% KM Bootstrap t UCL	2.566
90% KM Chebyshev UCL	0.936	95% KM Chebyshev UCL	1.203
97.5% KM Chebyshev UCL	1.574	99% KM Chebyshev UCL	2.302
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.585	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.296	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.308	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.525	k star (bias corrected MLE)	0.412
Theta hat (MLE)	0.793	Theta star (bias corrected MLE)	1.012
nu hat (MLE)	8.405	nu star (bias corrected)	6.587
Mean (detects)	0.416		
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	0.316
Maximum	1.896	Median	0.0799
SD	0.59	CV	1.867
k hat (MLE)	0.476	k star (bias corrected MLE)	0.407
Theta hat (MLE)	0.664	Theta star (bias corrected MLE)	0.777
nu hat (MLE)	10.47	nu star (bias corrected)	8.948
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (8.95, α)	3.296	Adjusted Chi Square Value (8.95, β)	2.761
95% Gamma Approximate UCL (use when n>=50)	0.858	95% Gamma Adjusted UCL (use when n<50)	1.024

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.346	SD (KM)	0.581
Variance (KM)	0.338	SE of Mean (KM)	0.197
k hat (KM)	0.355	k star (KM)	0.319
nu hat (KM)	7.813	nu star (KM)	7.016
theta hat (KM)	0.975	theta star (KM)	1.086
80% gamma percentile (KM)	0.539	90% gamma percentile (KM)	1.013
95% gamma percentile (KM)	1.553	99% gamma percentile (KM)	2.945
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.02, α)	2.179	Adjusted Chi Square Value (7.02, β)	1.767
95% Gamma Approximate KM-UCL (use when n>=50)	1.115	95% Gamma Adjusted KM-UCL (use when n<50)	1.375
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.322	Mean in Log Scale	-2.244
SD in Original Scale	0.586	SD in Log Scale	1.454
95% t UCL (assumes normality of ROS data)	0.643	95% Percentile Bootstrap UCL	0.645
95% BCA Bootstrap UCL	0.742	95% Bootstrap t UCL	3.012
95% H-UCL (Log ROS)	1.859		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.264	KM Geo Mean	0.104
KM SD (logged)	1.51	95% Critical H Value (KM-Log)	4.054
KM Standard Error of Mean (logged)	0.529	95% H-UCL (KM -Log)	2.248
KM SD (logged)	1.51	95% Critical H Value (KM-Log)	4.054
KM Standard Error of Mean (logged)	0.529		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.483	Mean in Log Scale	-1.834
SD in Original Scale	0.706	SD in Log Scale	1.622
95% t UCL (Assumes normality)	0.869	95% H-Stat UCL	5.406
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2.566	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.375
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.			

ARSENIC

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	12
Number of Detects	10	Number of Non-Detects	4
Number of Distinct Detects	10	Number of Distinct Non-Detects	3
Minimum Detect	0.097	Minimum Non-Detect	0.5
Maximum Detect	10	Maximum Non-Detect	10
Variance Detects	9.087	Percent Non-Detects	28.57%
Mean Detects	2.085	SD Detects	3.014
Median Detects	0.795	CV Detects	1.446
Skewness Detects	2.4	Kurtosis Detects	6.166
Mean of Logged Detects	-0.0465	SD of Logged Detects	1.34

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.665	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	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	1.739	KM Standard Error of Mean	0.736
KM SD	2.543	95% KM (BCA) UCL	2.956
95% KM (t) UCL	3.043	95% KM (Percentile Bootstrap) UCL	3.062
95% KM (z) UCL	2.951	95% KM Bootstrap t UCL	4.577
90% KM Chebyshev UCL	3.948	95% KM Chebyshev UCL	4.949
97.5% KM Chebyshev UCL	6.338	99% KM Chebyshev UCL	9.066

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.455	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.218	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.276	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.764	k star (bias corrected MLE)	0.602
Theta hat (MLE)	2.727	Theta star (bias corrected MLE)	3.465
nu hat (MLE)	15.29	nu star (bias corrected)	12.03
Mean (detects)	2.085		

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	1.652
Maximum	10	Median	0.625
SD	2.632	CV	1.594
k hat (MLE)	0.529	k star (bias corrected MLE)	0.463
Theta hat (MLE)	3.123	Theta star (bias corrected MLE)	3.566
nu hat (MLE)	14.81	nu star (bias corrected)	12.97
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (12.97, α)	5.873	Adjusted Chi Square Value (12.97, β)	5.252
95% Gamma Approximate UCL (use when n>=50)	3.648	95% Gamma Adjusted UCL (use when n<50)	4.079

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.739	SD (KM)	2.543
Variance (KM)	6.465	SE of Mean (KM)	0.736
k hat (KM)	0.468	k star (KM)	0.415
nu hat (KM)	13.1	nu star (KM)	11.63
theta hat (KM)	3.717	theta star (KM)	4.188
80% gamma percentile (KM)	2.819	90% gamma percentile (KM)	4.88
95% gamma percentile (KM)	7.134	99% gamma percentile (KM)	12.78
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.63, α)	4.984	Adjusted Chi Square Value (11.63, β)	4.42
95% Gamma Approximate KM-UCL (use when n>=50)	4.059	95% Gamma Adjusted KM-UCL (use when n<50)	4.576
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.658	Mean in Log Scale	-0.254
SD in Original Scale	2.613	SD in Log Scale	1.236
95% t UCL (assumes normality of ROS data)	2.894	95% Percentile Bootstrap UCL	2.969
95% BCA Bootstrap UCL	3.822	95% Bootstrap t UCL	4.646
95% H-UCL (Log ROS)	4.989		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.258	KM Geo Mean	0.772
KM SD (logged)	1.283	95% Critical H Value (KM-Log)	3.286
KM Standard Error of Mean (logged)	0.403	95% H-UCL (KM -Log)	5.668
KM SD (logged)	1.283	95% Critical H Value (KM-Log)	3.286
KM Standard Error of Mean (logged)	0.403		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.409	Mean in Log Scale	0.167
SD in Original Scale	2.787	SD in Log Scale	1.354
95% t UCL (Assumes normality)	3.728	95% H-Stat UCL	10.66
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	4.577	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.576
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.			

CHROMIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	8
Number of Detects	8	Number of Non-Detects	6
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.17	Minimum Non-Detect	2
Maximum Detect	28.7	Maximum Non-Detect	2
Variance Detects	96.8	Percent Non-Detects	42.86%
Mean Detects	4.4	SD Detects	9.839
Median Detects	1.2	CV Detects	2.236
Skewness Detects	2.806	Kurtosis Detects	7.903
Mean of Logged Detects	0.0618	SD of Logged Detects	1.608

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.478	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.475	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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	2.912	KM Standard Error of Mean	2.057
KM SD	7.178	95% KM (BCA) UCL	7.038
95% KM (t) UCL	6.555	95% KM (Percentile Bootstrap) UCL	6.835
95% KM (z) UCL	6.296	95% KM Bootstrap t UCL	26.4
90% KM Chebyshev UCL	9.083	95% KM Chebyshev UCL	11.88
97.5% KM Chebyshev UCL	15.76	99% KM Chebyshev UCL	23.38

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.018	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.77	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.367	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.311	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)	0.454	k star (bias corrected MLE)	0.367
Theta hat (MLE)	9.688	Theta star (bias corrected MLE)	11.98
nu hat (MLE)	7.266	nu star (bias corrected)	5.875
Mean (detects)	4.4		

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	3.356
Maximum	28.7	Median	0.918
SD	7.568	CV	2.255
k hat (MLE)	0.346	k star (bias corrected MLE)	0.32
Theta hat (MLE)	9.69	Theta star (bias corrected MLE)	10.5
nu hat (MLE)	9.697	nu star (bias corrected)	8.953
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (8.95, α)	3.298	Adjusted Chi Square Value (8.95, β)	2.859
95% Gamma Approximate UCL (use when n>=50)	9.109	95% Gamma Adjusted UCL (use when n<50)	10.51

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.912	SD (KM)	7.178
Variance (KM)	51.52	SE of Mean (KM)	2.057
k hat (KM)	0.165	k star (KM)	0.177
nu hat (KM)	4.61	nu star (KM)	4.955
theta hat (KM)	17.69	theta star (KM)	16.46
80% gamma percentile (KM)	3.575	90% gamma percentile (KM)	8.775
95% gamma percentile (KM)	15.47	99% gamma percentile (KM)	34.28
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.96, α)	1.131	Adjusted Chi Square Value (4.96, β)	0.911
95% Gamma Approximate KM-UCL (use when n>=50)	12.75	95% Gamma Adjusted KM-UCL (use when n<50)	15.84
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.02	Mean in Log Scale	-0.105
SD in Original Scale	7.444	SD in Log Scale	1.395
95% t UCL (assumes normality of ROS data)	6.544	95% Percentile Bootstrap UCL	6.82
95% BCA Bootstrap UCL	8.798	95% Bootstrap t UCL	30.67
95% H-UCL (Log ROS)	9.197		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.14	KM Geo Mean	0.869
KM SD (logged)	1.302	95% Critical H Value (KM-Log)	3.321
KM Standard Error of Mean (logged)	0.437	95% H-UCL (KM -Log)	6.736
KM SD (logged)	1.302	95% Critical H Value (KM-Log)	3.321
KM Standard Error of Mean (logged)	0.437		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.943	Mean in Log Scale	0.0353
SD in Original Scale	7.428	SD in Log Scale	1.181
95% t UCL (Assumes normality)	6.458	95% H-Stat UCL	5.74
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	15.76	99% KM (Chebyshev) UCL	23.38
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.			

COBALT

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	9
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.053	Minimum Non-Detect	1
Maximum Detect	37	Maximum Non-Detect	50
Variance Detects	220.1	Percent Non-Detects	57.14%
Mean Detects	8.76	SD Detects	14.83
Median Detects	0.81	CV Detects	1.693
Skewness Detects	1.868	Kurtosis Detects	3.232
Mean of Logged Detects	0.0743	SD of Logged Detects	2.628

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.693	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	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	5.599	KM Standard Error of Mean	3.943
KM SD	11.28	95% KM (BCA) UCL	12.52
95% KM (t) UCL	12.58	95% KM (Percentile Bootstrap) UCL	11.96
95% KM (z) UCL	12.08	95% KM Bootstrap t UCL	123.6
90% KM Chebyshev UCL	17.43	95% KM Chebyshev UCL	22.78
97.5% KM Chebyshev UCL	30.22	99% KM Chebyshev UCL	44.83

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.443	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.308	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.356	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.325	k star (bias corrected MLE)	0.273
Theta hat (MLE)	26.97	Theta star (bias corrected MLE)	32.03
nu hat (MLE)	3.897	nu star (bias corrected)	3.282
Mean (detects)	8.76		

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	4.954
Maximum	37	Median	0.439
SD	10.24	CV	2.068
k hat (MLE)	0.253	k star (bias corrected MLE)	0.246
Theta hat (MLE)	19.59	Theta star (bias corrected MLE)	20.11
nu hat (MLE)	7.08	nu star (bias corrected)	6.896
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (6.90, α)	2.114	Adjusted Chi Square Value (6.90, β)	1.781
95% Gamma Approximate UCL (use when n>=50)	16.16	95% Gamma Adjusted UCL (use when n<50)	19.18

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.599	SD (KM)	11.28
Variance (KM)	127.2	SE of Mean (KM)	3.943
k hat (KM)	0.246	k star (KM)	0.241
nu hat (KM)	6.899	nu star (KM)	6.754
theta hat (KM)	22.72	theta star (KM)	23.21
80% gamma percentile (KM)	8.026	90% gamma percentile (KM)	16.85
95% gamma percentile (KM)	27.39	99% gamma percentile (KM)	55.6
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.75, α)	2.037	Adjusted Chi Square Value (6.75, β)	1.712
95% Gamma Approximate KM-UCL (use when n>=50)	18.57	95% Gamma Adjusted KM-UCL (use when n<50)	22.1
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.206	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.369	Mean in Log Scale	-0.48
SD in Original Scale	10.09	SD in Log Scale	2.034
95% t UCL (assumes normality of ROS data)	9.146	95% Percentile Bootstrap UCL	9.291
95% BCA Bootstrap UCL	11.8	95% Bootstrap t UCL	31.08
95% H-UCL (Log ROS)	71.09		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.484	KM Geo Mean	0.617
KM SD (logged)	2.174	95% Critical H Value (KM-Log)	5.026
KM Standard Error of Mean (logged)	0.857	95% H-UCL (KM -Log)	135.5
KM SD (logged)	2.174	95% Critical H Value (KM-Log)	5.026
KM Standard Error of Mean (logged)	0.857		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	11.92	Mean in Log Scale	0.985
SD in Original Scale	13.12	SD in Log Scale	2.326
95% t UCL (Assumes normality)	18.12	95% H-Stat UCL	1254
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	123.6	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	22.1
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

CYANIDE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CYANIDE was not processed!

IRON

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	2
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	230	Minimum Non-Detect	200
Maximum Detect	68400	Maximum Non-Detect	200
Variance Detects	4.867E+8	Percent Non-Detects	14.29%
Mean Detects	15008	SD Detects	22061
Median Detects	5628	CV Detects	1.47
Skewness Detects	1.86	Kurtosis Detects	2.634
Mean of Logged Detects	8.341	SD of Logged Detects	1.94

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.708	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	12892	KM Standard Error of Mean	5647
KM SD	20230	95% KM (BCA) UCL	22222
95% KM (t) UCL	22893	95% KM (Percentile Bootstrap) UCL	22301
95% KM (z) UCL	22181	95% KM Bootstrap t UCL	40591
90% KM Chebyshev UCL	29834	95% KM Chebyshev UCL	37508
97.5% KM Chebyshev UCL	48159	99% KM Chebyshev UCL	69081

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.275	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.259	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.498	k star (bias corrected MLE)	0.429
Theta hat (MLE)	30112	Theta star (bias corrected MLE)	34954
nu hat (MLE)	11.96	nu star (bias corrected)	10.3
Mean (detects)	15008		

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	12864
Maximum	68400	Median	3638
SD	21012	CV	1.633
k hat (MLE)	0.241	k star (bias corrected MLE)	0.237
Theta hat (MLE)	53465	Theta star (bias corrected MLE)	54355
nu hat (MLE)	6.737	nu star (bias corrected)	6.627
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (6.63, α)	1.968	Adjusted Chi Square Value (6.63, β)	1.65
95% Gamma Approximate UCL (use when n>=50)	43315	95% Gamma Adjusted UCL (use when n<50)	51665

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	12892	SD (KM)	20230
Variance (KM)	4.093E+8	SE of Mean (KM)	5647
k hat (KM)	0.406	k star (KM)	0.367
nu hat (KM)	11.37	nu star (KM)	10.27
theta hat (KM)	31744	theta star (KM)	35155
80% gamma percentile (KM)	20568	90% gamma percentile (KM)	36956
95% gamma percentile (KM)	55185	99% gamma percentile (KM)	101457
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (10.27, α)	4.11	Adjusted Chi Square Value (10.27, β)	3.608
95% Gamma Approximate KM-UCL (use when n>=50)	32209	95% Gamma Adjusted KM-UCL (use when n<50)	36694
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.115	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	12870	Mean in Log Scale	7.68
SD in Original Scale	21008	SD in Log Scale	2.459
95% t UCL (assumes normality of ROS data)	22814	95% Percentile Bootstrap UCL	22238
95% BCA Bootstrap UCL	25080	95% Bootstrap t UCL	42349
95% H-UCL (Log ROS)	2040657		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	7.907	KM Geo Mean	2715
KM SD (logged)	2.022	95% Critical H Value (KM-Log)	4.72
KM Standard Error of Mean (logged)	0.565	95% H-UCL (KM -Log)	296126
KM SD (logged)	2.022	95% Critical H Value (KM-Log)	4.72
KM Standard Error of Mean (logged)	0.565		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	12878	Mean in Log Scale	7.808
SD in Original Scale	21003	SD in Log Scale	2.241
95% t UCL (Assumes normality)	22819	95% H-Stat UCL	751624
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	40591	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	36694
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.			

MANGANESE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	13	Number of Non-Detects	1
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	3.1	Minimum Non-Detect	75
Maximum Detect	4490	Maximum Non-Detect	75
Variance Detects	2749905	Percent Non-Detects	7.143%
Mean Detects	1344	SD Detects	1658
Median Detects	169	CV Detects	1.234
Skewness Detects	0.964	Kurtosis Detects	-0.504
Mean of Logged Detects	5.521	SD of Logged Detects	2.581

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.792	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1249	KM Standard Error of Mean	437.7
KM SD	1573	95% KM (BCA) UCL	1989
95% KM (t) UCL	2024	95% KM (Percentile Bootstrap) UCL	1979
95% KM (z) UCL	1968	95% KM Bootstrap t UCL	2336
90% KM Chebyshev UCL	2562	95% KM Chebyshev UCL	3156
97.5% KM Chebyshev UCL	3982	99% KM Chebyshev UCL	5603

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.479	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.811	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.197	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.253	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.392	k star (bias corrected MLE)	0.353
Theta hat (MLE)	3426	Theta star (bias corrected MLE)	3807
nu hat (MLE)	10.2	nu star (bias corrected)	9.179
Mean (detects)	1344		

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	3.1	Mean	1254
Maximum	4490	Median	166
SD	1629	CV	1.299
k hat (MLE)	0.389	k star (bias corrected MLE)	0.354
Theta hat (MLE)	3219	Theta star (bias corrected MLE)	3545
nu hat (MLE)	10.9	nu star (bias corrected)	9.9
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (9.90, α)	3.879	Adjusted Chi Square Value (9.90, β)	3.394
95% Gamma Approximate UCL (use when n>=50)	3199	95% Gamma Adjusted UCL (use when n<50)	3656

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1249	SD (KM)	1573
Variance (KM)	2475648	SE of Mean (KM)	437.7
k hat (KM)	0.63	k star (KM)	0.542
nu hat (KM)	17.63	nu star (KM)	15.19
theta hat (KM)	1983	theta star (KM)	2302
80% gamma percentile (KM)	2056	90% gamma percentile (KM)	3320
95% gamma percentile (KM)	4659	99% gamma percentile (KM)	7925
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.19, α)	7.391	Adjusted Chi Square Value (15.19, β)	6.681
95% Gamma Approximate KM-UCL (use when n>=50)	2565	95% Gamma Adjusted KM-UCL (use when n<50)	2838
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1249	Mean in Log Scale	5.285
SD in Original Scale	1633	SD in Log Scale	2.632
95% t UCL (assumes normality of ROS data)	2021	95% Percentile Bootstrap UCL	1975
95% BCA Bootstrap UCL	2085	95% Bootstrap t UCL	2285
95% H-UCL (Log ROS)	494061		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.249	KM Geo Mean	190.3
KM SD (logged)	2.589	95% Critical H Value (KM-Log)	5.882
KM Standard Error of Mean (logged)	0.722	95% H-UCL (KM -Log)	370369
KM SD (logged)	2.589	95% Critical H Value (KM-Log)	5.882
KM Standard Error of Mean (logged)	0.722		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1251	Mean in Log Scale	5.385
SD in Original Scale	1631	SD in Log Scale	2.531
95% t UCL (Assumes normality)	2023	95% H-Stat UCL	307111
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2336	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2838
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.			

DIOXIN-LIKE PCB TEQ			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	8
		Number of Missing Observations	1
Number of Detects	6	Number of Non-Detects	5
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	1.8300E-4	Minimum Non-Detect	20
Maximum Detect	0.0121	Maximum Non-Detect	21
Variance Detects	3.0964E-5	Percent Non-Detects	45.45%
Mean Detects	0.00395	SD Detects	0.00556
Median Detects	5.8500E-4	CV Detects	1.408
Skewness Detects	1.02	Kurtosis Detects	-1.537
Mean of Logged Detects	-6.847	SD of Logged Detects	1.885
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.703	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.394	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	0.00395	KM Standard Error of Mean	0.00227
KM SD	0.00508	95% KM (BCA) UCL	0.00752
95% KM (t) UCL	0.00807	95% KM (Percentile Bootstrap) UCL	0.00816
95% KM (z) UCL	0.00769	95% KM Bootstrap t UCL	0.0948
90% KM Chebyshev UCL	0.0108	95% KM Chebyshev UCL	0.0139
97.5% KM Chebyshev UCL	0.0181	99% KM Chebyshev UCL	0.0266
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.744	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.738	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.359	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.349	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)	0.486	k star (bias corrected MLE)	0.354
Theta hat (MLE)	0.00813	Theta star (bias corrected MLE)	0.0112
nu hat (MLE)	5.83	nu star (bias corrected)	4.249
Mean (detects)	0.00395		
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	1.8300E-4	Mean	0.0067
Maximum	0.0121	Median	0.01
SD	0.00505	CV	0.753
k hat (MLE)	0.731	k star (bias corrected MLE)	0.592
Theta hat (MLE)	0.00917	Theta star (bias corrected MLE)	0.0113
nu hat (MLE)	16.07	nu star (bias corrected)	13.02
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (13.02, α)	5.908	Adjusted Chi Square Value (13.02, β)	5.147
95% Gamma Approximate UCL (use when n>=50)	0.0148	95% Gamma Adjusted UCL (use when n<50)	0.017

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00395	SD (KM)	0.00508
Variance (KM)	2.5803E-5	SE of Mean (KM)	0.00227
k hat (KM)	0.605	k star (KM)	0.501
nu hat (KM)	13.32	nu star (KM)	11.02
theta hat (KM)	0.00653	theta star (KM)	0.00789
80% gamma percentile (KM)	0.00649	90% gamma percentile (KM)	0.0107
95% gamma percentile (KM)	0.0152	99% gamma percentile (KM)	0.0262
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.02, α)	4.588	Adjusted Chi Square Value (11.02, β)	3.934
95% Gamma Approximate KM-UCL (use when n>=50)	0.00949	95% Gamma Adjusted KM-UCL (use when n<50)	0.0111
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00301	Mean in Log Scale	-6.847
SD in Original Scale	0.00427	SD in Log Scale	1.558
95% t UCL (assumes normality of ROS data)	0.00534	95% Percentile Bootstrap UCL	0.00499
95% BCA Bootstrap UCL	0.00557	95% Bootstrap t UCL	0.00873
95% H-UCL (Log ROS)	0.0278		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.847	KM Geo Mean	0.00106
KM SD (logged)	1.721	95% Critical H Value (KM-Log)	4.521
KM Standard Error of Mean (logged)	0.769	95% H-UCL (KM -Log)	0.0547
KM SD (logged)	1.721	95% Critical H Value (KM-Log)	4.521
KM Standard Error of Mean (logged)	0.769		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.639	Mean in Log Scale	-2.679
SD in Original Scale	5.328	SD in Log Scale	4.97
95% t UCL (Assumes normality)	7.55	95% H-Stat UCL	3.371E+12
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	0.0181	99% KM (Chebyshev) UCL	0.0266
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

1,4-DIOXANE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	5
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.082	Minimum Non-Detect	0.5
Maximum Detect	29	Maximum Non-Detect	0.5
Variance Detects	97.18	Percent Non-Detects	35.71%
Mean Detects	5.781	SD Detects	9.858
Median Detects	1.1	CV Detects	1.705
Skewness Detects	2.039	Kurtosis Detects	3.944
Mean of Logged Detects	-0.032	SD of Logged Detects	2.233
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.67	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.346	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	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	3.763	KM Standard Error of Mean	2.247
KM SD	7.928	95% KM (BCA) UCL	7.557
95% KM (t) UCL	7.744	95% KM (Percentile Bootstrap) UCL	7.76
95% KM (z) UCL	7.46	95% KM Bootstrap t UCL	18.9
90% KM Chebyshev UCL	10.51	95% KM Chebyshev UCL	13.56
97.5% KM Chebyshev UCL	17.8	99% KM Chebyshev UCL	26.13
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.556	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.794	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.242	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.373	k star (bias corrected MLE)	0.322
Theta hat (MLE)	15.52	Theta star (bias corrected MLE)	17.93
nu hat (MLE)	6.706	nu star (bias corrected)	5.804
Mean (detects)	5.781		
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	3.72
Maximum	29	Median	0.123
SD	8.248	CV	2.217
k hat (MLE)	0.24	k star (bias corrected MLE)	0.236
Theta hat (MLE)	15.5	Theta star (bias corrected MLE)	15.75
nu hat (MLE)	6.72	nu star (bias corrected)	6.613
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (6.61, α)	1.961	Adjusted Chi Square Value (6.61, β)	1.644
95% Gamma Approximate UCL (use when n>=50)	12.55	95% Gamma Adjusted UCL (use when n<50)	14.97

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.763	SD (KM)	7.928
Variance (KM)	62.86	SE of Mean (KM)	2.247
k hat (KM)	0.225	k star (KM)	0.225
nu hat (KM)	6.309	nu star (KM)	6.291
theta hat (KM)	16.7	theta star (KM)	16.75
80% gamma percentile (KM)	5.242	90% gamma percentile (KM)	11.36
95% gamma percentile (KM)	18.79	99% gamma percentile (KM)	38.87
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.29, α)	1.79	Adjusted Chi Square Value (6.29, β)	1.491
95% Gamma Approximate KM-UCL (use when n>=50)	13.22	95% Gamma Adjusted KM-UCL (use when n<50)	15.88
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.794	Mean in Log Scale	-0.748
SD in Original Scale	8.214	SD in Log Scale	2.132
95% t UCL (assumes normality of ROS data)	7.682	95% Percentile Bootstrap UCL	7.574
95% BCA Bootstrap UCL	9.818	95% Bootstrap t UCL	19.16
95% H-UCL (Log ROS)	85.15		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.77	KM Geo Mean	0.463
KM SD (logged)	1.971	95% Critical H Value (KM-Log)	4.616
KM Standard Error of Mean (logged)	0.567	95% H-UCL (KM -Log)	40.22
KM SD (logged)	1.971	95% Critical H Value (KM-Log)	4.616
KM Standard Error of Mean (logged)	0.567		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.806	Mean in Log Scale	-0.516
SD in Original Scale	8.208	SD in Log Scale	1.877
95% t UCL (Assumes normality)	7.69	95% H-Stat UCL	34.8
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	18.9	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	15.88
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.			

DIBENZO(A,H)ANTHRACENE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.0057	Minimum Non-Detect	0.091
Maximum Detect	0.32	Maximum Non-Detect	0.1
Variance Detects	0.0494	Percent Non-Detects	85.71%
Mean Detects	0.163	SD Detects	0.222
Median Detects	0.163	CV Detects	1.365
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.153	SD of Logged Detects	2.848

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0282	KM Standard Error of Mean	0.0306
KM SD	0.0809	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0823	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0785	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.12	95% KM Chebyshev UCL	0.162
97.5% KM Chebyshev UCL	0.219	99% KM Chebyshev UCL	0.333

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.478	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.341	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.912	nu star (bias corrected)	N/A
Mean (detects)	0.163		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0282	SD (KM)	0.0809
Variance (KM)	0.00655	SE of Mean (KM)	0.0306
k hat (KM)	0.121	k star (KM)	0.143
nu hat (KM)	3.386	nu star (KM)	3.994
theta hat (KM)	0.233	theta star (KM)	0.197
80% gamma percentile (KM)	0.0294	90% gamma percentile (KM)	0.0828
95% gamma percentile (KM)	0.156	99% gamma percentile (KM)	0.372

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (3.99, α)	0.719	Adjusted Chi Square Value (3.99, β)	0.56
95% Gamma Approximate KM-UCL (use when n>=50)	0.156	95% Gamma Adjusted KM-UCL (use when n<50)	0.201

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0331	Mean in Log Scale	-4.919

SD in Original Scale	0.0838	SD in Log Scale	1.652
95% t UCL (assumes normality of ROS data)	0.0728	95% Percentile Bootstrap UCL	0.0758
95% BCA Bootstrap UCL	0.1	95% Bootstrap t UCL	0.36
95% H-UCL (Log ROS)	0.177		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.88	KM Geo Mean	0.0076
KM SD (logged)	1.037	95% Critical H Value (KM-Log)	2.854
KM Standard Error of Mean (logged)	0.392	95% H-UCL (KM -Log)	0.0296
KM SD (logged)	1.037	95% Critical H Value (KM-Log)	2.854
KM Standard Error of Mean (logged)	0.392		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0656	Mean in Log Scale	-3.029
SD in Original Scale	0.0741	SD in Log Scale	0.792
95% t UCL (Assumes normality)	0.101	95% H-Stat UCL	0.114
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
KM Bootstrap t UCL	N/A		
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.			

INDENO(1,2,3-CD)PYRENE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.006	Minimum Non-Detect	0.091
Maximum Detect	0.39	Maximum Non-Detect	0.1
Variance Detects	0.0737	Percent Non-Detects	85.71%
Mean Detects	0.198	SD Detects	0.272
Median Detects	0.198	CV Detects	1.371
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.029	SD of Logged Detects	2.952

Warning: Data set has only 2 Detected Values.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0334	KM Standard Error of Mean	0.0374
KM SD	0.0989	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0996	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0949	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.146	95% KM Chebyshev UCL	0.196
97.5% KM Chebyshev UCL	0.267	99% KM Chebyshev UCL	0.405

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.457	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.433	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.828	nu star (bias corrected)	N/A
Mean (detects)	0.198		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0334	SD (KM)	0.0989
Variance (KM)	0.00978	SE of Mean (KM)	0.0374
k hat (KM)	0.114	k star (KM)	0.137
nu hat (KM)	3.199	nu star (KM)	3.847
theta hat (KM)	0.293	theta star (KM)	0.243
80% gamma percentile (KM)	0.0337	90% gamma percentile (KM)	0.0977
95% gamma percentile (KM)	0.187	99% gamma percentile (KM)	0.451

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (3.85, α)	0.662	Adjusted Chi Square Value (3.85, β)	0.513
95% Gamma Approximate KM-UCL (use when n>=50)	0.194	95% Gamma Adjusted KM-UCL (use when n<50)	0.251

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0391	Mean in Log Scale	-4.858
SD in Original Scale	0.102	SD in Log Scale	1.712
95% t UCL (assumes normality of ROS data)	0.0876	95% Percentile Bootstrap UCL	0.0918
95% BCA Bootstrap UCL	0.12	95% Bootstrap t UCL	0.476
95% H-UCL (Log ROS)	0.236		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.818	KM Geo Mean	0.00808
KM SD (logged)	1.075	95% Critical H Value (KM-Log)	2.918
KM Standard Error of Mean (logged)	0.406	95% H-UCL (KM -Log)	0.0344
KM SD (logged)	1.075	95% Critical H Value (KM-Log)	2.918
KM Standard Error of Mean (logged)	0.406		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0706	Mean in Log Scale	-3.011
SD in Original Scale	0.0927	SD in Log Scale	0.819
95% t UCL (Assumes normality)	0.114	95% H-Stat UCL	0.122
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
KM Bootstrap t UCL	N/A		
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.			

NAPHTHALENE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	10
Number of Detects	7	Number of Non-Detects	7
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	0.0063	Minimum Non-Detect	0.097
Maximum Detect	0.36	Maximum Non-Detect	0.1
Variance Detects	0.0175	Percent Non-Detects	50%
Mean Detects	0.06	SD Detects	0.132
Median Detects	0.0097	CV Detects	2.206
Skewness Detects	2.642	Kurtosis Detects	6.985
Mean of Logged Detects	-4.14	SD of Logged Detects	1.41
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.476	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.484	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.035	KM Standard Error of Mean	0.0261
KM SD	0.0902	95% KM (BCA) UCL	0.086
95% KM (t) UCL	0.0811	95% KM (Percentile Bootstrap) UCL	0.0848
95% KM (z) UCL	0.0779	95% KM Bootstrap t UCL	1.089
90% KM Chebyshev UCL	0.113	95% KM Chebyshev UCL	0.149
97.5% KM Chebyshev UCL	0.198	99% KM Chebyshev UCL	0.294
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.593	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.755	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.443	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.328	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)	0.482	k star (bias corrected MLE)	0.371
Theta hat (MLE)	0.125	Theta star (bias corrected MLE)	0.162
nu hat (MLE)	6.745	nu star (bias corrected)	5.187
Mean (detects)	0.06		
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	0.0063	Mean	0.0419
Maximum	0.36	Median	0.01
SD	0.0939	CV	2.241
k hat (MLE)	0.634	k star (bias corrected MLE)	0.546
Theta hat (MLE)	0.0661	Theta star (bias corrected MLE)	0.0767
nu hat (MLE)	17.75	nu star (bias corrected)	15.28
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (15.28, α)	7.458	Adjusted Chi Square Value (15.28, β)	6.744
95% Gamma Approximate UCL (use when n>=50)	0.0858	95% Gamma Adjusted UCL (use when n<50)	0.0949

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.035	SD (KM)	0.0902
Variance (KM)	0.00814	SE of Mean (KM)	0.0261
k hat (KM)	0.15	k star (KM)	0.166
nu hat (KM)	4.212	nu star (KM)	4.642
theta hat (KM)	0.233	theta star (KM)	0.211
80% gamma percentile (KM)	0.0411	90% gamma percentile (KM)	0.105
95% gamma percentile (KM)	0.189	99% gamma percentile (KM)	0.427
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.64, α)	0.991	Adjusted Chi Square Value (4.64, β)	0.79
95% Gamma Approximate KM-UCL (use when n>=50)	0.164	95% Gamma Adjusted KM-UCL (use when n<50)	0.206
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.657	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.339	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.037	Mean in Log Scale	-4.308
SD in Original Scale	0.0933	SD in Log Scale	1.087
95% t UCL (assumes normality of ROS data)	0.0811	95% Percentile Bootstrap UCL	0.0864
95% BCA Bootstrap UCL	0.113	95% Bootstrap t UCL	0.645
95% H-UCL (Log ROS)	0.0589		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.4	KM Geo Mean	0.0123
KM SD (logged)	0.985	95% Critical H Value (KM-Log)	2.767
KM Standard Error of Mean (logged)	0.3	95% H-UCL (KM -Log)	0.0425
KM SD (logged)	0.985	95% Critical H Value (KM-Log)	2.767
KM Standard Error of Mean (logged)	0.3		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0548	Mean in Log Scale	-3.571
SD in Original Scale	0.0901	SD in Log Scale	1.125
95% t UCL (Assumes normality)	0.0974	95% H-Stat UCL	0.135
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.149		
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.			

1,1-DICHLOROETHANE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.31	Minimum Non-Detect	0.5
Maximum Detect	3.7	Maximum Non-Detect	0.5
Variance Detects	3.786	Percent Non-Detects	78.57%
Mean Detects	1.453	SD Detects	1.946
Median Detects	0.35	CV Detects	1.339
Skewness Detects	1.731	Kurtosis Detects	N/A
Mean of Logged Detects	-0.304	SD of Logged Detects	1.398

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.381	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.571	KM Standard Error of Mean	0.285
KM SD	0.868	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.075	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.039	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.424	95% KM Chebyshev UCL	1.811
97.5% KM Chebyshev UCL	2.348	99% KM Chebyshev UCL	3.402

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.866	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.678	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.198	nu star (bias corrected)	N/A
Mean (detects)	1.453		

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	0.731
Maximum	3.7	Median	0.33
SD	1.017	CV	1.392
k hat (MLE)	0.508	k star (bias corrected MLE)	0.446
Theta hat (MLE)	1.44	Theta star (bias corrected MLE)	1.638
nu hat (MLE)	14.21	nu star (bias corrected)	12.5
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (12.50, α)	5.559	Adjusted Chi Square Value (12.50, β)	4.958
95% Gamma Approximate UCL (use when n>=50)	1.644	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.571	SD (KM)	0.868
Variance (KM)	0.754	SE of Mean (KM)	0.285
k hat (KM)	0.432	k star (KM)	0.387
nu hat (KM)	12.1	nu star (KM)	10.84
theta hat (KM)	1.321	theta star (KM)	1.474
80% gamma percentile (KM)	0.917	90% gamma percentile (KM)	1.621
95% gamma percentile (KM)	2.398	99% gamma percentile (KM)	4.358
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (10.84, α)	4.474	Adjusted Chi Square Value (10.84, β)	3.946
95% Gamma Approximate KM-UCL (use when n>=50)	1.383	95% Gamma Adjusted KM-UCL (use when n<50)	1.568
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.787	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.686	Mean in Log Scale	-0.894
SD in Original Scale	0.932	SD in Log Scale	0.991
95% t UCL (assumes normality of ROS data)	1.127	95% Percentile Bootstrap UCL	1.143
95% BCA Bootstrap UCL	1.346	95% Bootstrap t UCL	2.018
95% H-UCL (Log ROS)	1.435		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.938	KM Geo Mean	0.392
KM SD (logged)	0.626	95% Critical H Value (KM-Log)	2.246
KM Standard Error of Mean (logged)	0.21	95% H-UCL (KM -Log)	0.703
KM SD (logged)	0.626	95% Critical H Value (KM-Log)	2.246
KM Standard Error of Mean (logged)	0.21		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.508	Mean in Log Scale	-1.154
SD in Original Scale	0.919	SD in Log Scale	0.716
95% t UCL (Assumes normality)	0.943	95% H-Stat UCL	0.651
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.075		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BENZENE

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	9
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.089	Minimum Non-Detect	0.5
Maximum Detect	0.88	Maximum Non-Detect	0.5
Variance Detects	0.109	Percent Non-Detects	64.29%
Mean Detects	0.302	SD Detects	0.33
Median Detects	0.17	CV Detects	1.093
Skewness Detects	2.021	Kurtosis Detects	4.177
Mean of Logged Detects	-1.575	SD of Logged Detects	0.908

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.35	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	0.209	KM Standard Error of Mean	0.0654
KM SD	0.197	95% KM (BCA) UCL	0.314
95% KM (t) UCL	0.325	95% KM (Percentile Bootstrap) UCL	0.323
95% KM (z) UCL	0.316	95% KM Bootstrap t UCL	0.497
90% KM Chebyshev UCL	0.405	95% KM Chebyshev UCL	0.494
97.5% KM Chebyshev UCL	0.617	99% KM Chebyshev UCL	0.86

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.475	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.687	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.258	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	1.472	k star (bias corrected MLE)	0.722
Theta hat (MLE)	0.205	Theta star (bias corrected MLE)	0.418
nu hat (MLE)	14.72	nu star (bias corrected)	7.221
Mean (detects)	0.302		

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	0.224
Maximum	0.88	Median	0.16
SD	0.228	CV	1.021
k hat (MLE)	1.094	k star (bias corrected MLE)	0.907
Theta hat (MLE)	0.204	Theta star (bias corrected MLE)	0.246
nu hat (MLE)	30.63	nu star (bias corrected)	25.4
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (25.40, α)	14.92	Adjusted Chi Square Value (25.40, β)	13.86
95% Gamma Approximate UCL (use when n>=50)	0.381	95% Gamma Adjusted UCL (use when n<50)	0.41

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.209	SD (KM)	0.197
Variance (KM)	0.0387	SE of Mean (KM)	0.0654
k hat (KM)	1.126	k star (KM)	0.933
nu hat (KM)	31.54	nu star (KM)	26.11
theta hat (KM)	0.185	theta star (KM)	0.224
80% gamma percentile (KM)	0.338	90% gamma percentile (KM)	0.489
95% gamma percentile (KM)	0.641	99% gamma percentile (KM)	0.996
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (26.11, α)	15.47	Adjusted Chi Square Value (26.11, β)	14.39
95% Gamma Approximate KM-UCL (use when n>=50)	0.353	95% Gamma Adjusted KM-UCL (use when n<50)	0.379
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.201	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.221	Mean in Log Scale	-1.796
SD in Original Scale	0.211	SD in Log Scale	0.737
95% t UCL (assumes normality of ROS data)	0.321	95% Percentile Bootstrap UCL	0.325
95% BCA Bootstrap UCL	0.363	95% Bootstrap t UCL	0.444
95% H-UCL (Log ROS)	0.355		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.807	KM Geo Mean	0.164
KM SD (logged)	0.612	95% Critical H Value (KM-Log)	2.226
KM Standard Error of Mean (logged)	0.255	95% H-UCL (KM -Log)	0.289
KM SD (logged)	0.612	95% Critical H Value (KM-Log)	2.226
KM Standard Error of Mean (logged)	0.255		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.269	Mean in Log Scale	-1.454
SD in Original Scale	0.185	SD in Log Scale	0.512
95% t UCL (Assumes normality)	0.356	95% H-Stat UCL	0.355
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	0.497	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.379
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.			

CIS-1,2-DICHLOROETHENE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.22	Minimum Non-Detect	0.5
Maximum Detect	1800	Maximum Non-Detect	0.5
Variance Detects	517788	Percent Non-Detects	57.14%
Mean Detects	334.8	SD Detects	719.6
Median Detects	43.5	CV Detects	2.149
Skewness Detects	2.422	Kurtosis Detects	5.895
Mean of Logged Detects	2.749	SD of Logged Detects	3.365
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.554	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.451	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	143.6	KM Standard Error of Mean	134.9
KM SD	460.8	95% KM (BCA) UCL	403.3
95% KM (t) UCL	382.5	95% KM (Percentile Bootstrap) UCL	394.7
95% KM (z) UCL	365.5	95% KM Bootstrap t UCL	2895
90% KM Chebyshev UCL	548.4	95% KM Chebyshev UCL	731.7
97.5% KM Chebyshev UCL	986.1	99% KM Chebyshev UCL	1486
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.432	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.79	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.264	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.234	k star (bias corrected MLE)	0.228
Theta hat (MLE)	1430	Theta star (bias corrected MLE)	1467
nu hat (MLE)	2.81	nu star (bias corrected)	2.739
Mean (detects)	334.8		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	143.5
Maximum	1800	Median	0.01
SD	478.2	CV	3.333
k hat (MLE)	0.123	k star (bias corrected MLE)	0.144
Theta hat (MLE)	1166	Theta star (bias corrected MLE)	994.2
nu hat (MLE)	3.447	nu star (bias corrected)	4.042
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (4.04, α)	0.738	Adjusted Chi Square Value (4.04, β)	0.576
95% Gamma Approximate UCL (use when n>=50)	785.7	95% Gamma Adjusted UCL (use when n<50)	1007

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	143.6	SD (KM)	460.8
Variance (KM)	212345	SE of Mean (KM)	134.9
k hat (KM)	0.0971	k star (KM)	0.124
nu hat (KM)	2.72	nu star (KM)	3.471
theta hat (KM)	1478	theta star (KM)	1159
80% gamma percentile (KM)	130.6	90% gamma percentile (KM)	410.4
95% gamma percentile (KM)	816.1	99% gamma percentile (KM)	2044
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.47, α)	0.524	Adjusted Chi Square Value (3.47, β)	0.4
95% Gamma Approximate KM-UCL (use when n>=50)	950.4	95% Gamma Adjusted KM-UCL (use when n<50)	1247
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	143.7	Mean in Log Scale	-0.514
SD in Original Scale	478.2	SD in Log Scale	4.039
95% t UCL (assumes normality of ROS data)	370	95% Percentile Bootstrap UCL	398.3
95% BCA Bootstrap UCL	531.9	95% Bootstrap t UCL	3049
95% H-UCL (Log ROS)	47127978		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.313	KM Geo Mean	1.367
KM SD (logged)	2.915	95% Critical H Value (KM-Log)	6.563
KM Standard Error of Mean (logged)	0.853	95% H-UCL (KM -Log)	19257
KM SD (logged)	2.915	95% Critical H Value (KM-Log)	6.563
KM Standard Error of Mean (logged)	0.853		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	143.6	Mean in Log Scale	0.386
SD in Original Scale	478.2	SD in Log Scale	2.977
95% t UCL (Assumes normality)	370	95% H-Stat UCL	31182
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2895	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1247
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.			

TRICHLOROETHENE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	6
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.15	Minimum Non-Detect	0.5
Maximum Detect	420	Maximum Non-Detect	0.5
Variance Detects	28188	Percent Non-Detects	57.14%
Mean Detects	79.9	SD Detects	167.9
Median Detects	3.05	CV Detects	2.101
Skewness Detects	2.37	Kurtosis Detects	5.671
Mean of Logged Detects	1.064	SD of Logged Detects	3.418
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.578	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.397	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	34.34	KM Standard Error of Mean	31.56
KM SD	107.8	95% KM (BCA) UCL	90.54
95% KM (t) UCL	90.24	95% KM (Percentile Bootstrap) UCL	90.95
95% KM (z) UCL	86.26	95% KM Bootstrap t UCL	2372
90% KM Chebyshev UCL	129	95% KM Chebyshev UCL	171.9
97.5% KM Chebyshev UCL	231.5	99% KM Chebyshev UCL	348.4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.561	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.795	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.288	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.363	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.219	k star (bias corrected MLE)	0.22
Theta hat (MLE)	365.3	Theta star (bias corrected MLE)	362.4
nu hat (MLE)	2.625	nu star (bias corrected)	2.646
Mean (detects)	79.9		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	34.7
Maximum	420	Median	0.08
SD	111.8	CV	3.222
k hat (MLE)	0.147	k star (bias corrected MLE)	0.163
Theta hat (MLE)	236.8	Theta star (bias corrected MLE)	213.2
nu hat (MLE)	4.103	nu star (bias corrected)	4.557
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (4.56, α)	0.953	Adjusted Chi Square Value (4.56, β)	0.758
95% Gamma Approximate UCL (use when n>=50)	165.8	95% Gamma Adjusted UCL (use when n<50)	208.6

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	34.34	SD (KM)	107.8
Variance (KM)	11624	SE of Mean (KM)	31.56
k hat (KM)	0.101	k star (KM)	0.127
nu hat (KM)	2.84	nu star (KM)	3.565
theta hat (KM)	338.5	theta star (KM)	269.7
80% gamma percentile (KM)	32.11	90% gamma percentile (KM)	98.77
95% gamma percentile (KM)	194.4	99% gamma percentile (KM)	482
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.56, α)	0.558	Adjusted Chi Square Value (3.56, β)	0.427
95% Gamma Approximate KM-UCL (use when n>=50)	219.5	95% Gamma Adjusted KM-UCL (use when n<50)	286.8
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	34.67	Mean in Log Scale	-0.49
SD in Original Scale	111.8	SD in Log Scale	2.97
95% t UCL (assumes normality of ROS data)	87.57	95% Percentile Bootstrap UCL	90.84
95% BCA Bootstrap UCL	124.6	95% Bootstrap t UCL	2466
95% H-UCL (Log ROS)	12362		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.573	KM Geo Mean	0.564
KM SD (logged)	2.488	95% Critical H Value (KM-Log)	5.674
KM Standard Error of Mean (logged)	0.731	95% H-UCL (KM -Log)	625.3
KM SD (logged)	2.488	95% Critical H Value (KM-Log)	5.674
KM Standard Error of Mean (logged)	0.731		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	34.39	Mean in Log Scale	-0.336
SD in Original Scale	111.9	SD in Log Scale	2.465
95% t UCL (Assumes normality)	87.33	95% H-Stat UCL	696.8
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2372	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	286.8
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.			

VINYL CHLORIDE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.51	Minimum Non-Detect	0.5
Maximum Detect	11	Maximum Non-Detect	0.5
Variance Detects	36.06	Percent Non-Detects	78.57%
Mean Detects	4.067	SD Detects	6.005
Median Detects	0.69	CV Detects	1.477
Skewness Detects	1.73	Kurtosis Detects	N/A
Mean of Logged Detects	0.451	SD of Logged Detects	1.693

Warning: Data set has only 3 Detected Values.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.763	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.38	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	1.264	KM Standard Error of Mean	0.884
KM SD	2.701	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.83	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.718	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.916	95% KM Chebyshev UCL	5.118
97.5% KM Chebyshev UCL	6.785	99% KM Chebyshev UCL	10.06

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.643	k star (bias corrected MLE)	N/A
Theta hat (MLE)	6.327	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.857	nu star (bias corrected)	N/A
Mean (detects)	4.067		

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	0.879
Maximum	11	Median	0.01
SD	2.921	CV	3.322
k hat (MLE)	0.215	k star (bias corrected MLE)	0.216
Theta hat (MLE)	4.099	Theta star (bias corrected MLE)	4.068
nu hat (MLE)	6.007	nu star (bias corrected)	6.053
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (6.05, α)	1.667	Adjusted Chi Square Value (6.05, β)	1.381
95% Gamma Approximate UCL (use when n>=50)	3.193	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.264	SD (KM)	2.701
Variance (KM)	7.293	SE of Mean (KM)	0.884
k hat (KM)	0.219	k star (KM)	0.22
nu hat (KM)	6.136	nu star (KM)	6.155
theta hat (KM)	5.769	theta star (KM)	5.752
80% gamma percentile (KM)	1.744	90% gamma percentile (KM)	3.82
95% gamma percentile (KM)	6.351	99% gamma percentile (KM)	13.22
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.15, α)	1.719	Adjusted Chi Square Value (6.15, β)	1.428
95% Gamma Approximate KM-UCL (use when n>=50)	4.525	95% Gamma Adjusted KM-UCL (use when n<50)	5.449
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.877	Mean in Log Scale	-6.086
SD in Original Scale	2.922	SD in Log Scale	4.661
95% t UCL (assumes normality of ROS data)	2.259	95% Percentile Bootstrap UCL	2.4
95% BCA Bootstrap UCL	3.38	95% Bootstrap t UCL	18.91
95% H-UCL (Log ROS)	69888514		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.448	KM Geo Mean	0.639
KM SD (logged)	0.794	95% Critical H Value (KM-Log)	2.469
KM Standard Error of Mean (logged)	0.26	95% H-UCL (KM -Log)	1.508
KM SD (logged)	0.794	95% Critical H Value (KM-Log)	2.469
KM Standard Error of Mean (logged)	0.26		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.068	Mean in Log Scale	-0.993
SD in Original Scale	2.862	SD in Log Scale	1.026
95% t UCL (Assumes normality)	2.422	95% H-Stat UCL	1.406
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.83		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

PENTADECAFLUOROOCTANOIC ACID			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	6
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.014	Minimum Non-Detect	0.019
Maximum Detect	0.15	Maximum Non-Detect	0.02
Variance Detects	0.00217	Percent Non-Detects	42.86%
Mean Detects	0.0443	SD Detects	0.0466
Median Detects	0.023	CV Detects	1.053
Skewness Detects	2.075	Kurtosis Detects	4.413
Mean of Logged Detects	-3.478	SD of Logged Detects	0.845
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.715	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0321	KM Standard Error of Mean	0.0102
KM SD	0.0358	95% KM (BCA) UCL	0.0469
95% KM (t) UCL	0.0503	95% KM (Percentile Bootstrap) UCL	0.0494
95% KM (z) UCL	0.049	95% KM Bootstrap t UCL	0.0912
90% KM Chebyshev UCL	0.0629	95% KM Chebyshev UCL	0.0768
97.5% KM Chebyshev UCL	0.0961	99% KM Chebyshev UCL	0.134
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.62	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.532	k star (bias corrected MLE)	1.041
Theta hat (MLE)	0.0289	Theta star (bias corrected MLE)	0.0425
nu hat (MLE)	24.52	nu star (bias corrected)	16.66
Mean (detects)	0.0443		
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	0.0316
Maximum	0.15	Median	0.0177
SD	0.0377	CV	1.195
k hat (MLE)	1.443	k star (bias corrected MLE)	1.182
Theta hat (MLE)	0.0219	Theta star (bias corrected MLE)	0.0267
nu hat (MLE)	40.41	nu star (bias corrected)	33.09
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (33.09, α)	20.94	Adjusted Chi Square Value (33.09, β)	19.66
95% Gamma Approximate UCL (use when n>=50)	0.0499	95% Gamma Adjusted UCL (use when n<50)	0.0531

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0321	SD (KM)	0.0358
Variance (KM)	0.00128	SE of Mean (KM)	0.0102
k hat (KM)	0.804	k star (KM)	0.679
nu hat (KM)	22.51	nu star (KM)	19.02
theta hat (KM)	0.0399	theta star (KM)	0.0473
80% gamma percentile (KM)	0.0528	90% gamma percentile (KM)	0.0812
95% gamma percentile (KM)	0.111	99% gamma percentile (KM)	0.181
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (19.02, α)	10.13	Adjusted Chi Square Value (19.02, β)	9.284
95% Gamma Approximate KM-UCL (use when n>=50)	0.0603	95% Gamma Adjusted KM-UCL (use when n<50)	0.0658
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0325	Mean in Log Scale	-3.769
SD in Original Scale	0.0372	SD in Log Scale	0.757
95% t UCL (assumes normality of ROS data)	0.0501	95% Percentile Bootstrap UCL	0.0492
95% BCA Bootstrap UCL	0.058	95% Bootstrap t UCL	0.0894
95% H-UCL (Log ROS)	0.051		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.764	KM Geo Mean	0.0232
KM SD (logged)	0.686	95% Critical H Value (KM-Log)	2.322
KM Standard Error of Mean (logged)	0.199	95% H-UCL (KM -Log)	0.0457
KM SD (logged)	0.686	95% Critical H Value (KM-Log)	2.322
KM Standard Error of Mean (logged)	0.199		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0295	Mean in Log Scale	-3.965
SD in Original Scale	0.0385	SD in Log Scale	0.851
95% t UCL (Assumes normality)	0.0477	95% H-Stat UCL	0.0498
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0503		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

PERFLUOROOCTANE SULFONIC ACID			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	7
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.016	Minimum Non-Detect	0.039
Maximum Detect	0.14	Maximum Non-Detect	0.041
Variance Detects	0.00508	Percent Non-Detects	78.57%
Mean Detects	0.0577	SD Detects	0.0713
Median Detects	0.017	CV Detects	1.236
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-3.392	SD of Logged Detects	1.235
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0253	KM Standard Error of Mean	0.0104
KM SD	0.0318	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0438	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0425	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0566	95% KM Chebyshev UCL	0.0707
97.5% KM Chebyshev UCL	0.0904	99% KM Chebyshev UCL	0.129
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.064	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0542	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	6.382	nu star (bias corrected)	N/A
Mean (detects)	0.0577		
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	0.0299
Maximum	0.14	Median	0.0161
SD	0.0343	CV	1.147
k hat (MLE)	1.57	k star (bias corrected MLE)	1.281
Theta hat (MLE)	0.0191	Theta star (bias corrected MLE)	0.0234
nu hat (MLE)	43.96	nu star (bias corrected)	35.87
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (35.87, α)	23.17	Adjusted Chi Square Value (35.87, β)	21.82
95% Gamma Approximate UCL (use when n>=50)	0.0463	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0253	SD (KM)	0.0318
Variance (KM)	0.00101	SE of Mean (KM)	0.0104
k hat (KM)	0.634	k star (KM)	0.545
nu hat (KM)	17.74	nu star (KM)	15.27
theta hat (KM)	0.04	theta star (KM)	0.0464
80% gamma percentile (KM)	0.0417	90% gamma percentile (KM)	0.0673
95% gamma percentile (KM)	0.0943	99% gamma percentile (KM)	0.16
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.27, α)	7.452	Adjusted Chi Square Value (15.27, β)	6.739
95% Gamma Approximate KM-UCL (use when n>=50)	0.0519	95% Gamma Adjusted KM-UCL (use when n<50)	0.0574
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0282	Mean in Log Scale	-3.895
SD in Original Scale	0.0335	SD in Log Scale	0.728
95% t UCL (assumes normality of ROS data)	0.044	95% Percentile Bootstrap UCL	0.0452
95% BCA Bootstrap UCL	0.0541	95% Bootstrap t UCL	0.077
95% H-UCL (Log ROS)	0.0428		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.952	KM Geo Mean	0.0192
KM SD (logged)	0.552	95% Critical H Value (KM-Log)	2.088
KM Standard Error of Mean (logged)	0.182	95% H-UCL (KM -Log)	0.0308
KM SD (logged)	0.552	95% Critical H Value (KM-Log)	2.088
KM Standard Error of Mean (logged)	0.182		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0281	Mean in Log Scale	-3.8
SD in Original Scale	0.0322	SD in Log Scale	0.533
95% t UCL (Assumes normality)	0.0433	95% H-Stat UCL	0.0349
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0438		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Outside Landfill – Deep Groundwater

Event 3

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 3

Samples	ALUMINUM	d_ALUMINUM	ANTIMONY	d_ANTIMONY	ARSENIC	d_ARSENIC	BERYLLIUM	d_BERYLLIUM	CHROMIUM	d_CHROMIUM	COBALT	d_COBALT	CYANIDE	d_CYANIDE
LDCA-MW13D-0615	135	1	5.5	1	0.28	1	1	0	25.7	1	1	0		
LDCA-MW13I-0615	183	1	2	0	0.36	1	1	0	2	0	1	0		
LDCA-MW14D-0615	84.4	1	2	0	0.78	1	1	0	2	0	0.026	1	10	0
LDCA-MW15D-0615-AVG														
LDCA-MW16D-0615	244	1	2	0	0.69	1	1	0	2	0	1	0	11.1	1
LDCA-MW17D-0615	10.6	1	2	0	0.13	1	1	0	0.046	1	0.79	1		
LDCA-MW18D-0615	227	1	2	0	0.28	1	1	0	0.52	1	0.09	1		
LDCA-MW19-0615	24.9	1	2	0	0.39	1	0.17	1	0.4	1	0.26	1		
LDCA-MW21D-0615	20	0	2	0	1.1	1	1	0	2	0	29.9	1		
LDCA-MW21S-0615	20	0	2	0	0.28	1	1	0	2	0	40.9	1		
LDCA-MW22-0615	63.6	1	2	0	1.4	1	1	0	2	0	0.69	1		
LDCA-MW23D-0615	36800	1	2	0	5.5	1	2.5	1	27.1	1	29.9	1	10	0
LDCA-MW23I-0615	4.3	1	2	0	5	1	0.11	1	0.12	1	4.2	1		
LDCA-MW23S-0615	3.8	1	2	0	2.9	1	0.13	1	0.11	1	4.4	1		

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 3

Samples	IRON	d_IRON	LEAD	d_LEAD	MANGANESE	d_MANGANESE	VANADIUM	d_VANADIUM	DIELDRIN	d_DIELDRIN	1,4-DIOXANE	d_1,4-DIOXANE	BENZO(A)PYRENE	d_BENZO(A)PYRENE
LDCA-MW13D-0615	200	0	1.7	1	1.1	1	2.6	0	0.00096	0	8.3	1	0.077	1
LDCA-MW13I-0615	200	0	0.048	1	253	1	2.6	0	0.00095	0	13	1	0.1	0
LDCA-MW14D-0615	213	1	1	0	20	0	1.3	1	0.00224	1	0.5	0		
LDCA-MW15D-0615-AVG									0.000975	0	0.38	1		
LDCA-MW16D-0615	896	1	0.84	1	58.5	1	2.6	0	0.00098	0	0.5	0	0.1	0
LDCA-MW17D-0615	70.2	1	0.058	1	85.8	1	0.37	1	0.00095	0	0.24	1		
LDCA-MW18D-0615	2920	1	1.1	1	175	1	0.67	1	0.00095	0	0.5	0		
LDCA-MW19-0615	21600	1	0.21	1	1610	1	2.6	0	0.001	0	32	1	0.1	0
LDCA-MW21D-0615	11600	1	1	0	4070	1	0.03	1			2	0	0.1	0
LDCA-MW21S-0615	7430	1	1	0	5080	1	2.6	0			2	0	0.1	0
LDCA-MW22-0615	2450	1	1	0	225	1	2.2	1			0.33	1		
LDCA-MW23D-0615	30700	1	41.4	1	1430	1	15.4	1	0.00099	0	0.54	0	0.1	0
LDCA-MW23I-0615	42500	1	0.033	1	3590	1	2.6	0	0.00095	0	2	0	0.1	0
LDCA-MW23S-0615	42400	1	0.045	1	2790	1	2.6	0	0.00097	0	2	0	0.1	0

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 3

Samples	1,1-DICHLOROETHANE	d_1,1-DICHLOROETHANE	BENZENE	d_BENZENE	CHLOROFORM	d_CHLOROFORM	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE
LDCA-MW13D-0615	0.23	1	0.5	0	0.5	0	100	1
LDCA-MW13I-0615	0.22	1	0.23	1	0.5	0	84	1
LDCA-MW14D-0615	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW15D-0615-AVG	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW16D-0615	0.5	0	0.5	0	0.5	0	0.5	0
LDCA-MW17D-0615								
LDCA-MW18D-0615								
LDCA-MW19-0615	2.9	1	0.65	1	0.5	0	1500	1
LDCA-MW21D-0615	0.5	0	0.5	0	0.5	0	1.7	1
LDCA-MW21S-0615	0.5	0	0.5	0	0.5	0	1.8	1
LDCA-MW22-0615	0.5	0	0.5	0	1.2	1	0.5	0
LDCA-MW23D-0615								
LDCA-MW23I-0615								
LDCA-MW23S-0615								

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 3

Samples	TRICHLOROETHENE	d_TRICHLOROETHENE	VINYL CHLORIDE	d_VINYL CHLORIDE	PENTADECAFLUOROOCTANOIC ACID	d_PENTADECAFLUOROOCTANOIC ACID
LDCA-MW13D-0615	3.5	1	0.5	0	0.031	1
LDCA-MW13I-0615	59	1	0.5	0	0.049	1
LDCA-MW14D-0615	0.5	0	0.5	0		
LDCA-MW15D-0615-AVG	0.5	0	0.5	0		
LDCA-MW16D-0615	0.5	0	0.5	0		
LDCA-MW17D-0615						
LDCA-MW18D-0615						
LDCA-MW19-0615	330	1	8.5	1		
LDCA-MW21D-0615	0.5	0	0.5	0		
LDCA-MW21S-0615	0.5	0	0.5	0		
LDCA-MW22-0615	0.5	0	0.5	0		
LDCA-MW23D-0615						
LDCA-MW23I-0615						
LDCA-MW23S-0615						

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 3

Samples	PERFLUOROOCTANE SULFONIC ACID	d_PERFLUOROOCTANE SULFONIC ACID
LDCA-MW13D-0615	0.028	1
LDCA-MW13I-0615	0.024	1
LDCA-MW14D-0615		
LDCA-MW15D-0615-AVG		
LDCA-MW16D-0615		
LDCA-MW17D-0615		
LDCA-MW18D-0615		
LDCA-MW19-0615		
LDCA-MW21D-0615		
LDCA-MW21S-0615		
LDCA-MW22-0615		
LDCA-MW23D-0615		
LDCA-MW23I-0615		
LDCA-MW23S-0615		

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 7:49:34 AM
From File	ProUCL Data Outside Deep-Event 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ARSENIC

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	1
Minimum	0.13	Mean	1.468
Maximum	5.5	Median	0.69
SD	1.835	Std. Error of Mean	0.509
Coefficient of Variation	1.25	Skewness	1.619

Normal GOF Test

Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	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	2.376	95% Adjusted-CLT UCL (Chen-1995)	2.55
		95% Modified-t UCL (Johnson-1978)	2.414

Gamma GOF Test

A-D Test Statistic	0.728	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.244	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.883	k star (bias corrected MLE)	0.731
Theta hat (MLE)	1.663	Theta star (bias corrected MLE)	2.01
nu hat (MLE)	22.96	nu star (bias corrected)	19
MLE Mean (bias corrected)	1.468	MLE Sd (bias corrected)	1.718
		Approximate Chi Square Value (0.05)	10.11
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	9.203

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.758	95% Adjusted Gamma UCL (use when n<50)	3.031

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.173	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics			
Minimum of Logged Data	-2.04	Mean of logged Data	-0.279
Maximum of Logged Data	1.705	SD of logged Data	1.186
Assuming Lognormal Distribution			
95% H-UCL	4.545	90% Chebyshev (MVUE) UCL	2.932
95% Chebyshev (MVUE) UCL	3.622	97.5% Chebyshev (MVUE) UCL	4.579
99% Chebyshev (MVUE) UCL	6.46		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2.306	95% Jackknife UCL	2.376
95% Standard Bootstrap UCL	2.271	95% Bootstrap-t UCL	3.328
95% Hall's Bootstrap UCL	2.676	95% Percentile Bootstrap UCL	2.325
95% BCA Bootstrap UCL	2.499		
90% Chebyshev(Mean, Sd) UCL	2.995	95% Chebyshev(Mean, Sd) UCL	3.687
97.5% Chebyshev(Mean, Sd) UCL	4.647	99% Chebyshev(Mean, Sd) UCL	6.533
Suggested UCL to Use			
95% Adjusted Gamma UCL	3.031		
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.			

PENTADECAFLUOROOCTANOIC ACID

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.031	Mean	0.04
Maximum	0.049	Median	0.04

Warning: This data set only has 2 observations!

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

The data set for variable PENTADECAFLUOROOCTANOIC ACID was not processed!

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

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

PERFLUOROOCTANE SULFONIC ACID

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.024	Mean	0.026
Maximum	0.028	Median	0.026

Warning: This data set only has 2 observations!

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

The data set for variable PERFLUOROOCTANE SULFONIC ACID was not processed!

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

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

UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.16/21/2016 6:59:04 AM
From File	ProUCL Data Outside Deep-Event 3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ALUMINUM

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	1
Number of Detects	11	Number of Non-Detects	2
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	3.8	Minimum Non-Detect	20
Maximum Detect	36800	Maximum Non-Detect	20
Variance Detects	1.225E+8	Percent Non-Detects	15.38%
Mean Detects	3435	SD Detects	11066
Median Detects	84.4	CV Detects	3.222
Skewness Detects	3.316	Kurtosis Detects	11
Mean of Logged Detects	4.41	SD of Logged Detects	2.534

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.352	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.523	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	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	2907	KM Standard Error of Mean	2846
KM SD	9784	95% KM (BCA) UCL	8563
95% KM (t) UCL	7980	95% KM (Percentile Bootstrap) UCL	8546
95% KM (z) UCL	7589	95% KM Bootstrap t UCL	408415
90% KM Chebyshev UCL	11446	95% KM Chebyshev UCL	15313
97.5% KM Chebyshev UCL	20681	99% KM Chebyshev UCL	31226

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.911	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.863	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.442	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.282	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)	0.198	k star (bias corrected MLE)	0.204
Theta hat (MLE)	17384	Theta star (bias corrected MLE)	16812
nu hat (MLE)	4.347	nu star (bias corrected)	4.495
Mean (detects)	3435		

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	2906
Maximum	36800	Median	63.6
SD	10184	CV	3.504
k hat (MLE)	0.155	k star (bias corrected MLE)	0.17
Theta hat (MLE)	18805	Theta star (bias corrected MLE)	17079
nu hat (MLE)	4.018	nu star (bias corrected)	4.424
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (4.42, α)	0.896	Adjusted Chi Square Value (4.42, β)	0.696
95% Gamma Approximate UCL (use when n>=50)	14349	95% Gamma Adjusted UCL (use when n<50)	18460

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2907	SD (KM)	9784
Variance (KM)	95734181	SE of Mean (KM)	2846
k hat (KM)	0.0883	k star (KM)	0.119
nu hat (KM)	2.295	nu star (KM)	3.099
theta hat (KM)	32930	theta star (KM)	24391
80% gamma percentile (KM)	2530	90% gamma percentile (KM)	8221
95% gamma percentile (KM)	16603	99% gamma percentile (KM)	42231

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.10, α)	0.402	Adjusted Chi Square Value (3.10, β)	0.296
95% Gamma Approximate KM-UCL (use when n>=50)	22393	95% Gamma Adjusted KM-UCL (use when n<50)	30413

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2907	Mean in Log Scale	3.96
SD in Original Scale	10184	SD in Log Scale	2.574
95% t UCL (assumes normality of ROS data)	7941	95% Percentile Bootstrap UCL	8552
95% BCA Bootstrap UCL	11413	95% Bootstrap t UCL	408163
95% H-UCL (Log ROS)	126920		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	3.996	KM Geo Mean	54.36
KM SD (logged)	2.432	95% Critical H Value (KM-Log)	5.729
KM Standard Error of Mean (logged)	0.711	95% H-UCL (KM -Log)	58377
KM SD (logged)	2.432	95% Critical H Value (KM-Log)	5.729
KM Standard Error of Mean (logged)	0.711		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2908	Mean in Log Scale	4.086
SD in Original Scale	10184	SD in Log Scale	2.445
95% t UCL (Assumes normality)	7942	95% H-Stat UCL	68554
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	31226		
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.			

ANTIMONY

General Statistics

Total Number of Observations	13	Number of Distinct Observations	2
		Number of Missing Observations	1
Number of Detects	1	Number of Non-Detects	12
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ANTIMONY was not processed!

BERYLLIUM			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	5
		Number of Missing Observations	1
Number of Detects	4	Number of Non-Detects	9
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	1
Maximum Detect	2.5	Maximum Non-Detect	1
Variance Detects	1.397	Percent Non-Detects	69.23%
Mean Detects	0.728	SD Detects	1.182
Median Detects	0.15	CV Detects	1.625
Skewness Detects	1.997	Kurtosis Detects	3.991
Mean of Logged Detects	-1.276	SD of Logged Detects	1.472
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.649	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.431	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	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	0.318	KM Standard Error of Mean	0.202
KM SD	0.63	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.679	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.651	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.925	95% KM Chebyshev UCL	1.2
97.5% KM Chebyshev UCL	1.582	99% KM Chebyshev UCL	2.331
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.785	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.675	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.438	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.407	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)	0.639	k star (bias corrected MLE)	0.326
Theta hat (MLE)	1.138	Theta star (bias corrected MLE)	2.228
nu hat (MLE)	5.114	nu star (bias corrected)	2.612
Mean (detects)	0.728		
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	0.416
Maximum	2.5	Median	0.13
SD	0.697	CV	1.676
k hat (MLE)	0.484	k star (bias corrected MLE)	0.424
Theta hat (MLE)	0.858	Theta star (bias corrected MLE)	0.981
nu hat (MLE)	12.59	nu star (bias corrected)	11.02
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (11.02, α)	4.589	Adjusted Chi Square Value (11.02, β)	4.014
95% Gamma Approximate UCL (use when n>=50)	0.998	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.318	SD (KM)	0.63
Variance (KM)	0.397	SE of Mean (KM)	0.202
k hat (KM)	0.255	k star (KM)	0.248
nu hat (KM)	6.639	nu star (KM)	6.44
theta hat (KM)	1.247	theta star (KM)	1.286
80% gamma percentile (KM)	0.461	90% gamma percentile (KM)	0.956
95% gamma percentile (KM)	1.546	99% gamma percentile (KM)	3.116
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.44, α)	1.869	Adjusted Chi Square Value (6.44, β)	1.54
95% Gamma Approximate KM-UCL (use when n>=50)	1.097	95% Gamma Adjusted KM-UCL (use when n<50)	1.332
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.738	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.373	Mean in Log Scale	-1.708
SD in Original Scale	0.658	SD in Log Scale	1.111
95% t UCL (assumes normality of ROS data)	0.698	95% Percentile Bootstrap UCL	0.707
95% BCA Bootstrap UCL	0.911	95% Bootstrap t UCL	1.885
95% H-UCL (Log ROS)	0.891		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.782	KM Geo Mean	0.168
KM SD (logged)	0.798	95% Critical H Value (KM-Log)	2.516
KM Standard Error of Mean (logged)	0.273	95% H-UCL (KM -Log)	0.413
KM SD (logged)	0.798	95% Critical H Value (KM-Log)	2.516
KM Standard Error of Mean (logged)	0.273		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.57	Mean in Log Scale	-0.872
SD in Original Scale	0.601	SD in Log Scale	0.788
95% t UCL (Assumes normality)	0.867	95% H-Stat UCL	1.006
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.2		
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.			

CHROMIUM			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	8
		Number of Missing Observations	1
Number of Detects	7	Number of Non-Detects	6
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.046	Minimum Non-Detect	2
Maximum Detect	27.1	Maximum Non-Detect	2
Variance Detects	163.1	Percent Non-Detects	46.15%
Mean Detects	7.714	SD Detects	12.77
Median Detects	0.4	CV Detects	1.656
Skewness Detects	1.233	Kurtosis Detects	-0.814
Mean of Logged Detects	-0.347	SD of Logged Detects	2.604
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.622	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.428	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	4.264	KM Standard Error of Mean	2.83
KM SD	9.444	95% KM (BCA) UCL	8.422
95% KM (t) UCL	9.308	95% KM (Percentile Bootstrap) UCL	8.456
95% KM (z) UCL	8.919	95% KM Bootstrap t UCL	159.5
90% KM Chebyshev UCL	12.75	95% KM Chebyshev UCL	16.6
97.5% KM Chebyshev UCL	21.94	99% KM Chebyshev UCL	32.42
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.901	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.788	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.361	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.336	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)	0.29	k star (bias corrected MLE)	0.261
Theta hat (MLE)	26.59	Theta star (bias corrected MLE)	29.55
nu hat (MLE)	4.061	nu star (bias corrected)	3.654
Mean (detects)	7.714		
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	4.797
Maximum	27.1	Median	0.4
SD	9.721	CV	2.027
k hat (MLE)	0.262	k star (bias corrected MLE)	0.253
Theta hat (MLE)	18.31	Theta star (bias corrected MLE)	18.98
nu hat (MLE)	6.81	nu star (bias corrected)	6.572
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (6.57, α)	1.939	Adjusted Chi Square Value (6.57, β)	1.602
95% Gamma Approximate UCL (use when n>=50)	16.26	95% Gamma Adjusted UCL (use when n<50)	19.68

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.264	SD (KM)	9.444
Variance (KM)	89.2	SE of Mean (KM)	2.83
k hat (KM)	0.204	k star (KM)	0.208
nu hat (KM)	5.3	nu star (KM)	5.41
theta hat (KM)	20.92	theta star (KM)	20.49
80% gamma percentile (KM)	5.733	90% gamma percentile (KM)	12.9
95% gamma percentile (KM)	21.74	99% gamma percentile (KM)	45.94
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.41, α)	1.346	Adjusted Chi Square Value (5.41, β)	1.081
95% Gamma Approximate KM-UCL (use when n>=50)	17.14	95% Gamma Adjusted KM-UCL (use when n<50)	21.33
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.386	Mean in Log Scale	-0.922
SD in Original Scale	9.785	SD in Log Scale	2.227
95% t UCL (assumes normality of ROS data)	9.223	95% Percentile Bootstrap UCL	8.584
95% BCA Bootstrap UCL	10.43	95% Bootstrap t UCL	90.64
95% H-UCL (Log ROS)	143.8		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.016	KM Geo Mean	0.362
KM SD (logged)	2.005	95% Critical H Value (KM-Log)	4.817
KM Standard Error of Mean (logged)	0.659	95% H-UCL (KM -Log)	43.95
KM SD (logged)	2.005	95% Critical H Value (KM-Log)	4.817
KM Standard Error of Mean (logged)	0.659		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.615	Mean in Log Scale	-0.187
SD in Original Scale	9.68	SD in Log Scale	1.85
95% t UCL (Assumes normality)	9.4	95% H-Stat UCL	49.34
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	32.42		
Warning: Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

COBALT			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	10
		Number of Missing Observations	1
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.026	Minimum Non-Detect	1
Maximum Detect	40.9	Maximum Non-Detect	1
Variance Detects	251.5	Percent Non-Detects	23.08%
Mean Detects	11.12	SD Detects	15.86
Median Detects	2.495	CV Detects	1.427
Skewness Detects	1.143	Kurtosis Detects	-0.518
Mean of Logged Detects	0.541	SD of Logged Detects	2.567
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.364	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	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	8.636	KM Standard Error of Mean	4.079
KM SD	13.95	95% KM (BCA) UCL	15.53
95% KM (t) UCL	15.91	95% KM (Percentile Bootstrap) UCL	15.37
95% KM (z) UCL	15.35	95% KM Bootstrap t UCL	18.51
90% KM Chebyshev UCL	20.87	95% KM Chebyshev UCL	26.42
97.5% KM Chebyshev UCL	34.11	99% KM Chebyshev UCL	49.22
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.461	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.803	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.359	k star (bias corrected MLE)	0.318
Theta hat (MLE)	30.99	Theta star (bias corrected MLE)	34.98
nu hat (MLE)	7.174	nu star (bias corrected)	6.355
Mean (detects)	11.12		
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	8.67
Maximum	40.9	Median	0.79
SD	14.5	CV	1.673
k hat (MLE)	0.287	k star (bias corrected MLE)	0.272
Theta hat (MLE)	30.2	Theta star (bias corrected MLE)	31.86
nu hat (MLE)	7.465	nu star (bias corrected)	7.075
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (7.08, α)	2.212	Adjusted Chi Square Value (7.08, β)	1.845
95% Gamma Approximate UCL (use when n>=50)	27.73	95% Gamma Adjusted UCL (use when n<50)	33.24

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	8.636	SD (KM)	13.95
Variance (KM)	194.6	SE of Mean (KM)	4.079
k hat (KM)	0.383	k star (KM)	0.346
nu hat (KM)	9.963	nu star (KM)	8.998
theta hat (KM)	22.54	theta star (KM)	24.96
80% gamma percentile (KM)	13.65	90% gamma percentile (KM)	24.98
95% gamma percentile (KM)	37.7	99% gamma percentile (KM)	70.18
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.00, α)	3.325	Adjusted Chi Square Value (9.00, β)	2.852
95% Gamma Approximate KM-UCL (use when n>=50)	23.37	95% Gamma Adjusted KM-UCL (use when n<50)	27.24
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	8.633	Mean in Log Scale	0.0687
SD in Original Scale	14.52	SD in Log Scale	2.456
95% t UCL (assumes normality of ROS data)	15.81	95% Percentile Bootstrap UCL	15.67
95% BCA Bootstrap UCL	16.58	95% Bootstrap t UCL	18.67
95% H-UCL (Log ROS)	1316		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.0466	KM Geo Mean	1.048
KM SD (logged)	2.4	95% Critical H Value (KM-Log)	5.664
KM Standard Error of Mean (logged)	0.738	95% H-UCL (KM -Log)	945.3
KM SD (logged)	2.4	95% Critical H Value (KM-Log)	5.664
KM Standard Error of Mean (logged)	0.738		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.666	Mean in Log Scale	0.256
SD in Original Scale	14.5	SD in Log Scale	2.288
95% t UCL (Assumes normality)	15.83	95% H-Stat UCL	640.5
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	18.51	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	27.24
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.			

CYANIDE

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
		Number of Missing Observations	9
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CYANIDE was not processed!

IRON			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	1
Number of Detects	11	Number of Non-Detects	2
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	70.2	Minimum Non-Detect	200
Maximum Detect	42500	Maximum Non-Detect	200
Variance Detects	2.809E+8	Percent Non-Detects	15.38%
Mean Detects	14798	SD Detects	16761
Median Detects	7430	CV Detects	1.133
Skewness Detects	0.873	Kurtosis Detects	-0.888
Mean of Logged Detects	8.372	SD of Logged Detects	2.171
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	12532	KM Standard Error of Mean	4547
KM SD	15631	95% KM (BCA) UCL	20758
95% KM (t) UCL	20636	95% KM (Percentile Bootstrap) UCL	19901
95% KM (z) UCL	20011	95% KM Bootstrap t UCL	23396
90% KM Chebyshev UCL	26173	95% KM Chebyshev UCL	32352
97.5% KM Chebyshev UCL	40928	99% KM Chebyshev UCL	57774
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.27	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.78	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.136	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.269	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.514	k star (bias corrected MLE)	0.434
Theta hat (MLE)	28788	Theta star (bias corrected MLE)	34062
nu hat (MLE)	11.31	nu star (bias corrected)	9.558
Mean (detects)	14798		
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	12521
Maximum	42500	Median	2920
SD	16279	CV	1.3
k hat (MLE)	0.235	k star (bias corrected MLE)	0.232
Theta hat (MLE)	53390	Theta star (bias corrected MLE)	54044
nu hat (MLE)	6.098	nu star (bias corrected)	6.024
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (6.02, α)	1.652	Adjusted Chi Square Value (6.02, β)	1.349
95% Gamma Approximate UCL (use when n>=50)	45656	95% Gamma Adjusted UCL (use when n<50)	55933

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	12532	SD (KM)	15631
Variance (KM)	2.443E+8	SE of Mean (KM)	4547
k hat (KM)	0.643	k star (KM)	0.546
nu hat (KM)	16.71	nu star (KM)	14.19
theta hat (KM)	19497	theta star (KM)	22964
80% gamma percentile (KM)	20640	90% gamma percentile (KM)	33284
95% gamma percentile (KM)	46659	99% gamma percentile (KM)	79286
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (14.19, α)	6.701	Adjusted Chi Square Value (14.19, β)	5.982
95% Gamma Approximate KM-UCL (use when n>=50)	26537	95% Gamma Adjusted KM-UCL (use when n<50)	29726
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	12537	Mean in Log Scale	7.77
SD in Original Scale	16266	SD in Log Scale	2.477
95% t UCL (assumes normality of ROS data)	20577	95% Percentile Bootstrap UCL	19584
95% BCA Bootstrap UCL	21426	95% Bootstrap t UCL	23603
95% H-UCL (Log ROS)	3274773		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	7.738	KM Geo Mean	2294
KM SD (logged)	2.416	95% Critical H Value (KM-Log)	5.696
KM Standard Error of Mean (logged)	0.703	95% H-UCL (KM -Log)	2252573
KM SD (logged)	2.416	95% Critical H Value (KM-Log)	5.696
KM Standard Error of Mean (logged)	0.703		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	12537	Mean in Log Scale	7.792
SD in Original Scale	16266	SD in Log Scale	2.435
95% t UCL (Assumes normality)	20577	95% H-Stat UCL	2642322
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	20636		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

LEAD			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	10
		Number of Missing Observations	1
Number of Detects	9	Number of Non-Detects	4
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.033	Minimum Non-Detect	1
Maximum Detect	41.4	Maximum Non-Detect	1
Variance Detects	186.2	Percent Non-Detects	30.77%
Mean Detects	5.048	SD Detects	13.64
Median Detects	0.21	CV Detects	2.703
Skewness Detects	2.989	Kurtosis Detects	8.951
Mean of Logged Detects	-1.087	SD of Logged Detects	2.36
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.426	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.486	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	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	3.558	KM Standard Error of Mean	3.218
KM SD	10.94	95% KM (BCA) UCL	9.97
95% KM (t) UCL	9.293	95% KM (Percentile Bootstrap) UCL	9.718
95% KM (z) UCL	8.851	95% KM Bootstrap t UCL	88.67
90% KM Chebyshev UCL	13.21	95% KM Chebyshev UCL	17.58
97.5% KM Chebyshev UCL	23.65	99% KM Chebyshev UCL	35.57
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.128	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.823	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.313	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.304	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)	0.261	k star (bias corrected MLE)	0.248
Theta hat (MLE)	19.36	Theta star (bias corrected MLE)	20.37
nu hat (MLE)	4.693	nu star (bias corrected)	4.462
Mean (detects)	5.048		
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	3.522
Maximum	41.4	Median	0.058
SD	11.39	CV	3.235
k hat (MLE)	0.228	k star (bias corrected MLE)	0.227
Theta hat (MLE)	15.45	Theta star (bias corrected MLE)	15.54
nu hat (MLE)	5.926	nu star (bias corrected)	5.892
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (5.89, α)	1.585	Adjusted Chi Square Value (5.89, β)	1.29
95% Gamma Approximate UCL (use when n>=50)	13.09	95% Gamma Adjusted UCL (use when n<50)	16.09

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.558	SD (KM)	10.94
Variance (KM)	119.6	SE of Mean (KM)	3.218
k hat (KM)	0.106	k star (KM)	0.133
nu hat (KM)	2.752	nu star (KM)	3.451
theta hat (KM)	33.61	theta star (KM)	26.81
80% gamma percentile (KM)	3.47	90% gamma percentile (KM)	10.33
95% gamma percentile (KM)	20.01	99% gamma percentile (KM)	48.87
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.45, α)	0.518	Adjusted Chi Square Value (3.45, β)	0.386
95% Gamma Approximate KM-UCL (use when n>=50)	23.72	95% Gamma Adjusted KM-UCL (use when n<50)	31.79
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.549	Mean in Log Scale	-1.46
SD in Original Scale	11.38	SD in Log Scale	2.119
95% t UCL (assumes normality of ROS data)	9.176	95% Percentile Bootstrap UCL	9.802
95% BCA Bootstrap UCL	13.06	95% Bootstrap t UCL	111.6
95% H-UCL (Log ROS)	48.77		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.477	KM Geo Mean	0.228
KM SD (logged)	2.042	95% Critical H Value (KM-Log)	4.899
KM Standard Error of Mean (logged)	0.647	95% H-UCL (KM -Log)	32.95
KM SD (logged)	2.042	95% Critical H Value (KM-Log)	4.899
KM Standard Error of Mean (logged)	0.647		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.649	Mean in Log Scale	-0.966
SD in Original Scale	11.35	SD in Log Scale	1.936
95% t UCL (Assumes normality)	9.261	95% H-Stat UCL	33.32
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	35.57		
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.			

MANGANESE			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	1
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	20
Maximum Detect	5080	Maximum Non-Detect	20
Variance Detects	3325027	Percent Non-Detects	7.692%
Mean Detects	1614	SD Detects	1823
Median Detects	841.5	CV Detects	1.13
Skewness Detects	0.829	Kurtosis Detects	-0.793
Mean of Logged Detects	6.029	SD of Logged Detects	2.45
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.832	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.272	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1490	KM Standard Error of Mean	501.6
KM SD	1732	95% KM (BCA) UCL	2398
95% KM (t) UCL	2384	95% KM (Percentile Bootstrap) UCL	2340
95% KM (z) UCL	2315	95% KM Bootstrap t UCL	2664
90% KM Chebyshev UCL	2995	95% KM Chebyshev UCL	3676
97.5% KM Chebyshev UCL	4622	99% KM Chebyshev UCL	6481
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.391	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.79	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.177	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.26	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.472	k star (bias corrected MLE)	0.41
Theta hat (MLE)	3419	Theta star (bias corrected MLE)	3941
nu hat (MLE)	11.33	nu star (bias corrected)	9.83
Mean (detects)	1614		
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	1.1	Mean	1494
Maximum	5080	Median	253
SD	1799	CV	1.204
k hat (MLE)	0.449	k star (bias corrected MLE)	0.397
Theta hat (MLE)	3324	Theta star (bias corrected MLE)	3763
nu hat (MLE)	11.69	nu star (bias corrected)	10.32
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (10.32, α)	4.144	Adjusted Chi Square Value (10.32, β)	3.604
95% Gamma Approximate UCL (use when n>=50)	3721	95% Gamma Adjusted UCL (use when n<50)	4280

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1490	SD (KM)	1732
Variance (KM)	2998210	SE of Mean (KM)	501.6
k hat (KM)	0.74	k star (KM)	0.621
nu hat (KM)	19.25	nu star (KM)	16.14
theta hat (KM)	2012	theta star (KM)	2400
80% gamma percentile (KM)	2455	90% gamma percentile (KM)	3845
95% gamma percentile (KM)	5296	99% gamma percentile (KM)	8794
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (16.14, α)	8.062	Adjusted Chi Square Value (16.14, β)	7.262
95% Gamma Approximate KM-UCL (use when n>=50)	2983	95% Gamma Adjusted KM-UCL (use when n<50)	3312
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.87	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1490	Mean in Log Scale	5.695
SD in Original Scale	1802	SD in Log Scale	2.637
95% t UCL (assumes normality of ROS data)	2381	95% Percentile Bootstrap UCL	2340
95% BCA Bootstrap UCL	2348	95% Bootstrap t UCL	2646
95% H-UCL (Log ROS)	1044305		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.572	KM Geo Mean	263
KM SD (logged)	2.753	95% Critical H Value (KM-Log)	6.41
KM Standard Error of Mean (logged)	0.797	95% H-UCL (KM -Log)	1898024
KM SD (logged)	2.753	95% Critical H Value (KM-Log)	6.41
KM Standard Error of Mean (logged)	0.797		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1491	Mean in Log Scale	5.742
SD in Original Scale	1802	SD in Log Scale	2.563
95% t UCL (Assumes normality)	2381	95% H-Stat UCL	706702
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2664	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	3312
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.			

VANADIUM			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	7
		Number of Missing Observations	1
Number of Detects	6	Number of Non-Detects	7
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.03	Minimum Non-Detect	2.6
Maximum Detect	15.4	Maximum Non-Detect	2.6
Variance Detects	35.56	Percent Non-Detects	53.85%
Mean Detects	3.328	SD Detects	5.963
Median Detects	0.985	CV Detects	1.792
Skewness Detects	2.361	Kurtosis Detects	5.65
Mean of Logged Detects	-0.186	SD of Logged Detects	2.069
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.615	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.408	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	2.028	KM Standard Error of Mean	1.223
KM SD	3.93	95% KM (BCA) UCL	4.231
95% KM (t) UCL	4.208	95% KM (Percentile Bootstrap) UCL	4.199
95% KM (z) UCL	4.04	95% KM Bootstrap t UCL	10.51
90% KM Chebyshev UCL	5.697	95% KM Chebyshev UCL	7.359
97.5% KM Chebyshev UCL	9.666	99% KM Chebyshev UCL	14.2
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.329	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.239	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.35	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.463	k star (bias corrected MLE)	0.343
Theta hat (MLE)	7.189	Theta star (bias corrected MLE)	9.715
nu hat (MLE)	5.556	nu star (bias corrected)	4.111
Mean (detects)	3.328		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.278
Maximum	15.4	Median	0.67
SD	4.211	CV	1.849
k hat (MLE)	0.367	k star (bias corrected MLE)	0.334
Theta hat (MLE)	6.204	Theta star (bias corrected MLE)	6.826
nu hat (MLE)	9.545	nu star (bias corrected)	8.676
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (8.68, α)	3.132	Adjusted Chi Square Value (8.68, β)	2.676
95% Gamma Approximate UCL (use when n>=50)	6.309	95% Gamma Adjusted UCL (use when n<50)	7.383

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.028	SD (KM)	3.93
Variance (KM)	15.44	SE of Mean (KM)	1.223
k hat (KM)	0.266	k star (KM)	0.256
nu hat (KM)	6.926	nu star (KM)	6.661
theta hat (KM)	7.614	theta star (KM)	7.917
80% gamma percentile (KM)	2.971	90% gamma percentile (KM)	6.077
95% gamma percentile (KM)	9.746	99% gamma percentile (KM)	19.48
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.66, α)	1.987	Adjusted Chi Square Value (6.66, β)	1.644
95% Gamma Approximate KM-UCL (use when n>=50)	6.801	95% Gamma Adjusted KM-UCL (use when n<50)	8.217
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.038	Mean in Log Scale	-0.536
SD in Original Scale	4.127	SD in Log Scale	1.721
95% t UCL (assumes normality of ROS data)	4.077	95% Percentile Bootstrap UCL	4.149
95% BCA Bootstrap UCL	5.339	95% Bootstrap t UCL	10.45
95% H-UCL (Log ROS)	20.53		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.501	KM Geo Mean	0.606
KM SD (logged)	1.713	95% Critical H Value (KM-Log)	4.165
KM Standard Error of Mean (logged)	0.733	95% H-UCL (KM -Log)	20.61
KM SD (logged)	1.713	95% Critical H Value (KM-Log)	4.165
KM Standard Error of Mean (logged)	0.733		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.236	Mean in Log Scale	0.0554
SD in Original Scale	3.991	SD in Log Scale	1.356
95% t UCL (Assumes normality)	4.209	95% H-Stat UCL	10.43
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	10.51	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	8.217
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.			

DIELDRIN

General Statistics

Total Number of Observations	11	Number of Distinct Observations	8
		Number of Missing Observations	3
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	7

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable DIELDRIN was not processed!

1,4-DIOXANE			
General Statistics			
Total Number of Observations	14	Number of Distinct Observations	9
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.24	Minimum Non-Detect	0.5
Maximum Detect	32	Maximum Non-Detect	2
Variance Detects	154.3	Percent Non-Detects	57.14%
Mean Detects	9.042	SD Detects	12.42
Median Detects	4.34	CV Detects	1.374
Skewness Detects	1.591	Kurtosis Detects	2.432
Mean of Logged Detects	0.774	SD of Logged Detects	2.176
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.789	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	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	4.056	KM Standard Error of Mean	2.515
KM SD	8.589	95% KM (BCA) UCL	8.591
95% KM (t) UCL	8.509	95% KM (Percentile Bootstrap) UCL	8.021
95% KM (z) UCL	8.192	95% KM Bootstrap t UCL	12.36
90% KM Chebyshev UCL	11.6	95% KM Chebyshev UCL	15.02
97.5% KM Chebyshev UCL	19.76	99% KM Chebyshev UCL	29.08
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.514	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.313	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.351	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.452	k star (bias corrected MLE)	0.337
Theta hat (MLE)	20.01	Theta star (bias corrected MLE)	26.82
nu hat (MLE)	5.423	nu star (bias corrected)	4.045
Mean (detects)	9.042		
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	4.207
Maximum	32	Median	0.285
SD	8.881	CV	2.111
k hat (MLE)	0.241	k star (bias corrected MLE)	0.237
Theta hat (MLE)	17.45	Theta star (bias corrected MLE)	17.75
nu hat (MLE)	6.751	nu star (bias corrected)	6.638
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (6.64, α)	1.974	Adjusted Chi Square Value (6.64, β)	1.655
95% Gamma Approximate UCL (use when n>=50)	14.15	95% Gamma Adjusted UCL (use when n<50)	16.87

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.056	SD (KM)	8.589
Variance (KM)	73.77	SE of Mean (KM)	2.515
k hat (KM)	0.223	k star (KM)	0.223
nu hat (KM)	6.244	nu star (KM)	6.24
theta hat (KM)	18.19	theta star (KM)	18.2
80% gamma percentile (KM)	5.629	90% gamma percentile (KM)	12.25
95% gamma percentile (KM)	20.3	99% gamma percentile (KM)	42.08
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.24, α)	1.764	Adjusted Chi Square Value (6.24, β)	1.467
95% Gamma Approximate KM-UCL (use when n>=50)	14.35	95% Gamma Adjusted KM-UCL (use when n<50)	17.25
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.835	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.207	Mean in Log Scale	-0.213
SD in Original Scale	8.854	SD in Log Scale	1.784
95% t UCL (assumes normality of ROS data)	8.398	95% Percentile Bootstrap UCL	8.521
95% BCA Bootstrap UCL	10.96	95% Bootstrap t UCL	17.21
95% H-UCL (Log ROS)	32.35		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.336	KM Geo Mean	0.715
KM SD (logged)	1.623	95% Critical H Value (KM-Log)	3.928
KM Standard Error of Mean (logged)	0.482	95% H-UCL (KM -Log)	15.66
KM SD (logged)	1.623	95% Critical H Value (KM-Log)	3.928
KM Standard Error of Mean (logged)	0.482		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.234	Mean in Log Scale	-0.0589
SD in Original Scale	8.838	SD in Log Scale	1.634
95% t UCL (Assumes normality)	8.417	95% H-Stat UCL	21.43
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	8.509		
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.			

BENZO(A)PYRENE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	2
		Number of Missing Observations	5
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZO(A)PYRENE was not processed!

1,1-DICHLOROETHANE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	4
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.22	Minimum Non-Detect	0.5
Maximum Detect	2.9	Maximum Non-Detect	0.5
Variance Detects	2.385	Percent Non-Detects	66.67%
Mean Detects	1.117	SD Detects	1.544
Median Detects	0.23	CV Detects	1.383
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-0.64	SD of Logged Detects	1.476

Warning: Data set has only 3 Detected Values.

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.384	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.522	KM Standard Error of Mean	0.343
KM SD	0.841	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.16	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.087	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.552	95% KM Chebyshev UCL	2.018
97.5% KM Chebyshev UCL	2.666	99% KM Chebyshev UCL	3.937

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.792	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.409	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.754	nu star (bias corrected)	N/A
Mean (detects)	1.117		

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	0.622
Maximum	2.9	Median	0.23
SD	0.927	CV	1.49
k hat (MLE)	0.536	k star (bias corrected MLE)	0.431
Theta hat (MLE)	1.161	Theta star (bias corrected MLE)	1.442
nu hat (MLE)	9.644	nu star (bias corrected)	7.763
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (7.76, α)	2.598	Adjusted Chi Square Value (7.76, β)	2.013
95% Gamma Approximate UCL (use when n>=50)	1.858	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.522	SD (KM)	0.841
Variance (KM)	0.707	SE of Mean (KM)	0.343
k hat (KM)	0.386	k star (KM)	0.331
nu hat (KM)	6.946	nu star (KM)	5.964
theta hat (KM)	1.353	theta star (KM)	1.576
80% gamma percentile (KM)	0.819	90% gamma percentile (KM)	1.52
95% gamma percentile (KM)	2.313	99% gamma percentile (KM)	4.348

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.96, α)	1.621	Adjusted Chi Square Value (5.96, β)	1.192
95% Gamma Approximate KM-UCL (use when n>=50)	1.921	95% Gamma Adjusted KM-UCL (use when n<50)	2.613

Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.763	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.38	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.588	Mean in Log Scale	-1.156
SD in Original Scale	0.891	SD in Log Scale	1.08
95% t UCL (assumes normality of ROS data)	1.141	95% Percentile Bootstrap UCL	1.156
95% BCA Bootstrap UCL	1.424	95% Bootstrap t UCL	3.099
95% H-UCL (Log ROS)	2.083		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.208	KM Geo Mean	0.299
KM SD (logged)	0.804	95% Critical H Value (KM-Log)	2.821
KM Standard Error of Mean (logged)	0.328	95% H-UCL (KM -Log)	0.92
KM SD (logged)	0.804	95% Critical H Value (KM-Log)	2.821
KM Standard Error of Mean (logged)	0.328		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.539	Mean in Log Scale	-1.137
SD in Original Scale	0.885	SD in Log Scale	0.827
95% t UCL (Assumes normality)	1.088	95% H-Stat UCL	1.044
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.16		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BENZENE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	2
Number of Detects	2	Number of Non-Detects	7
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	0.5
Maximum Detect	0.65	Maximum Non-Detect	0.5
Variance Detects	0.0882	Percent Non-Detects	77.78%
Mean Detects	0.44	SD Detects	0.297
Median Detects	0.44	CV Detects	0.675
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.95	SD of Logged Detects	0.735

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.277	KM Standard Error of Mean	0.0622
KM SD	0.132	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.392	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.379	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.463	95% KM Chebyshev UCL	0.548
97.5% KM Chebyshev UCL	0.665	99% KM Chebyshev UCL	0.896

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	4.028	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.109	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	16.11	nu star (bias corrected)	N/A
Mean (detects)	0.44		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.277	SD (KM)	0.132
Variance (KM)	0.0174	SE of Mean (KM)	0.0622
k hat (KM)	4.393	k star (KM)	3.003
nu hat (KM)	79.08	nu star (KM)	54.06
theta hat (KM)	0.063	theta star (KM)	0.0921
80% gamma percentile (KM)	0.395	90% gamma percentile (KM)	0.491
95% gamma percentile (KM)	0.58	99% gamma percentile (KM)	0.775

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0231
Approximate Chi Square Value (54.06, α)	38.16	Adjusted Chi Square Value (54.06, β)	35.37
95% Gamma Approximate KM-UCL (use when n>=50)	0.392	95% Gamma Adjusted KM-UCL (use when n<50)	0.423

Lognormal GOF Test on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.286	Mean in Log Scale	-1.37
SD in Original Scale	0.16	SD in Log Scale	0.503
95% t UCL (assumes normality of ROS data)	0.385	95% Percentile Bootstrap UCL	0.372
95% BCA Bootstrap UCL	0.399	95% Bootstrap t UCL	0.447
95% H-UCL (Log ROS)	0.428		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.354	KM Geo Mean	0.258
KM SD (logged)	0.326	95% Critical H Value (KM-Log)	2.042
KM Standard Error of Mean (logged)	0.154	95% H-UCL (KM -Log)	0.345
KM SD (logged)	0.326	95% Critical H Value (KM-Log)	2.042
KM Standard Error of Mean (logged)	0.154		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.292	Mean in Log Scale	-1.289
SD in Original Scale	0.134	SD in Log Scale	0.323
95% t UCL (Assumes normality)	0.375	95% H-Stat UCL	0.366
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.548		
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.			

CHLOROFORM

General Statistics

Total Number of Observations	9	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CHLOROFORM was not processed!

CIS-1,2-DICHLOROETHENE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	5	Number of Non-Detects	4
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	1.7	Minimum Non-Detect	0.5
Maximum Detect	1500	Maximum Non-Detect	0.5
Variance Detects	424383	Percent Non-Detects	44.44%
Mean Detects	337.5	SD Detects	651.4
Median Detects	84	CV Detects	1.93
Skewness Detects	2.209	Kurtosis Detects	4.903
Mean of Logged Detects	3.494	SD of Logged Detects	2.912

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.612	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.442	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	187.7	KM Standard Error of Mean	173.5
KM SD	465.5	95% KM (BCA) UCL	520.7
95% KM (t) UCL	510.3	95% KM (Percentile Bootstrap) UCL	509.9
95% KM (z) UCL	473.1	95% KM Bootstrap t UCL	2732
90% KM Chebyshev UCL	708.1	95% KM Chebyshev UCL	943.9
97.5% KM Chebyshev UCL	1271	99% KM Chebyshev UCL	1914

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.429	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.269	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.38	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.297	k star (bias corrected MLE)	0.252
Theta hat (MLE)	1137	Theta star (bias corrected MLE)	1339
nu hat (MLE)	2.967	nu star (bias corrected)	2.52
Mean (detects)	337.5		

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	187.5
Maximum	1500	Median	1.7
SD	493.8	CV	2.633
k hat (MLE)	0.145	k star (bias corrected MLE)	0.171
Theta hat (MLE)	1296	Theta star (bias corrected MLE)	1100
nu hat (MLE)	2.604	nu star (bias corrected)	3.07
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (3.07, α)	0.393	Adjusted Chi Square Value (3.07, β)	0.249
95% Gamma Approximate UCL (use when n>=50)	1463	95% Gamma Adjusted UCL (use when n<50)	2313

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	187.7	SD (KM)	465.5
Variance (KM)	216656	SE of Mean (KM)	173.5
k hat (KM)	0.163	k star (KM)	0.183
nu hat (KM)	2.928	nu star (KM)	3.285
theta hat (KM)	1154	theta star (KM)	1029
80% gamma percentile (KM)	234.9	90% gamma percentile (KM)	566.5
95% gamma percentile (KM)	989.8	99% gamma percentile (KM)	2173

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.29, α)	0.462	Adjusted Chi Square Value (3.29, β)	0.295
95% Gamma Approximate KM-UCL (use when n>=50)	1336	95% Gamma Adjusted KM-UCL (use when n<50)	2091

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.241	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	187.5	Mean in Log Scale	-0.256
SD in Original Scale	493.8	SD in Log Scale	5.12
95% t UCL (assumes normality of ROS data)	493.6	95% Percentile Bootstrap UCL	509.9
95% BCA Bootstrap UCL	685.5	95% Bootstrap t UCL	3343
95% H-UCL (Log ROS)	4.250E+16		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.633	KM Geo Mean	5.118
KM SD (logged)	2.846	95% Critical H Value (KM-Log)	7.938
KM Standard Error of Mean (logged)	1.061	95% H-UCL (KM -Log)	862466
KM SD (logged)	2.846	95% Critical H Value (KM-Log)	7.938
KM Standard Error of Mean (logged)	1.061		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	187.6	Mean in Log Scale	1.325
SD in Original Scale	493.7	SD in Log Scale	3.295
95% t UCL (Assumes normality)	493.7	95% H-Stat UCL	35914746
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Bootstrap t UCL	2732	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2091
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.			

TRICHLOROETHENE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	4
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	3.5	Minimum Non-Detect	0.5
Maximum Detect	330	Maximum Non-Detect	0.5
Variance Detects	30521	Percent Non-Detects	66.67%
Mean Detects	130.8	SD Detects	174.7
Median Detects	59	CV Detects	1.335
Skewness Detects	1.537	Kurtosis Detects	N/A
Mean of Logged Detects	3.71	SD of Logged Detects	2.295

Warning: Data set has only 3 Detected Values.

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.326	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	43.94	KM Standard Error of Mean	41.95
KM SD	102.7	95% KM (BCA) UCL	N/A
95% KM (t) UCL	121.9	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	112.9	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	169.8	95% KM Chebyshev UCL	226.8
97.5% KM Chebyshev UCL	305.9	99% KM Chebyshev UCL	461.3

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.539	k star (bias corrected MLE)	N/A
Theta hat (MLE)	242.6	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.236	nu star (bias corrected)	N/A
Mean (detects)	130.8		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	43.62
Maximum	330	Median	0.01
SD	109.1	CV	2.502
k hat (MLE)	0.139	k star (bias corrected MLE)	0.166
Theta hat (MLE)	314.7	Theta star (bias corrected MLE)	262
nu hat (MLE)	2.495	nu star (bias corrected)	2.996
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (3.00, α)	0.371	Adjusted Chi Square Value (3.00, β)	0.234
95% Gamma Approximate UCL (use when n>=50)	351.9	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	43.94	SD (KM)	102.7
Variance (KM)	10557	SE of Mean (KM)	41.95
k hat (KM)	0.183	k star (KM)	0.196
nu hat (KM)	3.293	nu star (KM)	3.528
theta hat (KM)	240.2	theta star (KM)	224.2
80% gamma percentile (KM)	57.29	90% gamma percentile (KM)	132.9
95% gamma percentile (KM)	227.6	99% gamma percentile (KM)	489.3

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.53, α)	0.545	Adjusted Chi Square Value (3.53, β)	0.353
95% Gamma Approximate KM-UCL (use when n>=50)	284.6	95% Gamma Adjusted KM-UCL (use when n<50)	439.4

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.981	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	43.64	Mean in Log Scale	-2.543
SD in Original Scale	109.1	SD in Log Scale	5.536
95% t UCL (assumes normality of ROS data)	111.3	95% Percentile Bootstrap UCL	110.8
95% BCA Bootstrap UCL	146.7	95% Bootstrap t UCL	4138
95% H-UCL (Log ROS)	2.838E+18		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.775	KM Geo Mean	2.17
KM SD (logged)	2.341	95% Critical H Value (KM-Log)	6.6
KM Standard Error of Mean (logged)	0.956	95% H-UCL (KM -Log)	7911
KM SD (logged)	2.341	95% Critical H Value (KM-Log)	6.6
KM Standard Error of Mean (logged)	0.956		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	43.78	Mean in Log Scale	0.312
SD in Original Scale	109.1	SD in Log Scale	2.795
95% t UCL (Assumes normality)	111.4	95% H-Stat UCL	151108
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	121.9		
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.			

VINYL CHLORIDE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable VINYL CHLORIDE was not processed!

Outside Landfill – Deep Groundwater

Event 4

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 4

Samples	1,1-DICHLOROETHANE	d_1,1-DICHLOROETHANE	BENZENE	d_BENZENE	CIS-1,2-DICHLOROETHENE	d_CIS-1,2-DICHLOROETHENE	TRICHLOROETHENE	d_TRICHLOROETHENE
LDCA-MW13D-0416	0.37	1	0.5	0	120	1	3.7	1
LDCA-MW13I-0416	0.28	1	0.5	0	74	1	44	1
LDCA-MW14D-0416								
LDCA-MW15D-0416								
LDCA-MW19-0416-AVG	3.6	1	0.745	1	1750	1	295	1
LDCA-MW21D-0416	0.5	0	0.5	0	2.4	1	0.15	1
LDCA-MW21S-0416	0.5	0	0.5	0	2.4	1	0.13	1

PROUCL DATA - OUTSIDE LANDFILL DEEP WELLS - EVENT 4

Samples	VINYL CHLORIDE	d_VINYL CHLORIDE
LDCA-MW13D-0416	0.92	1
LDCA-MW13I-0416	0.38	1
LDCA-MW14D-0416		
LDCA-MW15D-0416		
LDCA-MW19-0416-AVG	9.7	1
LDCA-MW21D-0416	0.5	0
LDCA-MW21S-0416	0.5	0

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.17/14/2016 2:14:13 PM
From File	ProUCL Data - Outside Deep-Event 4.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

CIS-1,2-DICHLOROETHENE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	2
Minimum	2.4	Mean	389.8
Maximum	1750	Median	74
SD	762	Std. Error of Mean	340.8
Coefficient of Variation	1.955	Skewness	2.212

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	0.609	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.438	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	1116	95% Adjusted-CLT UCL (Chen-1995)	1311
		95% Modified-t UCL (Johnson-1978)	1172

Gamma GOF Test

A-D Test Statistic	0.429	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.266	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.38	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.299	k star (bias corrected MLE)	0.253
Theta hat (MLE)	1302	Theta star (bias corrected MLE)	1540
nu hat (MLE)	2.994	nu star (bias corrected)	2.531
MLE Mean (bias corrected)	389.8	MLE Sd (bias corrected)	774.7
		Approximate Chi Square Value (0.05)	0.248
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	0.0963

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3974	95% Adjusted Gamma UCL (use when n<50)	10249

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.875	Mean of logged Data	3.662
Maximum of Logged Data	7.467	SD of logged Data	2.815
Assuming Lognormal Distribution			
95% H-UCL	2.122E+11	90% Chebyshev (MVUE) UCL	1410
95% Chebyshev (MVUE) UCL	1873	97.5% Chebyshev (MVUE) UCL	2515
99% Chebyshev (MVUE) UCL	3776		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	950.3	95% Jackknife UCL	1116
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1412	95% Chebyshev(Mean, Sd) UCL	1875
97.5% Chebyshev(Mean, Sd) UCL	2518	99% Chebyshev(Mean, Sd) UCL	3781
Suggested UCL to Use			
95% Adjusted Gamma UCL	10249		
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

TRICHLOROETHENE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	2
Minimum	0.13	Mean	68.6
Maximum	295	Median	3.7
SD	127.9	Std. Error of Mean	57.2
Coefficient of Variation	1.865	Skewness	2.125

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	0.652	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	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	190.5	95% Adjusted-CLT UCL (Chen-1995)	220.8
		95% Modified-t UCL (Johnson-1978)	199.6

Gamma GOF Test

A-D Test Statistic	0.354	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.23	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.384	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.249	k star (bias corrected MLE)	0.233
Theta hat (MLE)	275.9	Theta star (bias corrected MLE)	294.7
nu hat (MLE)	2.486	nu star (bias corrected)	2.328
MLE Mean (bias corrected)	68.6	MLE Sd (bias corrected)	142.2
		Approximate Chi Square Value (0.05)	0.205
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	0.0838

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	779.9	95% Adjusted Gamma UCL (use when n<50)	1906

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.23	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.04	Mean of logged Data	1.368
Maximum of Logged Data	5.687	SD of logged Data	3.42

Assuming Lognormal Distribution			
95% H-UCL	8.700E+14	90% Chebyshev (MVUE) UCL	333.4
95% Chebyshev (MVUE) UCL	444.6	97.5% Chebyshev (MVUE) UCL	599
99% Chebyshev (MVUE) UCL	902.2		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	162.7	95% Jackknife UCL	190.5
95% Standard Bootstrap UCL	151.8	95% Bootstrap-t UCL	4462
95% Hall's Bootstrap UCL	1889	95% Percentile Bootstrap UCL	144.4
95% BCA Bootstrap UCL	186.5		
90% Chebyshev(Mean, Sd) UCL	240.2	95% Chebyshev(Mean, Sd) UCL	317.9
97.5% Chebyshev(Mean, Sd) UCL	425.8	99% Chebyshev(Mean, Sd) UCL	637.8
Suggested UCL to Use			
95% Adjusted Gamma UCL	1906		
Recommended UCL exceeds the maximum observation			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/14/2016 2:13:16 PM
From File	ProUCL Data - Outside Deep-Event 4.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1-DICHLOROETHANE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	2
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.28	Minimum Non-Detect	0.5
Maximum Detect	3.6	Maximum Non-Detect	0.5
Variance Detects	3.577	Percent Non-Detects	40%
Mean Detects	1.417	SD Detects	1.891
Median Detects	0.37	CV Detects	1.335
Skewness Detects	1.728	Kurtosis Detects	N/A
Mean of Logged Detects	-0.329	SD of Logged Detects	1.401

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

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

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.98	KM Standard Error of Mean	0.718
KM SD	1.311	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.511	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.161	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.135	95% KM Chebyshev UCL	4.111
97.5% KM Chebyshev UCL	5.465	99% KM Chebyshev UCL	8.126

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.867	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.633	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.205	nu star (bias corrected)	N/A
Mean (detects)	1.417		

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	1.001
Maximum	3.6	Median	0.37
SD	1.476	CV	1.475
k hat (MLE)	0.534	k star (bias corrected MLE)	0.347
Theta hat (MLE)	1.876	Theta star (bias corrected MLE)	2.887
nu hat (MLE)	5.338	nu star (bias corrected)	3.468
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (3.47, α)	0.524	Adjusted Chi Square Value (3.47, β)	0.202
95% Gamma Approximate UCL (use when n>=50)	6.63	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.98	SD (KM)	1.311
Variance (KM)	1.718	SE of Mean (KM)	0.718
k hat (KM)	0.559	k star (KM)	0.357
nu hat (KM)	5.591	nu star (KM)	3.57
theta hat (KM)	1.753	theta star (KM)	2.745
80% gamma percentile (KM)	1.557	90% gamma percentile (KM)	2.821
95% gamma percentile (KM)	4.233	99% gamma percentile (KM)	7.828

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.57, α)	0.56	Adjusted Chi Square Value (3.57, β)	0.219
95% Gamma Approximate KM-UCL (use when n>=50)	6.253	95% Gamma Adjusted KM-UCL (use when n<50)	16.01

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.007	Mean in Log Scale	-0.618
SD in Original Scale	1.456	SD in Log Scale	1.123
95% t UCL (assumes normality of ROS data)	2.395	95% Percentile Bootstrap UCL	2.277
95% BCA Bootstrap UCL	2.348	95% Bootstrap t UCL	16.22
95% H-UCL (Log ROS)	21.45		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.651	KM Geo Mean	0.522
KM SD (logged)	0.974	95% Critical H Value (KM-Log)	4.792
KM Standard Error of Mean (logged)	0.538	95% H-UCL (KM -Log)	8.644
KM SD (logged)	0.974	95% Critical H Value (KM-Log)	4.792
KM Standard Error of Mean (logged)	0.538		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.95	Mean in Log Scale	-0.752
SD in Original Scale	1.482	SD in Log Scale	1.148
95% t UCL (Assumes normality)	2.363	95% H-Stat UCL	21.96
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.511		
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.			

BENZENE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	4
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BENZENE was not processed!

VINYL CHLORIDE

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	2
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.38	Minimum Non-Detect	0.5
Maximum Detect	9.7	Maximum Non-Detect	0.5
Variance Detects	27.37	Percent Non-Detects	40%
Mean Detects	3.667	SD Detects	5.232
Median Detects	0.92	CV Detects	1.427
Skewness Detects	1.711	Kurtosis Detects	N/A
Mean of Logged Detects	0.407	SD of Logged Detects	1.675

Warning: Data set has only 3 Detected Values.

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.367	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	2.352	KM Standard Error of Mean	2.016
KM SD	3.68	95% KM (BCA) UCL	N/A
95% KM (t) UCL	6.649	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	5.667	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	8.399	95% KM Chebyshev UCL	11.14
97.5% KM Chebyshev UCL	14.94	99% KM Chebyshev UCL	22.41

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.68	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.391	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.081	nu star (bias corrected)	N/A
Mean (detects)	3.667		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2.204
Maximum	9.7	Median	0.38
SD	4.207	CV	1.909
k hat (MLE)	0.29	k star (bias corrected MLE)	0.249
Theta hat (MLE)	7.592	Theta star (bias corrected MLE)	8.835
nu hat (MLE)	2.903	nu star (bias corrected)	2.495
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (2.49, α)	0.24	Adjusted Chi Square Value (2.49, β)	0.0938
95% Gamma Approximate UCL (use when n>=50)	22.92	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2.352	SD (KM)	3.68
Variance (KM)	13.54	SE of Mean (KM)	2.016
k hat (KM)	0.408	k star (KM)	0.297
nu hat (KM)	4.085	nu star (KM)	2.967
theta hat (KM)	5.758	theta star (KM)	7.926
80% gamma percentile (KM)	3.597	90% gamma percentile (KM)	6.946
95% gamma percentile (KM)	10.8	99% gamma percentile (KM)	20.82

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (2.97, α)	0.363	Adjusted Chi Square Value (2.97, β)	0.135
95% Gamma Approximate KM-UCL (use when n>=50)	19.24	95% Gamma Adjusted KM-UCL (use when n<50)	51.52

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.282	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2.328	Mean in Log Scale	-0.264
SD in Original Scale	4.13	SD in Log Scale	1.543
95% t UCL (assumes normality of ROS data)	6.266	95% Percentile Bootstrap UCL	5.929
95% BCA Bootstrap UCL	6.08	95% Bootstrap t UCL	62.39
95% H-UCL (Log ROS)	712.9		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.143	KM Geo Mean	0.867
KM SD (logged)	1.255	95% Critical H Value (KM-Log)	6.024
KM Standard Error of Mean (logged)	0.687	95% H-UCL (KM -Log)	83.5
KM SD (logged)	1.255	95% Critical H Value (KM-Log)	6.024
KM Standard Error of Mean (logged)	0.687		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.3	Mean in Log Scale	-0.31
SD in Original Scale	4.146	SD in Log Scale	1.539
95% t UCL (Assumes normality)	6.253	95% H-Stat UCL	654.3
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	6.649		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

APPENDIX G-5

PART 5 - ESTIMATION OF AIR CONCENTRATIONS FROM IRRIGATION

Calculation of Air Concentrations

EXPOSURE POINT CONCENTRATIONS (INHALATION) FOR WORKERS EXPOSED VIA IRRIGATION (PAGE 1 OF 2)

Scenario Timeframe: Current/Future
Exposure Medium: Groundwater
Exposure Point: Inside Landfill
Receptor Population:Industrial Workers
Receptor Age: Adult

Relevant Equations

$$C_{air} = C_{gw} \times SE \times \frac{V_{water}}{V_{air}} \times \frac{1\,mg}{1000\,ug} \qquad SE = \frac{[7.95 \times \ln(H) + 68.17]}{100}$$

C_{air} = Air concentration from irrigation (mg/m^3)
SE = Stripping efficiency (%)
V_{water} = Volume water (L)
V_{air} = Volume air (m^3)
H = dimensionless Henry's Law Constant

V_{water} = 1,450 L
V_{air} = 31,320 m3

Chemical	Concentration of Contaminant in Groundwater Cgw (ug/L)	Is Chemical a VOC ?	Dimensionless Henry's Law Constant (H)	Stripping Effciency (%)	Concentration of Contaminant Air Cair (mg/m^3)
1,3-Dichlorobenzene	0.77	Yes	1.08E-01	5.05E-01	1.80E-05
1,4-Dichlorobenzene	1.89	Yes	9.85E-02	4.97E-01	4.35E-05
Benzene	1.6	Yes	2.27E-01	5.64E-01	4.18E-05
Chlorobenzene	30.3	Yes	1.27E-01	5.18E-01	7.27E-04
Trichloroethene	2.3	Yes	4.03E-01	6.09E-01	6.48E-05
1,4-Dioxane	91.9	Yes	1.96E-04	2.98E-03	1.27E-05
Benzo(a)anthracene	0.274	Yes	4.91E-04	7.60E-02	9.64E-07
Benzo(a)pyrene	0.83	No	NA	NA	0.00E+00
Benzo(b)fluoranthene	0.52	No	NA	NA	0.00E+00
Benzo(k)fluoranthene	0.53	No	NA	NA	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	No	NA	NA	0.00E+00
Dibenzo(a,h)anthracene	0.061	No	NA	NA	0.00E+00
Dibenzofuran	7.4	Yes	8.71E-03	3.05E-01	1.04E-04
Indeno(1,2,3-cd)pyrene	0.48	No	NA	NA	0.00E+00
Naphthalene	0.194	Yes	1.80E-02	3.62E-01	3.25E-06
Pentachlorophenol	0.191	No	NA	NA	0.00E+00
Phenanthrene	1.89	Yes	1.73E-03	1.76E-01	1.54E-05
2,3,7,8-TCDD Equivalents	0.0025	Yes	2.04E-03	1.89E-01	2.19E-08
Pentadecafluorooctanoic Acid	0.29	No	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	No	NA	NA	0.00E+00
4,4'-DDD	0.01	No	NA	NA	0.00E+00
4,4'-DDE	0.055	Yes	1.70E-03	1.75E-01	4.46E-07
Aldrin	0.047	Yes	1.80E-03	1.79E-01	3.89E-07
beta-BHC	0.042	No	NA	NA	0.00E+00
delta-BHC	0.034	No	NA	NA	0.00E+00
Dieldrin	0.022	No	NA	NA	0.00E+00
Heptachlor	0.0049	Yes	1.20E-02	3.30E-01	7.49E-08
Heptachlor Epoxide	0.0009	Yes	8.59E-04	1.20E-01	5.00E-09
gamma-BHC (Lindane)	0.044	No	NA	NA	0.00E+00
Dioxin-Like PCBs	0.00025	Yes	1.70E-02	3.58E-01	4.14E-09
Nondioxin-Like PCBs	132	Yes	1.70E-02	3.58E-01	2.19E-03
Aluminum	11530	No	NA	NA	0.00E+00
Antimony	27.8	No	NA	NA	0.00E+00

EXPOSURE POINT CONCENTRATIONS (INHALATION) FOR WORKERS EXPOSED VIA IRRIGATION (PAGE 2 OF 2)

Scenario Timeframe: Current/Future
Exposure Medium: Groundwater
Exposure Point: Inside Landfill
Receptor Population:Industrial Workers
Receptor Age: Adult

Chemical	Concentration of Contaminant in Groundwater Cgw (ug/L)	Is Chemical a VOC ?	Dimensionless Henry's Law Constant (H)	Stripping Effciency (%)	Concentration of Contaminant in Trench Ctrench (mg/m^3)
Arsenic	25.2	No	NA	NA	0.00E+00
Barium	1222	No	NA	NA	0.00E+00
Beryllium	6.75	No	NA	NA	0.00E+00
Boron	2351	No	NA	NA	0.00E+00
Cadmium	21.9	No	NA	NA	0.00E+00
Chromium	151	No	NA	NA	0.00E+00
Cobalt	12.6	No	NA	NA	0.00E+00
Copper	280	No	NA	NA	0.00E+00
Cyanide	108	Yes	9.89E-01	6.81E-01	3.41E-03
Iron	52850	No	NA	NA	0.00E+00
Lead	226	No	NA	NA	0.00E+00
Manganese	4642	No	NA	NA	0.00E+00
Mercury	8.2	No	NA	NA	0.00E+00
Nickel	132	No	NA	NA	0.00E+00
Silver	26.3	No	NA	NA	0.00E+00
Thallium	2.9	No	NA	NA	0.00E+00
Vanadium	90.7	No	NA	NA	0.00E+00
Zinc	1626	No	NA	NA	0.00E+00

Air concentrations were only calculated for chemicals identified as volatile in the USEPA RSL Table.

EXPOSURE POINT CONCENTRATIONS (INHALATION) FOR WORKERS EXPOSED VIA IRRIGATION (PAGE 1 OF 2)

Scenario Timeframe: Current/Future
Exposure Medium: Groundwater
Exposure Point: Shallow Groundwater Outside Landfill
Receptor Population:Industrial Workers
Receptor Age: Adult

Relevant Equations

$$C_{air} = C_{gw} \times SE \times \frac{V_{water}}{V_{air}} \times \frac{1\,mg}{1000\,ug} \qquad SE = \frac{[7.95 \times \ln(H) + 68.17]}{100}$$

C_{air} = Air concentration from irrigation (mg/m^3)
SE = Stripping efficiency (%)
V_{water} = Volume water (L)
V_{air} = Volume air (m^3)
H = dimensionless Henry's Law Constant

V_{water} = 1,450 L
V_{air} = 31,320 m3

Chemical	Concentration of Contaminant in Groundwater Cgw (ug/L)	Is Chemical a VOC ?	Dimensionless Henry's Law Constant (H)	Stripping Effciency (%)	Concentration of Contaminant Air Cair (mg/m^3)
1,1,2-Trichloroethane	0.12	Yes	3.37E-02	4.12E-01	2.29E-06
1,2-Dibromo-3-Chloropropane	0.23	Yes	6.01E-03	2.75E-01	2.93E-06
1,2-Dichloroethane	1.1	Yes	4.82E-02	4.41E-01	2.25E-05
1,4-Dichlorobenzene	0.92	Yes	9.85E-02	4.97E-01	2.12E-05
Benzene	5.8	Yes	2.27E-01	5.64E-01	1.51E-04
cis-1,2-Dichloroethene	54	Yes	1.67E-01	5.39E-01	1.35E-03
Ethylbenzene	4.4	Yes	3.22E-01	5.92E-01	1.21E-04
m+p-Xylenes	26	Yes	2.71E-01	5.78E-01	6.96E-04
Trichloroethene (Mutagenic)	6.2	Yes	4.03E-01	6.09E-01	1.75E-04
Trichloroethene (Nonmutagenic)	6.2	Yes	4.03E-01	6.09E-01	1.75E-04
Vinyl Chloride	4.2	Yes	1.14E+00	6.92E-01	1.35E-04
1,4-Dioxane	56.6	Yes	1.96E-04	2.98E-03	7.81E-06
2,6-Dinitrotoluene	8.6	No	NA	NA	0.00E+00
2-Methylnaphthalene	9.3	Yes	2.12E-02	3.75E-01	1.61E-04
Benzo(a)anthracene	0.26	Yes	4.91E-04	7.60E-02	9.15E-07
Benzo(a)pyrene	0.12	No	NA	NA	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	Yes	6.95E-04	1.04E-01	5.78E-06
Naphthalene	8	Yes	1.80E-02	3.62E-01	1.34E-04
Pentadecafluorooctanoic Acid	1.85	No	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	No	NA	NA	0.00E+00
Pentachlorophenol	0.49	No	NA	NA	0.00E+00
2,3,7,8-TCDD Equivalents	0.0000032	Yes	2.04E-03	1.89E-01	2.80E-11
Aldrin	0.0011	Yes	1.80E-03	1.79E-01	9.12E-09
beta-BHC	0.036	No	NA	NA	0.00E+00
Dieldrin	0.017	No	NA	NA	0.00E+00
Heptachlor	0.0011	Yes	1.20E-02	3.30E-01	1.68E-08
Heptachlor Epoxide	0.00095	Yes	8.59E-04	1.20E-01	5.28E-09
Dioxin-Like PCBs	0.0000014	Yes	1.70E-02	3.58E-01	2.32E-11
Nondioxin-Like PCBs	0.213	Yes	1.70E-02	3.58E-01	3.53E-06
Aluminum	7920	No	NA	NA	0.00E+00
Antimony	5.3	No	NA	NA	0.00E+00
Arsenic	18.7	No	NA	NA	0.00E+00
Barium	515	No	NA	NA	0.00E+00

EXPOSURE POINT CONCENTRATIONS (INHALATION) FOR WORKERS EXPOSED VIA IRRIGATION (PAGE 2 OF 2)

Scenario Timeframe: Current/Future
Exposure Medium: Groundwater
Exposure Point: Shallow Groundwater Outside Landfill
Receptor Population:Industrial Workers
Receptor Age: Adult

Chemical	Concentration of Contaminant in Groundwater Cgw (ug/L)	Is Chemical a VOC ?	Dimensionless Henry's Law Constant (H)	Stripping Effciency (%)	Concentration of Contaminant in Trench Ctrench (mg/m^3)
Boron	738	No	NA	NA	0.00E+00
Cadmium	1.84	No	NA	NA	0.00E+00
Chromium	8.03	No	NA	NA	0.00E+00
Cobalt	13	No	NA	NA	0.00E+00
Copper	22.4	No	NA	NA	0.00E+00
Cyanide	16.8	Yes	9.89E-01	6.81E-01	5.30E-04
Iron	39590	No	NA	NA	0.00E+00
Lead	87.6	No	NA	NA	0.00E+00
Manganese	10800	No	NA	NA	0.00E+00
Mercury	0.075	No	NA	NA	0.00E+00
Silver	25.3	No	NA	NA	0.00E+00
Thallium	3.9	No	NA	NA	0.00E+00
Vanadium	11.1	No	NA	NA	0.00E+00
Zinc	37.2	No	NA	NA	0.00E+00

Air concentrations were only calculated for chemicals identified as volatile in the USEPA RSL Table.

EXPOSURE POINT CONCENTRATIONS (INHALATION) FOR WORKERS EXPOSED VIA IRRIGATION (PAGE 1 OF 1)

Scenario Timeframe: Current/Future
Exposure Medium: Groundwater
Exposure Point: Deep Groundwater Outside Landfill
Receptor Population:Industrial Workers
Receptor Age: Adult

Relevant Equations

$$C_{air} = C_{gw} \times SE \times \frac{V_{water}}{V_{air}} \times \frac{1\,mg}{1000\,ug} \qquad SE = \frac{[7.95 \times \ln(H) + 68.17]}{100}$$

C_{air} = Air concentration from irrigation (mg/m^3)
SE = Stripping efficiency (%)
V_{water} = Volume water (L)
V_{air} = Volume air (m^3)
H = dimensionless Henry's Law Constant

V_{water} = 1,450 L
V_{air} = 31,320 m3

Chemical	Concentration of Contaminant in Groundwater Cgw (ug/L)	Is Chemical a VOC ?	Dimensionless Henry's Law Constant (H)	Stripping Effciency (%)	Concentration of Contaminant Air Cair (mg/m^3)
1,1-Dichloroethane	3.7	Yes	2.30E-01	5.65E-01	9.68E-05
Benzene	0.76	Yes	2.27E-01	5.64E-01	1.98E-05
Chloroform	1.2	Yes	1.50E-01	5.31E-01	2.95E-05
cis-1,2-Dichloroethene	2000	Yes	1.67E-01	5.39E-01	4.99E-02
Trichloroethene (Mutagenic)	330	Yes	4.03E-01	6.09E-01	9.30E-03
Trichloroethene (Nonmutagenic)	330	Yes	4.03E-01	6.09E-01	9.30E-03
Vinyl Chloride	11	Yes	1.14E+00	6.92E-01	3.52E-04
1,4-Dioxane	22	Yes	1.96E-04	2.98E-03	3.04E-06
Benzo(a)pyrene	0.077	No	NA	NA	0.00E+00
Bis(2-ethylhexyl)phthalate	7	No	NA	NA	0.00E+00
Dibenzo(a,h)anthracene	0.0057	No	NA	NA	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	No	NA	NA	0.00E+00
Naphthalene	0.15	Yes	1.80E-02	3.62E-01	2.51E-06
2,3,7,8-TCDD Equivalents	0.0000028	Yes	2.04E-03	1.89E-01	2.45E-11
Pentadecafluorooctanoic Acid	0.05	No	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	No	NA	NA	0.00E+00
Dieldrin	0.00224	No	NA	NA	0.00E+00
delta-BHC	0.013	No	NA	NA	0.00E+00
Dioxin-Like PCBs	0.000011	Yes	1.70E-02	3.58E-01	1.82E-10
Aluminum	31226	No	NA	NA	0.00E+00
Antimony	5.5	No	NA	NA	0.00E+00
Arsenic	4.58	No	NA	NA	0.00E+00
Barium	207	No	NA	NA	0.00E+00
Beryllium	1.2	No	NA	NA	0.00E+00
Cadmium	1.4	No	NA	NA	0.00E+00
Chromium	30.4	No	NA	NA	0.00E+00
Cobalt	27.2	No	NA	NA	0.00E+00
Cyanide	11.1	Yes	9.89E-01	6.81E-01	3.50E-04
Iron	36694	No	NA	NA	0.00E+00
Lead	3.65	No	NA	NA	0.00E+00
Manganese	3312	No	NA	NA	0.00E+00
Vanadium	8.21	No	NA	NA	0.00E+00

Florida Irrigation Model Documentation

UF | UNIVERSITY of FLORIDA

Center for Environmental & Human Toxicology

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January 14, 2009

Ligia Mora-Applegate
Bureau of Waste Cleanup
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Methodology for the development of irrigation water risk-based criteria

Dear Ms. Mora-Applegate:

At your request we have developed a methodology for the derivation of groundwater cleanup target levels for organic chemicals that are protective of human health under an irrigation scenario (IGCTLs). In the irrigation scenario, receptors are exposed to contaminated groundwater outdoors while irrigating lawns, ornamental beds, and vegetable crops. From this scenario, separate criteria were developed based upon: 1) exposure for residents using contaminated water for lawn and ornamental bed irrigation, including exposure from recreational use of the lawn sprinklers by children; 2) exposure for landscape maintenance workers using contaminated water for the irrigation of lawns and ornamental beds at commercial facilities; and 3) exposure for residents who use contaminated water to grow fruit and vegetables for personal consumption.

Irrigation of lawns and ornamental beds

The exposure models used to derive groundwater cleanup target levels for the irrigation (IGCTLs) of lawns and ornamental beds are shown in Figure 1. These models consider potential intake of contaminants in groundwater through inhalation, dermal contact, and incidental ingestion. Conservative exposure assumptions were taken from standard sources (e.g., U.S. EPA guidance) or selected based on professional judgment.

Air concentrations resulting from irrigation of lawns and ornamental beds were estimated using a simple box model and were dependent upon water usage rate, water-to-air stripping efficiency, and the volume of the box. There are several non-technical publications aimed at informing residents on the proper watering of Florida lawns. According to the University of Florida Institute of Food and Agricultural Sciences (IFAS), lawns in Florida need to be watered on the average 2 d/wk during spring, 1 d/wk during summer, and every two weeks during fall and winter. These seasonal watering rates correspond to an annual average of 1 d/wk or 52 d/yr. IFAS recommends irrigating at a rate of 1-2" per watering event. A value of 2" per watering event was selected so as not to underestimate the watering rate. The recommended irrigation rate is a total water rate and was meant to include rainfall events. Average yearly rainfall for central and south

Florida taken over the last 25 years average 1" of rainfall per week (Ali et al., 2000). Therefore, total irrigation is estimated at 1" per week of contaminated groundwater and 1" per week of rainfall for a total of 2" of water per watering event. For a sprinkler covering a radius of 10 ft., this irrigation rate requires a total of approximately 1450 L water per event, which corresponds to a water flow rate of 50 L/min for 29 min. For the box model, the dimensions of the box were determined by the width of the sprinkler area (20 ft., or 6 m) times the breathing height of the adult receptor (1.5 m), the assumed wind speed (2 m/sec), and the duration of the watering event (29 min), which corresponds to 31,320 m^3.

The proportion of a contaminant volatilizing into the air depends on many factors specific for the contaminant in question and factors related to the physical characteristics of the water-air interface through which the chemical moves. The chemical concentration in air was estimated using data from empirical studies relating the decrease in the water concentration that occurs by the stripping effect caused by the passage of contaminated water through a shower system. It is assumed that stripping of contaminants passing through a sprinkler head is similar to that occurring in a shower. The relationship between the dimensionless Henry's law constant (H) of a chemical and the stripping efficiency (SE) of a typical shower has been found to be adequately predicted by the equation (Moya et al., 1999):

$$SE = [7.95*\ln(H)]+68.17$$

This stripping efficiency was multiplied times the total volume of water used per event (1450 L, see above) to derive the amount of chemical released to air. This amount was assumed to be distributed equally in the volume of air specified by the box model (31,320 m^3) to obtain the breathing zone air concentration.

Inhalation rates for children and adults (as appropriate for the scenario examined) were combined with exposure frequency, exposure duration, and air concentration values to estimate inhalation exposure. Dermal exposure for a child playing in the sprinkler was estimated based on the dermal permeability coefficient for each chemical and the skin surface area assumed to be in contact with water. A small volume of water was assumed to be ingested incidentally for both children and adults each time there was contact with irrigation water. The exposure frequency and duration of contact were assumed to equal the frequency and duration of irrigation events.

Homegrown fruit and vegetable consumption

Several models are available for estimating the concentration of chemicals in fruit and vegetables cultivated on contaminated soil or using contaminated water (Briggs et al., 1982, 1983; McKone, 1994; Ryan et al., 1988; Trapp and Pussemier, 1991). Based upon our evaluation of these models, we consider the Briggs model to have the greatest utility in estimating uptake of a contaminant into produce from known concentrations in irrigation water. Equations for the Briggs model are presented in Figure 2 and inputs are listed in Table 1. The Briggs model develops criteria based on contaminant concentrations in soil solution. It is assumed that the concentration of contaminant in soil solution equals the concentration in irrigation water minus the loss from volatilization to air during the irrigation process. The relationships between soil solution concentration and concentration in plant tissues are calculated based on the K_{ow} for the chemical using the expressions shown in Figure 2.

Calculation of a contaminant intake rate from homegrown produce requires assumptions regarding consumption rate. Values for root and shoot fruit and vegetable consumption were obtained from the U.S. EPA's Exposure Factors Handbook (1997). The Exposure Factors Handbook recommends using a daily average adult root consumption rate of 0.0418 kg (or about 1.5 oz) per day and a shoot ingestion rate of 0.3132 kg (or about 11 oz) per day. The recommended child root consumption rate is 0.0099 kg (or about 0.5 oz) per day and the shoot consumption rate is 0.0604 kg (or about 2 oz) per day.

The calculations from the Briggs model are conservative in that they do not include estimates of contaminant loss from the plant due to transpiration or metabolism. Additionally, the model does not estimate loss of the contaminant from preparation techniques such as washing, peeling, or cooking. The amount of contaminant lost from these practices varies depending upon the vegetable and the habits of the consumer. The worst-case scenario assumes that washing, peeling, and cooking do not occur.

Please let us know if you have any questions regarding this methodology.

Sincerely,

Stephen M. Roberts, Ph.D.

Leah D. Stuchal, Ph.D.

References:

Ali, A., Abtew, W., Van Horn, S., and Khanal, N. Temporal and spatial characterization of rainfall over central and south Florida. *Journal of the American Water Resources Association* **36**(4): 833-848, 2000.

Briggs, G.G., Bromilow, R.H., and Evans, A.A. Relationships between lipophilicity and root uptake and translocation of non-ionised chemicals by barley. *Pestic. Sci.* **13**: 495-504, 1982.

Briggs, G.G. Bromilow, R.H., Evans, A.A., and Willams, M. Relationships between lipophilicity and the distribution of non-ionised chemicals in barley shoots following uptake by roots. *Pestic. Sci.* **14**: 492-500, 1983.

McKone, T.E. Uncertainty and variability in human exposures to soil contaminants through home-grown food: a Monte Carlo assessment. *Risk Anal.* **14**(4): 449-463, 1994.

Moya, J., Howard-Reed, C. and Corsi, R.L. Volatilization of chemicals from tap water to indoor air from contaminated water used for showering. *Environ. Sci. Technol.* **33**: 2321-2327, 1999.

Ryan, J.A., Bell, R.M., Davidson, J.M., and O'Connor, G.A. Plant uptake of non-ionic organic chemicals from soils. *Chemosphere* **17**(12): 2299-2323, 1988.

Trapp, S. and Pussemier, L. Model calculations and measurements of uptake and translocation of carbamates by bean plants. *Chemosphere* **22** (3-4): 327-339, 1991.

US EPA. Exposure Factors Handbook. National Center for Environmental Assessment. Office of Research and Development. 1997.

Figure 1 – IGCTLs for irrigation of lawns and ornamental beds

Residential scenario, carcinogens:

$$IGCTL = \frac{TR \times AT_c}{\left[\left(\frac{EF_i \times CSF_o \times IR_o \times ED_{ag}}{BW_{ag}}\right) + \left(\frac{EF_i \times CSF_d \times SA \times T_t \times K_p \times \left(1 - \frac{SE}{100}\right) \times 10^{-3} L/cm^3 \times ED_c}{BWc}\right) + \left(\frac{EF_i \times CSF_i \times IR_{iag} \times T_t \times V_w \times \frac{SE}{100} \times ED_{ag}}{BW_{ag} \times V_a}\right)\right]}$$

Residential scenario, non-carcinogens:

$$IGCTL = \frac{THI \times AT_{nc}}{\left[\left(\frac{EF_i \times IR_o \times ED_c}{RfD_o \times BW_c}\right) + \left(\frac{EF_i \times SA \times T_t \times K_p \times \left(1 - \frac{SE}{100}\right) \times 10^{-3} L/cm^3 \times ED_c}{RfD_d \times BW_c}\right) + \left(\frac{EF_i \times IR_{ic} \times T_t \times V_w \times \frac{SE}{100} \times ED_c}{RfD_i \times BW_c \times V_a}\right)\right]}$$

For this scenario, residential exposure is based on the "aggregate resident", which is an individual that lives at the residence as a child, adolescent, and young adult. Exposure to contaminants by inhalation and incidental ingestion is assumed to occur throughout this period. However, dermal exposure (from playing in the sprinklers) occurs only as a child.

Landscape maintenance worker scenario, carcinogens:

$$IGCTL = \frac{TR \times AT_c}{\left[\left(\frac{EF_i \times CSF_o \times IR_o \times ED_w}{BW_w}\right) + \left(\frac{EF_i \times CSF_i \times IR_w \times T_t \times V_w \times \frac{SE}{100} \times ED_w}{BW_w \times V_a}\right)\right]}$$

Landscape maintenance worker scenario, non-carcinogens:

$$IGCTL = \frac{THI \times AT_{nc}}{\left[\left(\frac{EF_i \times IR_o \times ED_w}{RfD_o \times BW_w}\right) + \left(\frac{EF_i \times IR_w \times T_t \times V_w \times \frac{SE}{100} \times ED_w}{RfD_i \times BW_w \times V_a}\right)\right]}$$

This scenario corresponds to a landscape worker at a commercial facility. The worker is assumed to be an adult exposed through inhalation and incidental ingestion

Figure 2 – IGCTLs for homegrown produce; Briggs model

Carcinogens:

$$IGCTL = \frac{TR \times AT_c}{\left(\frac{EF_v \times CSF_o \times \left[(RCF \times Ir_r) + (SCF \times Ir_s) \right] \times \left(1 - \frac{SE}{100} \right) \times RD \times ED_{ag}}{BW_{ag}} \right)}$$

Non-carcinogens:

$$IGCTL = \frac{THI \times AT_{nc}}{\left(\frac{EF_v \times ED_c \times \left[(RCF \times Ir_r) + (SCF \times Ir_s) \right] \times \left(1 - \frac{SE}{100} \right) \times RD}{RfD_o \times BW_c} \right)}$$

Supporting Equations:

$$SE = \left[7.95 \times \ln(H) \right] + 68.17$$

$$RCF = 10^{0.77 \log K_{ow} - 1.52} + 0.82$$

$$SCF = \left(10^{0.95 \log K_{ow} - 2.05} + 0.82 \right) \left(0.784 \times 10^{-0.434 (\log K_{ow} - 1.78)^2 / 2.44} \right)$$

Table 1 – Values used in the derivation of irrigation GCTLs

Abbreviation	Definition	Value
AT_c	Carcinogenic Averaging Time	25550 d
AT_{nc}	Non-carcinogenic Averaging Time	(365 x ED) d
BW_a	Adult Body Weight	70.0 kg
BW_{ag}	Aggregate Resident Body Weight	51.9 kg
BW_c	Child Body Weight	15.0 kg
CSF_d	Dermal Cancer Slope Factor	chemical-specific $(mg/kg\text{-}d)^{-1}$
CSF_i	Inhalation Cancer Slope Factor	chemical-specific $(mg/kg\text{-}d)^{-1}$
CSF_o	Oral Cancer Slope Factor	chemical-specific $(mg/kg\text{-}d)^{-1}$
ED_a	Adult Exposure duration	24 y
ED_{ag}	Aggregate Resident Exposure Duration	30 y
ED_c	Child Exposure Duration	6 y
EF_i	Irrigation Exposure Frequency	52 d/y
EF_v	Vegetable Exposure Frequency	350 d/y
H	Dimensionless Henry's Law Constant	chemical-specific
IGCTL	Irrigation GCTL	(mg/L)
IR_{iag}	Aggregate Resident Inhalation Rate	1.04 m^3/h
IR_{ic}	Child Inhalation Rate	1.2 m^3/h
IR_o	Water Incidental Ingestion Rate	0.01 L/d
Ir_f	Aggregate Ingestion of Root Vegetables	0.0354 kg/d
Ir_{rc}	Child Ingestion of Root Vegetables	0.0099 kg/d
Ir_s	Aggregate Ingestion of Shoot Vegetables	0.2626 kg/d
Ir_{sc}	Child Ingestion of Shoot Vegetables	0.0604 kg/d
K_{oc}	Octanol-Carbon Partition coefficient	chemical specific (L/kg)
K_{ow}	Octanol-Water Partition Coefficient	chemical-specific
K_p	Permeability Coefficient	chemical-specific (cm/h)
RCF	Root Concentration Factor	chemical-specific (L/kg)
RD	Rainfall Dilution	0.5
RfD_d	Dermal Reference Dose	chemical-specific (mg/kg-d)
RfD_i	Inhalation Reference Dose	chemical-specific (mg/kg-d)
RfD_o	Oral Reference Dose	chemical-specific (mg/kg-d)
SA	Child Surface Area	7023 cm^2
SCF	Shoot Concentration Factor	chemical-specific (L/kg)
SE	Water-to-air Chemical Stripping Efficiency	chemical-specific
THI	Target Hazard Index	1
TR	Target Cancer Risk	1.00E-06
T_t	Irrigation Time	0.483 h/d
V_a	Volume of Air for Volatilization	31320 m^3
V_w	Volume of Water Used	1450 L

Chlorinated Solvent Irrigation Water Guidance Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Carbon tetrachloride	56-23-5	230	540	7.7	-Liver	-yes
CFC 113 [see Trichloro-1,2,2-trifluoroethane, 1,1,2-]						
Chloroethane [see Ethyl chloride]						
Chloroform	67-66-3	850	960	8400	-Liver	-yes
Chloromethane [see Methyl chloride]						
Dichloroethane, 1,1-	75-34-3	390000	*	110000	-Kidney	
Dichloroethane, 1,2- [or EDC]	107-06-2	370	620	19	-None Specified	-yes
Dichloroethene, 1,1-	75-35-4	150000	810000	57000	-Liver	
Dichloroethene, cis-1,2-	156-59-2	28000	170000	9300	-Blood	
Dichloroethene, trans-1,2-	156-60-5	65000	320000	18000	-Blood -Liver	
EDC [see Dichloroethane, 1,2-]						
Ethyl chloride [or Chloroethane]	75-00-3	10000	16000	920	-Developmental	-yes
Methyl chloride [or Chloromethane]	74-87-3	4000	6900	290	-Neurological	-yes
Methyl chloroform [see Trichloroethane, 1,1,1-]						
Methylene chloride	75-09-2	7000	13000	300	-Liver	-yes

Chlorinated Solvent Irrigation Water Guidance Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
PCE [see Tetrachloroethene]						
TCE [see Trichloroethene]						
Tetrachloroethene [or PCE]	127-18-4	480	2400	8.9	-Liver	-yes
Trichloro-1,2,2-trifluoroethane, 1,1,2- [or CFC 113]	76-13-1	*	*	*	-Neurological	
Trichloroethane, 1,1,1- [or Methyl chloroform]	71-55-6	780000	*	190000	-None Specified	
Trichloroethene [or TCE]	79-01-6	2800	5900	110	-None Specified	-yes
Vinyl chloride	75-01-4	81	180	4.8	-Liver	-yes

† = These default Target Organ(s)/Systems or Effects are those reported to occur at the doses used to derive the reference dose. Non-default Target Organ(s)/Systems or Effects may be justified through a detailed toxicological analysis of the chemicals present at a specific site.

* = Contaminant is not a health concern for this exposure scenario.

** = Contaminant does not have toxicity values listed in the February 2005 "Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C."

*** = TRPH does not have toxicity values applicable for criteria development in water.

= These chemicals have a logKow > 4.5 and are highly unlikely to be taken up by plants from water. The produce scenario is not of concern for these chemicals.

NA = Not applicable. The Briggs plant uptake model utilized for this scenario is not applicable to inorganic chemicals.

None Specified = Target organ(s) not available at time of criteria development.

Note: Freshwater and marine surface waters, and groundwater at the point of discharge into surface water, shall pass acute and chronic toxicity bioassay tests: The user should consult the standard definitions for acute and chronic toxicity given in FAC 62-302.200(1) and FAC 62-302.200(4), respectively.

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June 28, 2016

Gladys Liehr, PhD
Office of District and Business Support
Division of Waste Management
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Update to the assumptions for the development of irrigation water screening levels (IWSLs)

Dear Dr. Liehr:

At your request, we have updated the assumptions for the derivation of groundwater cleanup target levels for organic chemicals that are protective of human health under an irrigation scenario (Irrigation Water Screening Levels; IWSLs) and provided a list of updated IWSLs. Methodology used for the calculation of these IWSLs was described in a letter to Ms. Ligia-Mora Applegate dated January 14, 2009. Since that time, exposure factors utilized in the equation have been updated by the USEPA. The updated exposure factors are described in detail below. The exposure models used to derive the updated IWSLs for the irrigation of lawns, ornamental beds, and produce are identical to those presented in our January 14, 2009 letter. Exposure models used to derive IWSLs for the irrigation of lawns and ornamental beds are shown in Figure 1 and models used to derive IWSLs for the irrigation of produce are shown in Figure 2. The majority of the exposure assumptions used in the derivation of the IWSLs have not changed (Table 1). Exposure assumptions that have changed include an updated root and shoot produce ingestion rate, body weight, child body surface area, and residential exposure duration (Table 2).

Adult and aggregate body weight, child body surface area, and residential exposure duration were updated using OSWER Directive 9200.1-120 (USEPA, 2014). Based on this directive, an updated residential exposure duration of 26 years was incorporated into the screening levels (6 as a child, and 20 as an adult). The updated USEPA adult body weight is 80 kg and the child body weight remains the same (15 kg). An aggregate body weight of 65 kg was calculated from these values using an exposure duration of 26 years (6 years at 15 kg and 20 years at 80 kg). The recommended USEPA child resident surface area for water of 6,378 cm^2 was also used in the equation (Table 2). A comparison between the 2009 and 2016 exposure factor assumptions is shown in Table 3. The homegrown produce root and shoot ingestion rates were updated using Tables 13-1 and 13-60 through 13-62 of the 2011 Exposure Factors Handbook (EFH; USEPA, 2011). To calculate the root produce ingestion rate, an age-weighted mean root produce consumption rate was calculated for ages 1-6 (child) and 1-

26 (aggregate resident) using Table 13-62 of the EFH. An age-weighted mean shoot produce consumption rate was also calculated for ages 1-6 (child) and 1-26 (aggregate resident) using Tables 13-1, 13-60, and 13-61 of the EFH. To calculate a total shoot ingestion rate, the age-weighted mean protected vegetable, mean exposed vegetable, and mean fruit consumption rates were summed. The recalculated homegrown produce ingestion rates are listed in Table 2.

In the irrigation scenario, receptors are exposed to contaminated groundwater outdoors while irrigating lawns, ornamental beds, and vegetable crops. From this scenario, separate criteria were developed based upon: 1) exposure for residents using contaminated water for lawn and ornamental bed irrigation, including exposure from recreational use of the lawn sprinklers by children; 2) exposure for landscape maintenance workers using contaminated water for the irrigation of lawns and ornamental beds at commercial facilities; and 3) exposure for residents who use contaminated water to grow fruit and vegetables for personal consumption. Updated IWSLs are included in the attached Tables.

As we have cautioned before, the model and assumptions used to calculate uptake into fruit and vegetables are particularly conservative and may substantially overestimate risk. As such, the principal value of the produce IWSLs is as protective screening values, and exceedances where fruit and vegetables are grown should merit follow up investigation including empirical measurement of contaminant levels in produce samples if possible.

Please let us know if you have any questions regarding these updates.

Sincerely,

Leah D. Stuchal, Ph.D.

Stephen M. Roberts, Ph.D.

References:

USEPA (2014) *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors.* United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9200.1-120.

USEPA (2001) *Exposure Factors Handbook: 2011 Edition.* United States Environmental Protection Agency, National Center for Environmental Assessment, Office of Research and Development, Washington, DC.

Figure 1 – Dose Equations for the irrigation of lawns and ornamental beds

Residential scenario, carcinogens:

$$\text{Dose} = GW \times 10^{-3}\,\text{mg}/\mu\text{g} \times \left[\left(\frac{EF_i \times IR_O \times ED_{ag}}{BW_{ag} \times AT_c} \right) + \left(\frac{EF_i \times SA \times T_t \times K_p \times \left(1 - \frac{SE}{100}\right) \times 10^{-3}\,\text{L/cm}^3 \times ED_c}{BW_c \times AT_c} \right) + \left(\frac{EF_i \times IR_{iag} \times T_t \times V_w \times \frac{SE}{100} \times ED_{ag}}{BW_{ag} \times V_a \times AT_c} \right) \right]$$

Residential scenario, non-carcinogens:

$$\text{Dose} = GW \times 10^{-3}\,\text{mg}/\mu\text{g} \times \left[\left(\frac{EF_i \times IR_O \times ED_c}{AT_{nc} \times BW_c} \right) + \left(\frac{EF_i \times SA \times T_t \times K_p \times \left(1 - \frac{SE}{100}\right) \times 10^{-3}\,\text{L/cm}^3 \times ED_c}{AT_{nc} \times BW_c} \right) + \left(\frac{EF_i \times IR_{ic} \times T_t \times V_w \times \frac{SE}{100} \times ED_c}{AT_{nc} \times BW_c \times V_a} \right) \right]$$

For this scenario, residential exposure is based on the "aggregate resident", which is an individual that lives at the residence as a child, adolescent and young adult. Exposure to contaminants by inhalation and incidental ingestion is assumed to occur throughout this period. However, dermal exposure (from playing in the sprinklers) occurs only as a child.

Landscape maintenance worker scenario, carcinogens:

$$\text{Dose} = GW \times 10^{-3}\,\text{mg}/\mu\text{g} \times \left[\left(\frac{EF_i \times IR_O \times ED_w}{BW_w \times AT_c} \right) + \left(\frac{EF_i \times IR_w \times T_t \times V_w \times \frac{SE}{100} \times ED_w}{BW_w \times V_a \times AT_c} \right) \right]$$

Landscape maintenance worker scenario, non-carcinogens:

$$\text{Dose} = GW \times 10^{-3}\,\text{mg}/\mu\text{g} \times \left[\left(\frac{EF_i \times IR_o \times ED_w}{AT_{nc} \times BW_w} \right) + \left(\frac{EF_i \times IR_w \times T_t \times V_w \times \frac{SE}{100} \times ED_w}{AT_{nc} \times BW_w \times V_a} \right) \right]$$

This scenario corresponds to a landscape worker at a commercial facility. The worker is assumed to be an adult exposed through inhalation and incidental ingestion.

Figure 2 – Dose equations for homegrown produce

Carcinogens:

$$\text{Dose} = \text{GW} \times 10^{-3}\,\text{mg}/\mu\text{g} \times \left(\frac{\text{EF}_\text{v} \times \left[\left(\text{RCF} \times \text{Ir}_\text{r} \right) + \left(\text{SCF} \times \text{Ir}_\text{s} \right) \right] \times \left(1 - \frac{\text{SE}}{100} \right) \times \text{RD} \times \text{ED}_\text{ag}}{\text{AT}_\text{c} \times \text{BW}_\text{ag}} \right)$$

Non-carcinogens:

$$\text{Dose} = \text{GW} \times 10^{-3}\text{mg}/\mu\text{g} \times \left(\frac{\text{EF}_\text{v} \times \text{ED}_\text{c} \times \left[\left(\text{RCF} \times \text{Ir}_\text{rc} \right) + \left(\text{SCF} \times \text{Ir}_\text{sc} \right) \right] \times \left(1 - \frac{\text{SE}}{100} \right) \times \text{RD}}{\text{AT}_\text{nc} \times \text{BW}_\text{c}} \right)$$

Supporting Equations:

$$\text{SE} = \left[7.95 \times \ln(\text{H}) \right] + 68.17$$

$$\text{RCF} = 10^{0.77 \log \text{K}_\text{ow} - 1.52} + 0.82$$

$$\text{SCF} = \left(10^{0.95 \log \text{K}_\text{ow} - 2.05} + 0.82 \right) \left(0.784 \times 10^{-0.434 (\log K_{ow} - 1.78)^2 / 2.44} \right)$$

Table 1 – Values used in the derivation of irrigation water screening levels

Abbreviation	Definition	Value
AT_c	Carcinogenic Averaging Time	25550 d
AT_{nc}	Non-carcinogenic Averaging Time	(365 x ED) d
CSF_d	Dermal Cancer Slope Factor	chemical-specific $(mg/kg\text{-}d)^{-1}$
CSF_i	Inhalation Cancer Slope Factor	chemical-specific $(mg/kg\text{-}d)^{-1}$
CSF_o	Oral Cancer Slope Factor	chemical-specific $(mg/kg\text{-}d)^{-1}$
ED_c	Child Exposure Duration	6 y
EF_i	Irrigation Exposure Frequency	52 d/y
EF_v	Vegetable Exposure Frequency	350 d/y
H	Dimensionless Henry's Law Constant	chemical-specific
IGCTL	Irrigation GCTL	(mg/L)
IR_{iag}	Aggregate Resident Inhalation Rate	1.04 m^3/h
IR_{ic}	Child Inhalation Rate	1.2 m^3/h
IR_o	Water Incidental Ingestion Rate	0.01 L/d
K_{oc}	Octanol-Carbon Partition coefficient	chemcial specific (L/kg)
K_{ow}	Octanol-Water Partition Coefficient	chemical-specific
K_p	Permeability Coefficient	chemical-specific (cm/h)
RCF	Root Concentration Factor	chemical-specific (L/kg)
RD	Rainfall Dilution	0.5
RfD_d	Dermal Reference Dose	chemical-specific (mg/kg-d)
RfD_i	Inhalation Reference Dose	chemical-specific (mg/kg-d)
RfD_o	Oral Reference Dose	chemical-specific (mg/kg-d)
SCF	Shoot Concentration Factor	chemical-specific (L/kg)
SE	Water-to-air Chemical Stripping Efficiency	chemical-specific
THI	Target Hazard Index	1
TR	Target Cancer Risk	1.00E-06
T_t	Irrigation Time	0.483 h/d
V_a	Volume of Air for Volatilization	31320 m^3
V_w	Volume of Water Used	1450 L

Table 2 – Updated values used in the derivation of irrigation water screening levels

Abbreviation	Definition	Value	Source
BW_a	Adult Body Weight	80 kg	USEPA, 2014
BW_{ag}	Aggregate Resident Body Weight	65 kg	Calculated
BW_c	Child Body Weight	15 kg	USEPA, 2014
ED_a	Adult Exposure duration	20 y	USEPA, 2014
ED_{ag}	Aggregate Resident Exposure Duration	26 y	USEPA, 2014
Ir_f	Aggregate Ingestion of Root Produce	0.0513 kg/d	USEPA, 2011
Ir_{rc}	Child Ingestion of Root Produce	0.0268 kg/d	USEPA, 2011
Ir_s	Aggregate Ingestion of Shoot Produce	0.2261 kg/d	USEPA, 2011
Ir_{sc}	Child Ingestion of Shoot Produce	0.1468 kg/d	USEPA, 2011
SA	Child Surface Area	6378 cm^2	USEPA, 2014

Table 3 – Comparison between 2009 and 2016 exposure factors

Abbreviation	2009 Value	2016 Value
BW_a	70 kg	80 kg
BW_{ag}	51.9 kg	65 kg
BW_c	15 kg	15 kg
ED_a	24 y	20 y
ED_{ag}	30 y	26 y
Ir_f	0.0354 kg/d	0.0513 kg/d
Ir_{rc}	0.0099 kg/d	0.0268 kg/d
Ir_s	0.2626 kg/d	0.2261 kg/d
Ir_{sc}	0.0604 kg/d	0.1468kg/d
SA	7023 cm^2	6378 cm^2

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Acenaphthene	83-32-9	20 *Primary Standard*	160	20 *Primary Standard*	-Liver	-yes
Acenaphthylene	208-96-8	110	1700	3.4	-Kidney	-yes
Acephate	30560-19-1	14000	18000	820	-Neurological	-yes
Acifluorfen, sodium [or Blazer]	62476-59-9	3500	4500	94	-Kidney -Mortality	-yes
Acrolein	107-02-8	74	360	440	-Mortality RfC=Nasal	
Acrylonitrile	107-13-1	150	210	9.2	-Blood RfC=Nasal - Reproductive	-yes
Alachlor	15972-60-8	2200	2800	3.5	-Blood	-yes
Aldicarb sulfone	1646-88-4	10000	56000	970	-Neurological	
Aldrin	309-00-2	0.1	5.8	#	-Liver	-yes
Allyl alcohol	107-18-6	11000	58000	2800	-Kidney -Liver RfC=Liver - Kidney	
Aluminum	7429-90-5	*	*	NA	-Neurological RfC=Neurological	
Ametryn	834-12-8	28000	510000	440	-Liver	
Anilazine [or Dyrene]	101-05-3	680	22000	7.5	-None Specified	
Anthracene	120-12-7	88000	*	3500	-None Specified	
Antimony	7440-36-0	1400	22000	NA	-Blood	

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Aroclor mixture [see PCBs]						
Arsenic	7440-38-2	63	100	NA	-Cardiovascular -Skin RfC=Neurological	-yes
Atrazine	1912-24-9	210	680	3 *Primary Standard*	-Body Weight -Cardiovascular	-yes
Azobenzene	103-33-3	72	1100	1.4		-yes
Barium (soluble salts)	7440-39-3	390000	*	NA	-Kidney RfC=Developmental	
Benomyl	17804-35-2	410000	*	6400	-Developmental	
Bensulide	741-58-2	19000	280000	67	-Body Weight -Neurological	
Bentazon	25057-89-0	180000	*	3200	-Blood	
Benzene	71-43-2	610	1500	39	-Blood RfC=Blood	-yes
Benzo(a)anthracene	56-55-3	1.1	200	#		-yes
Benzo(a)pyrene	50-32-8	17	22	#		-yes
Benzo(b)fluoranthene	205-99-2	170	220	#		-yes
Benzo(g,h,i)perylene	191-24-2	930	*	#	-Kidney	
Benzo(k)fluoranthene	207-08-9	1700	2200	#		-yes
Beryllium	7440-41-7	15	19	NA	-Gastrointestinal RfC=Respiratory	-yes

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
BHC, gamma- [see Hexachlorocyclohexane, gamma-]						
Bioallethrin	28434-00-6	5400	450000	#	-Liver	
Biphenyl, 1,1- [or Diphenyl]	92-52-4	730	5700	21	-Kidney RfC=Liver - Kidney	-yes
Bis(2-ethylhexyl)adipate	103-23-1	400 *Primary Standard*	130000	#	-Body Weight -Developmental -Liver - Reproductive	-yes
Bis(2-ethylhexyl)phthalate [or DEHP]	117-81-7	26	11000	#	-Liver	-yes
Blazer [see Acifluorfen, sodium]						
Bromacil	314-40-9	750000	*	13000	-Body Weight	
Bromate	15541-45-4	130	220	NA	-Kidney	-yes
Bromomethane [or Methyl bromide]	74-83-9	5300	27000	860	-Gastrointestinal RfC=Nasal	
Bromoxynil	1689-84-5	350	1500	2.1	-None Specified	-yes
Cadmium (water)	7440-43-9	740	28000	NA	-Kidney RfC=Kidney	-yes
Captafol	2425-06-1	290	1000	0.9	-Kidney Bladder	-yes
Captan	133-06-2	31000	68000	190	-Body Weight	-yes
Carbaryl [or Sevin]	63-25-2	450000	*	9600	-Kidney -Liver	
Carbofuran	1563-66-2	27000	280000	530	-Neurological -Reproductive	

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Carbon disulfide	75-15-0	330000	*	42000	-Developmental RfC=Neurological	
Carbon tetrachloride	56-23-5	590	1300	20	-Liver RfC=Liver	-yes
Carbophenothion [or Trithion]	786-19-6	68	7300	#	-Neurological	
Carboxin	5234-68-4	650000	*	13000	-Body Weight -Mortality	
CFC 113 [see Trichloro-1,2,2-trifluoroethane, 1,1,2-]						
Chloramben	133-90-4	98000	840000	2300	-Liver	
Chlordane (total)	57-74-9 (i)	13	260	#	-Liver RfC=Liver	-yes
Chlordecone [see Kepone]						
Chlorine	7782-50-5	4000 *Primary Standard*	4000 *Primary Standard*	87000	-None Specified RfC=Respiratory	
Chlorite (sodium salt) [or Sodium chlorite]	7758-19-2	240000	*	NA	-Developmental -Neurological	
Chloroacetic acid	79-11-8	18000	110000	1100	-Cardiovascular	
Chlorobenzene	108-90-7	29000	330000	2600	-Liver RfC=Kidney - Liver	
Chlorobenzilate	510-15-6	100	1400	#	-Body Weight nutrition	-yes
Chloroethane [see Ethyl chloride]						
Chloroform	67-66-3	760	900	70	-Liver	-yes

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Chloromethane [see Methyl chloride]						
Chromium (hexavalent)	18540-29-9	250	310	NA	-None Specified RfC=Respiratory, Nasal	-yes
Chromium (total)	7440-47-3	250	310	NA	-None Specified RfC=Respiratory, Nasal	-yes
Chromium (trivalent)	16065-83-1	640000	*	NA	-None Specified	
Chrysene	218-01-9	15000	18000	#		-yes
Copper	7440-50-8	420000	*	NA	-Gastrointestinal	
Cyanide, free	57-12-5	960	4800	1500	-Reproductive RfC=Thyroid	
D, 2,4- [see Dichlorophenoxy acetic acid, 2,4-]						
Dalapon	75-99-0	250000	*	10000	-Kidney	
DBCP, 1,2- [see Dibromo-3-chloropropane, 1,2-]						
DEHP [see Bis(2-ethylhexyl)phthalate]						
Demeton	8065-48-3	130	2200	1.6	-Eye -Neurological	
Diallate	2303-16-4	130	2600	1	-Body Weight	-yes
Diazinon	333-41-5	1800	39000	15	-Neurological	
Dibenz(a,h)anthracene	53-70-3	17	22	#		-yes

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Dibromo-3-chloropropane, 1,2- [or DBCP, 1,2-]	96-12-8	7.9	7.7	0.6	-Reproductive RfC=Reproductive	-yes
Dibromoethane, 1,2- [or EDB]	106-93-4	25	33	0.8	-Adrenals -Liver -Reproductive RfC=Nasal	-yes
Dicamba	1918-00-9	170000	*	3500	-Developmental	
Dichlorobenzene, 1,2-	95-50-1	90000	*	5500	-None Specified RfC=Body Weight	
Dichlorobenzene, 1,4-	106-46-7	1400	2300	81	-Kidney -Liver RfC=Liver	-yes
Dichloroethane, 1,1-	75-34-3	6700	9600	480	-Kidney RfC=Kidney	-yes
Dichloroethane, 1,2- [or EDC]	107-06-2	490	700	29	-Kidney RfC=Neurological	-yes
Dichloroethene, 1,1-	75-35-4	130000	930000	21000	-Liver RfC=Liver	
Dichloroethene, cis-1,2-	156-59-2	5300	40000	670	-Kidney	
Dichloroethene, trans-1,2-	156-60-5	53000	370000	6500	-Immunological	
Dichlorophenoxy acetic acid, 2,4- [or 2,4-D]	94-75-7	35000	560000	620	-Blood -Kidney -Liver	
Dichloroprop	120-36-5	71000	*	1100	-Kidney	
Dichloropropane, 1,2-	78-87-5	1000	1600	57	-Liver RfC=Nasal	-yes
Dichlorvos	62-73-7	340	540	5.5	-Neurological RfC=Neurological	-yes
Dicofol [or Kelthane]	115-32-2	440	22000	#	-Adrenals	

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Dieldrin	60-57-1	0.7	8.1	#	-Liver	-yes
Dimethrin	70-38-2	14000	*	#	-None Specified	
Dinoseb	88-85-7	1800	56000	26	-Developmental	
Dioxane, 1,4-	123-91-1	1100	1600	53	-Kidney -Liver RfC=Respiratory	-yes
Dioxins, as total 2,3,7,8-TCDD equivalents	1746-01-6	0.00003 *Primary Standard*	0.0007	#	-Developmental -Reproductive RfC= Liver - Lymph - Vascular - Resp.	-yes
Diphenyl [see Biphenyl, 1,1-]						
Diquat	85-00-7	23000	120000	3100	-Eye	
Dyrene [see Anilazine]						
EDB [see Dibromoethane, 1,2-]						
EDC [see Dichloroethane, 1,2-]						
Endothall	145-73-3	210000	*	3100	-Gastrointestinal	
Endrin	72-20-8	290	13000	#	-Liver RfC=None Specified	
Ethion	563-12-2	580	28000	#	-Neurological	
Ethoprop	13194-48-4	700	5600	6.3	-Neurological	-yes
Ethyl chloride [or Chloroethane]	75-00-3	*	*	*	RfC=Developmental	

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Ethylbenzene	100-41-4	1400	5500	62	-Kidney -Liver RfC=Developmental	-yes
Fluoranthene	206-44-0	4600	*	#	-Blood -Kidney -Liver	
Fluorene	86-73-7	15000	*	710	-Blood	
Fluoride	16984-48-8	480000	*	NA	-Teeth mottling - RFC=Bone	
Fonofos	944-22-9	2300	100000	39	-Liver -Neurological	
Furfural	98-01-1	25000	170000	1400	-Liver RfC=Nasal	
Glyphosate [or Roundup]	1071-83-6	*	*	140000	-Kidney	
Heptachlor	76-44-8	0.9	17	#	-Liver	-yes
Heptachlor epoxide	1024-57-3	1.9	12	#	-Liver	-yes
Hexachlorobenzene	118-74-1	1.8	38	#	-Liver	-yes
Hexachlorocyclohexane, gamma- [or Lindane or BHC, gamma-]	58-89-9	15	140	0.2 *Primary Standard*	-Kidney -Liver	-yes
Hexachlorocyclopentadiene	77-47-4	280	1400	#	-Gastrointestinal RfC=Nasal	
Indeno(1,2,3-cd)pyrene	193-39-5	170	220	#		-yes
Iron	7439-89-6	*	*	NA	-Gastrointestinal	
Kelthane [see Dicofol]						

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Kepone [or Chlordecone]	143-50-0	2.8	16	#	-Kidney	-yes
Lindane [see Hexachlorocyclohexane, gamma-]						
Manganese (water)	7439-96-5	170000	*	NA	-Neurological RfC=Neurological	
Mercury	7439-97-6	280	1500	76	RfC=Neurological	
Methoxychlor	72-43-5	3700	280000	#	-Developmental -Reproductive	
Methyl bromide [see Bromomethane]						
Methyl chloride [or Chloromethane]	74-87-3	4500	6100	430	RfC=Neurological	-yes
Methyl parathion [or Parathion, methyl]	298-00-0	1100	14000	14	-Blood -Neurological	
Methyl tert-butyl ether [or MTBE]	1634-04-4	37000	53000	2000	RfC=Eye - Kidney - Liver	-yes
Methylene chloride [or Dichloromethane]	75-09-2	40000	76000	1800	-Liver RfC=Liver	-yes
Methylnaphthalene, 1-	90-12-0	210	2400	6.9	-Respiratory	-yes
Methylnaphthalene, 2-	91-57-6	2100	99000	120	-Respiratory	
Metolachlor	51218-45-2	770000	*	6600	-Body Weight -Developmental	
Metribuzin	21087-64-9	190000	*	4500	-Body Weight -Kidney -Liver -Mortality	
Mevinphos	7786-34-7	2500	14000	140	-Neurological	

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Mirex	2385-85-5	0.6	3.7	#	-Liver -Thyroid	-yes
MTBE [see Methyl tert-butyl ether]						
Naphthalene	91-20-3	560	590	3.2	-Body Weight RfC=Nasal	-yes
Nickel	7440-02-0	83000	*	NA	-Body Weight RfC=Respiratory	-yes
Nitrate	14797-55-8	*	*	NA	-Blood	
Nitrate+Nitrite	NOCAS	**	**	NA		
Nitrite	14797-65-0	800000	*	NA	-Blood	
Nonylphenol	25154-52-3	74	44000	#	-Kidney	
Norflurazon	27314-13-2	310000	*	4200	-Liver -Thyroid	
Oryzalin	19044-88-3	16000	20000	20	-Adrenals -Blood -Kidney -Liver	-yes
Oxadiazon	19666-30-9	5500	280000	#	-Liver	
Oxamyl	23135-22-0	260000	*	23000	-Body Weight	
Paraquat	1910-42-5	47000	250000	6400	-Respiratory	
Parathion	56-38-2	13000	340000	120	-Neurological	
Parathion, methyl [see Methyl parathion]						

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
PCBs [or Aroclor mixture] (water)	1336-36-3	1.7	210	#	-Eye -Immunological	-yes
PCE [see Tetrachloroethene]						
Pebulate	1114-71-2	6.2	*	1500	-Blood	
Pendimethalin	40487-42-1	11000	*	#	-Liver	
Pentachlorophenol	87-86-5	7.5	390	#	-Liver	-yes
Permethrin	52645-53-1	200	16000	#	-Liver	-yes
Phenanthrene	85-01-8	8000	*	340	-Kidney	
Phenol	108-95-2	*	*	62000	-Developmental RfC=Liver - Neurological	
Phorate	298-02-2	420	11000	5.1	-Neurological	
Phosmet	732-11-6	140000	*	1200	-Body Weight -Liver -Neurological	
Phosphine	7803-51-2	380	1900	740	-Body Weight RfC=Body Weight	
Picloram	1918-02-1	530000	*	11000	-Liver	
Profluralin	26399-36-0	3100	160000	#	-None Specified	
Pyrene	129-00-0	4.2	250	#	-Kidney	-yes
Pyridine	110-86-1	7300	56000	400	-Liver RfC=Odor Threshold	

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Resmethrin	10453-86-8	29	2800	#	-Reproductive	-yes
Ronnel	299-84-3	42000	*	#	-Liver	
Rotenone	83-79-4	16000	220000	60	-Developmental	
Roundup [see Glyphosate]						
Selenium	7782-49-2	40000	280000	NA	-Hair Loss -Neurological -Skin RfC=Hair Loss - Neurological - Skin	
Sevin [see Carbaryl]						
Silver	7440-22-4	9400	280000	NA	-Skin	
Silvex [see Trichlorophenoxy propionic acid]						
Simazine	122-34-9	510	1300	7	-Blood -Body Weight	-yes
Sodium chlorite [see Chlorite (sodium salt)]						
Strychnine	57-24-9	2800	17000	46	-Mortality	
Styrene	100-42-5	270000	*	20000	-Blood -Liver RfC=Neurological	
TCE [see Trichloroethene]						
Temephos	3383-96-8	18000	*	#	-None Specified	
Temik [see Aldicarb]						

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Terbacil	5902-51-2	90000	730000	2000	-Liver -Thyroid	
Terbufos	13071-79-9	24	970	0.3	-Neurological	
Terbutryn	886-50-0	1400	56000	23	-Blood	
Tetrachloroethene [or PCE]	127-18-4	11000	38000	310	-Neurological RfC=Neurological	-yes
Thallium	7440-28-0	80	560	NA	-Hair Loss	
Toluene	108-88-3	160000	*	13000	-Kidney RfC=Neurological	
Toxaphene	8001-35-2	6.7	130	#		-yes
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	*	*	*	-Neurological RfC=Body Weight	
Trichlorobenzene, 1,2,4-	120-82-1	300	2100	70 *Primary Standard*	-Adrenals RfC=Urinary Tract	-yes
Trichloroethane, 1,1,1- [or Methyl chloroform]	71-55-6	*	*	500000	-Body Weight RfC=Body Weight	
Trichloroethane, 1,1,2-	79-00-5	470	1200	33	-Liver RfC=Nasal	-yes
Trichloroethene [or TCE]	79-01-6	930	2100	38	-Cardiovascular -Developmental - Immunological RfC=Cardiovascular - Develop. - Immune	-yes
Trichlorophenoxy propionic acid, 2,4,5- [or Silvex]	93-72-1	14000	450000	170	-Liver	
Trithion [see Carbophenothion]						
Vinyl chloride	75-01-4	93	210	6.3	-Liver RfC=Liver	-yes

Irrigation Water Screening Levels

Contaminants	CAS #s	Residential Criteria (ug/L)	Industrial Criteria (ug/L)	Produce Criteria (ug/L)	Non-Cancer Target Organs/Systems or Effects†	Carcinogen
Xylenes, total	1330-20-7	110000	800000	18000	-Body Weight -Mortality RfC=Neurological	
Zinc	7440-66-6	*	*	NA	-Blood	

† = These default Target Organ(s)/Systems or Effects are those reported to occur at the doses used to derive the reference dose. Non-default Target Organ(s)/Systems or Effects may be justified through a detailed toxicological analysis of the chemicals present at a specific site.

* = Contaminant is not a health concern for this exposure scenario.

** = Contaminant does not have toxicity values listed in the February 2005 "Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C."

*** = TRPH does not have toxicity values applicable for criteria development in water.

= These chemicals have a logKow > 4.5 and are highly unlikely to be taken up by plants from water. The produce scenario is not of concern for these chemicals.

NA = Not applicable. The Briggs plant uptake model utilized for this scenario is not applicable to inorganic chemicals.

None Specified = Target organ(s) not available at time of criteria development.

Note: Freshwater and marine surface waters, and groundwater at the point of discharge into surface water, shall pass acute and chronic toxicity bioassay tests: The user should consult the standard definitions for acute and chronic toxicity given in FAC 62-302.200(1) and FAC 62-302.200(4), respectively.

APPENDIX G-6

PART 6 – CALCULATION OF DAevent

TABLE 1
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CONSTRUCTION WORKERS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then: DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	8	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	3.60E-07
1,4-Dichlorobenzene	1.89	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	7.10E-07
Benzene	1.6	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	1.96E-07
Chlorobenzene	30.3	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	6.98E-06
Trichloroethene	2.3	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	2.35E-07
1,4-Dioxane	91.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	2.64E-07
Benzo(a)anthracene	0.555	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	5.79E-06
Indeno(1,2,3-cd)pyrene	0.48	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	4.08E-07
Pentachlorophenol	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	3.08E-07
Phenanthrene	8.21	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	9.49E-06
2,3,7,8-TCDD Equivalents	0.0025	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	Organic	No	0.00E+00	1	2.19E+01	0.00E+00	0.00E+00	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	Organic	No	0.00E+00	1	6.65E+01	0.00E+00	0.00E+00	0.00E+00
4,4'-DDD	0.01	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	4.01E-08
4,4'-DDE	0.055	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	1.29E-08
delta-BHC	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	1.02E-08
Dieldrin	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.70E-08
Heptachlor	0.0049	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	1.58E-08
Heptachlor Epoxide	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	4.69E-10
gamma-BHC (Lindane)	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	1.35E-08
Dioxin-Like PCBs	0.00025	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.22E-05
Antimony	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.22E-07
Arsenic	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.02E-07
Barium	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.78E-06
Beryllium	8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.40E-08
Boron	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.88E-05
Cadmium	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.75E-07
Chromium	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.21E-06

TABLE 1
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CONSTRUCTION WORKERS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Cobalt	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	4.03E-08
Copper	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.24E-06
Cyanide	108	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.64E-07
Iron	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.23E-04
Lead	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.81E-07
Manganese	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.71E-05
Mercury	8.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.56E-08
Nickel	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	2.11E-07
Silver	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.26E-07
Thallium	2.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.32E-08
Vanadium	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.26E-07
Zinc	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	7.80E-06

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 2
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CONSTRUCTION WORKERS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	4	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	2.20E-07
1,4-Dichlorobenzene	1.89	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	4.27E-07
Benzene	1.6	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	1.05E-07
Chlorobenzene	30.3	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	3.92E-06
Trichloroethene	2.3	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	1.34E-07
1,4-Dioxane	91.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	1.42E-07
Benzo(a)anthracene	0.555	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	3.85E-06
Indeno(1,2,3-cd)pyrene	0.48	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	2.38E-07
Pentachlorophenol	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	2.18E-07
Phenanthrene	8.21	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	6.75E-06
2,3,7,8-TCDD Equivalents	0.0025	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	Organic	No	0.00E+00	1	2.19E+01	0.00E+00	0.00E+00	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	Organic	No	0.00E+00	1	6.65E+01	0.00E+00	0.00E+00	0.00E+00
4,4'-DDD	0.01	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	2.83E-08
4,4'-DDE	0.055	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	9.10E-09
delta-BHC	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	7.19E-09
Dieldrin	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.20E-08
Heptachlor	0.0049	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	1.12E-08
Heptachlor Epoxide	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	3.32E-10
gamma-BHC (Lindane)	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	9.54E-09
Dioxin-Like PCBs	0.00025	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.61E-05
Antimony	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.11E-07
Arsenic	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.01E-07
Barium	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.89E-06
Beryllium	8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.20E-08
Boron	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.40E-06
Cadmium	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.76E-08
Chromium	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.04E-07

TABLE 2
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CONSTRUCTION WORKERS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Cobalt	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	2.02E-08
Copper	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.12E-06
Cyanide	108	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.32E-07
Iron	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.11E-04
Lead	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	9.04E-08
Manganese	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.86E-05
Mercury	8.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.28E-08
Nickel	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	1.06E-07
Silver	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	6.31E-08
Thallium	2.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.16E-08
Vanadium	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.63E-07
Zinc	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	3.90E-06

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 3
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
INDUSTRIAL WORKERS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then: DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	8	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	0.082	0.688	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	3.22E-07
1,4-Dichlorobenzene	1.89	0.200	1.69	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	6.35E-07
Benzene	1.6	0.239	1.36	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	1.67E-07
Chlorobenzene	30.3	3.70	26.6	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	6.13E-06
Trichloroethene	2.3	0.274	2.03	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	2.07E-07
1,4-Dioxane	91.9	0.275	91.6	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	2.63E-07
Benzo(a)anthracene	0.555	0.003	0.552	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	0	0.830	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	0	1.40	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	0	0.530	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	0	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	0	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	0.381	7.02	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	5.49E-06
Indeno(1,2,3-cd)pyrene	0.48	0	0.480	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	0.089	1.01	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	3.75E-07
Pentachlorophenol	0.191	0	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	3.08E-07
Phenanthrene	8.21	0.131	8.08	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	9.34E-06
2,3,7,8-TCDD Equivalents	0.0025	0.00003	0.002	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	0	0.290	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	0	0.520	Organic	No	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	0.01	0	0.010	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	4.01E-08
4,4'-DDE	0.055	0.0007	0.054	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	0.0005	0.046	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	0	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	1.29E-08
delta-BHC	0.034	0	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	1.02E-08
Dieldrin	0.022	0	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.70E-08
Heptachlor	0.0049	0.0002	0.005	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	1.51E-08
Heptachlor Epoxide	0.0009	0.000005	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	4.67E-10
gamma-BHC (Lindane)	0.044	0	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	1.35E-08
Dioxin-Like PCBs	0.00025	0.00001	0.0002	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Nondioxin-Like PCBs	132	7.00	125	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Aluminum	11530	0	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.22E-05
Antimony	27.8	0	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.22E-07
Arsenic	25.2	0	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.02E-07
Barium	1222	0	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.78E-06
Beryllium	8	0	8.00	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.40E-08
Boron	2351	0	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.88E-05
Cadmium	21.9	0	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.75E-07
Chromium	151	0	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.21E-06
Cobalt	12.6	0	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	4.03E-08
Copper	280	0	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.24E-06
Cyanide	108	27.2	80.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.47E-07
Iron	52850	0	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.23E-04
Lead	226	0	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.81E-07
Manganese	4642	0	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.71E-05
Mercury	8.2	0	8.20	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.56E-08

TABLE 3
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
INDUSTRIAL WORKERS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Nickel	132	0	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	2.11E-07
Silver	26.3	0	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.26E-07
Thallium	2.9	0	2.90	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.32E-08
Vanadium	90.7	0	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.26E-07
Zinc	1626	0	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	7.80E-06

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 4
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
INDUSTRIAL WORKERS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	4	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	0.082	0.688	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	1.97E-07
1,4-Dichlorobenzene	1.89	0.200	1.69	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	3.82E-07
Benzene	1.6	0.239	1.36	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	8.95E-08
Chlorobenzene	30.3	3.70	26.6	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	3.44E-06
Trichloroethene	2.3	0.274	2.03	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	1.18E-07
1,4-Dioxane	91.9	0.275	91.6	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	1.41E-07
Benzo(a)anthracene	0.555	0.003	0.552	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	0	0.830	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	0	1.40	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	0	0.530	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	0	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	0	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	0.381	7.02	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	3.65E-06
Indeno(1,2,3-cd)pyrene	0.48	0	0.480	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	0.089	1.01	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	2.19E-07
Pentachlorophenol	0.191	0	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	2.18E-07
Phenanthrene	8.21	0.131	8.08	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	6.64E-06
2,3,7,8-TCDD Equivalents	0.0025	0.00003	0.002	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	0	0.290	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	0	0.520	Organic	No	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	0.01	0	0.010	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	2.83E-08
4,4'-DDE	0.055	0.0007	0.054	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	0.0005	0.046	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	0	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	9.10E-09
delta-BHC	0.034	0	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	7.19E-09
Dieldrin	0.022	0	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.20E-08
Heptachlor	0.0049	0.0002	0.005	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	1.07E-08
Heptachlor Epoxide	0.0009	0.000005	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	3.30E-10
gamma-BHC (Lindane)	0.044	0	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	9.54E-09
Dioxin-Like PCBs	0.00025	0.00001	0.0002	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	7.00	125	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11530	0	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.61E-05
Antimony	27.8	0	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.11E-07
Arsenic	25.2	0	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.01E-07
Barium	1222	0	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.89E-06
Beryllium	8	0	8.00	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.20E-08
Boron	2351	0	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.40E-06
Cadmium	21.9	0	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.76E-08
Chromium	151	0	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.04E-07
Cobalt	12.6	0	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	2.02E-08
Copper	280	0	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.12E-06
Cyanide	108	27.2	80.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.23E-07
Iron	52850	0	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.11E-04
Lead	226	0	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	9.04E-08
Manganese	4642	0	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.86E-05
Mercury	8.2	0	8.20	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.28E-08

TABLE 4
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
INDUSTRIAL WORKERS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Nickel	132	0	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	1.06E-07
Silver	26.3	0	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	6.31E-08
Thallium	2.9	0	2.90	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.16E-08
Vanadium	90.7	0	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.63E-07
Zinc	1626	0	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	3.90E-06

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 5
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CHILD RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	0.54	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	7.63E-08
1,4-Dichlorobenzene	1.89	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	1.45E-07
Benzene	1.6	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	2.60E-08
Chlorobenzene	30.3	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	1.16E-06
Trichloroethene	2.3	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	4.10E-08
1,4-Dioxane	91.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	3.55E-08
Benzo(a)anthracene	0.555	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	1.41E-06
Indeno(1,2,3-cd)pyrene	0.48	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	7.71E-08
Pentachlorophenol	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	8.01E-08
Phenanthrene	8.21	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	2.48E-06
2,3,7,8-TCDD Equivalents	0.0025	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	Organic	No	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	0.01	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	1.04E-08
4,4'-DDE	0.055	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	3.34E-09
delta-BHC	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	2.64E-09
Dieldrin	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	4.40E-09
Heptachlor	0.0049	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	4.10E-09
Heptachlor Epoxide	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	1.22E-10
gamma-BHC (Lindane)	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	3.50E-09
Dioxin-Like PCBs	0.00025	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11,530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.23E-06
Antimony	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.50E-08
Arsenic	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.36E-08
Barium	1,222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.60E-07
Beryllium	8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.32E-09
Boron	2,351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.27E-06
Cadmium	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.18E-08
Chromium	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.15E-08
Cobalt	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	2.72E-09
Copper	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.51E-07

TABLE 5
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CHILD RESIDENTS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Cyanide	108	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.83E-08
Iron	52,850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.85E-05
Lead	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.22E-08
Manganese	4,642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.51E-06
Mercury	8.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.43E-09
Nickel	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	1.43E-08
Silver	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	8.52E-09
Thallium	2.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.57E-09
Vanadium	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.90E-08
Zinc	1,626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	5.27E-07

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 6
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CHILD RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	0.33	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	5.97E-08
1,4-Dichlorobenzene	1.89	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	1.14E-07
Benzene	1.6	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	2.03E-08
Chlorobenzene	30.3	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	9.09E-07
Trichloroethene	2.3	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	3.20E-08
1,4-Dioxane	91.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	2.77E-08
Benzo(a)anthracene	0.555	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	1.10E-06
Indeno(1,2,3-cd)pyrene	0.48	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	6.03E-08
Pentachlorophenol	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	6.26E-08
Phenanthrene	8.21	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	1.94E-06
2,3,7,8-TCDD Equivalents	0.0025	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	Organic	No	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	0.01	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	8.14E-09
4,4'-DDE	0.055	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	2.61E-09
delta-BHC	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	2.07E-09
Dieldrin	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	3.44E-09
Heptachlor	0.0049	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	3.20E-09
Heptachlor Epoxide	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	9.53E-11
gamma-BHC (Lindane)	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	2.74E-09
Dioxin-Like PCBs	0.00025	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.80E-06
Antimony	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.17E-09
Arsenic	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.32E-09
Barium	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.03E-07
Beryllium	8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.64E-09
Boron	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.76E-07
Cadmium	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.23E-09
Chromium	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.98E-08

TABLE 6
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
CHILD RESIDENTS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Cobalt	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	1.66E-09
Copper	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.24E-08
Cyanide	108	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.56E-08
Iron	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.74E-05
Lead	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	7.46E-09
Manganese	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.53E-06
Mercury	8.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.71E-09
Nickel	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	8.71E-09
Silver	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	5.21E-09
Thallium	2.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.57E-10
Vanadium	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.99E-08
Zinc	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	3.22E-07

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 7
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	0.71	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	0.082	0.688	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	7.82E-08
1,4-Dichlorobenzene	1.89	0.200	1.69	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	1.49E-07
Benzene	1.6	0.239	1.36	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	2.60E-08
Chlorobenzene	30.3	3.70	26.6	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	1.17E-06
Trichloroethene	2.3	0.274	2.03	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	4.14E-08
1,4-Dioxane	91.9	0.275	91.6	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	4.05E-08
Benzo(a)anthracene	0.555	0.003	0.552	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	0	0.83	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	0	1.4	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	0	0.530	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	0	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	0	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	0.381	7.02	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	1.53E-06
Indeno(1,2,3-cd)pyrene	0.48	0	0.480	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	0.089	1.01	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	8.13E-08
Pentachlorophenol	0.191	0	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	9.18E-08
Phenanthrene	8.21	0.131	8.08	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	2.80E-06
2,3,7,8-TCDD Equivalents	0.0025	0.00003	0.002	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	0	0.29	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	0	0.52	Organic	No	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	0.01	0	0.01	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	1.19E-08
4,4'-DDE	0.055	0.0007	0.054	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	0.0005	0.046	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	0	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	3.84E-09
delta-BHC	0.034	0	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	3.03E-09
Dieldrin	0.022	0	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	5.05E-09
Heptachlor	0.0049	0.0002	0.005	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	4.51E-09
Heptachlor Epoxide	0.0009	0.000005	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	1.39E-10
gamma-BHC (Lindane)	0.044	0	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	4.02E-09
Dioxin-Like PCBs	0.00025	0.00001	0.0002	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	7.00	125	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11530	0	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.19E-06
Antimony	27.8	0	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.97E-08
Arsenic	25.2	0	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.79E-08
Barium	1222	0	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.68E-07
Beryllium	8	0	8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.68E-09
Boron	2351	0	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.67E-06
Cadmium	21.9	0	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.55E-08
Chromium	151	0	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.07E-07
Cobalt	12.6	0	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	3.58E-09
Copper	280	0	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.99E-07
Cyanide	108	27.169	81	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.74E-08
Iron	52850	0	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.75E-05
Lead	226	0	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.60E-08
Manganese	4642	0	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.30E-06
Mercury	8.2	0	8.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.82E-09

TABLE 7
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Nickel	132	0	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	1.87E-08
Silver	26.3	0	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.12E-08
Thallium	2.9	0	2.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.06E-09
Vanadium	90.7	0	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.44E-08
Zinc	1626	0	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	6.93E-07

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 8
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	0.25	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,3-Dichlorobenzene	0.77	0.082	0.688	Organic	Yes	5.79E-02	1	7.11E-01	2.70E-01	1.71E+00	4.64E-08
1,4-Dichlorobenzene	1.89	0.200	1.69	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	8.85E-08
Benzene	1.6	0.239	1.36	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	1.50E-08
Chlorobenzene	30.3	3.70	26.6	Organic	Yes	2.82E-02	1	4.49E-01	1.15E-01	1.08E+00	6.95E-07
Trichloroethene	2.3	0.274	2.03	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	2.46E-08
1,4-Dioxane	91.9	0.275	91.6	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	2.41E-08
Benzo(a)anthracene	0.555	0.003	0.552	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.83	0	0.83	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Benzo(b)fluoranthene	1.4	0	1.4	Organic	No	4.17E-01	1	2.72E+00	2.55E+00	1.13E+01	0.00E+00
Benzo(k)fluoranthene	0.53	0	0.53	Organic	No	6.91E-01	0.9	2.72E+00	4.22E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	0	12.2	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.061	0	0.061	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Dibenzofuran	7.4	0.381	7.02	Organic	Yes	9.75E-02	1	9.20E-01	4.86E-01	2.21E+00	9.07E-07
Indeno(1,2,3-cd)pyrene	0.48	0	0.480	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	1.1	0.089	1.01	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	4.83E-08
Pentachlorophenol	0.191	0	0.191	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	5.45E-08
Phenanthrene	8.21	0.131	8.08	Organic	Yes	1.44E-01	1	1.06E+00	7.40E-01	4.11E+00	1.66E-06
2,3,7,8-TCDD Equivalents	0.0025	0.00003	0.002	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.29	0	0.29	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	0	0.52	Organic	No	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	0.01	0	0.01	Organic	Yes	2.51E-01	0.8	6.52E+00	1.73E+00	2.62E+01	7.08E-09
4,4'-DDE	0.055	0.0007	0.054	Organic	No	5.45E-01	0.8	6.35E+00	3.74E+00	2.73E+01	0.00E+00
Aldrin	0.047	0.0005	0.046	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.042	0	0.042	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	2.28E-09
delta-BHC	0.034	0	0.034	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	1.80E-09
Dieldrin	0.022	0	0.022	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	3.00E-09
Heptachlor	0.0049	0.0002	0.0047	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	2.67E-09
Heptachlor Epoxide	0.0009	0.000005	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	8.25E-11
gamma-BHC (Lindane)	0.044	0	0.044	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	2.38E-09
Dioxin-Like PCBs	0.00025	0.00001	0.00024	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	132	7.00	125	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	11530	0	11530	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.88E-06
Antimony	27.8	0	27.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.95E-09
Arsenic	25.2	0	25.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.30E-09
Barium	1222	0	1222	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.06E-07
Beryllium	8	0	8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.00E-09
Boron	2351	0	2351	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.88E-07
Cadmium	21.9	0	21.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.48E-09
Chromium	151	0	151	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.78E-08
Cobalt	12.6	0	12.6	Inorganic	Yes	4.00E-04	1	NA	NA	NA	1.26E-09
Copper	280	0	280	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.00E-08
Cyanide	108	27.2	80.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.02E-08
Iron	52850	0	52850	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.32E-05
Lead	226	0	226	Inorganic	Yes	1.00E-04	1	NA	NA	NA	5.65E-09

TABLE 8
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
GROUNDWATER INSIDE THE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Manganese	4642	0	4642	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.16E-06
Mercury	8.2	0	8.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.05E-09
Nickel	132	0	132	Inorganic	Yes	2.00E-04	1	NA	NA	NA	6.60E-09
Silver	26.3	0	26.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	3.95E-09
Thallium	2.9	0	2.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.25E-10
Vanadium	90.7	0	90.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.27E-08
Zinc	1626	0	1626	Inorganic	Yes	6.00E-04	1	NA	NA	NA	2.44E-07

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 9
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
INDUSTRIAL WORKERS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then: DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	8	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
1,1,2-Trichloroethane	0.12	0.011	0.109	Organic	Yes	5.04E-03	1	5.87E-01	2.24E-02	1.41E+00	4.94E-09
1,2-Dibromo-3-Chloropropane	0.23	0.008	0.222	Organic	Yes	6.85E-03	1	2.21E+00	4.05E-02	5.32E+00	1.87E-08
1,2-Dichloroethane	1.1	0.128	0.972	Organic	Yes	4.20E-03	1	3.77E-01	1.61E-02	9.04E-01	3.53E-08
1,4-Dichlorobenzene	0.92	0.097	0.823	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	3.09E-07
2-Hexanone	5.6	0.222	5.38	Organic	Yes	3.55E-03	1	3.83E-01	1.37E-02	9.18E-01	1.65E-07
Benzene	5.8	0.866	4.93	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	6.04E-07
cis-1,2-Dichloroethene	54	7.19	46.8	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	4.35E-06
Ethylbenzene	4.4	0.577	3.82	Organic	Yes	4.93E-02	1	4.13E-01	1.95E-01	9.92E-01	1.45E-06
m+p-Xylenes	26	3.39	22.6	Organic	Yes	5.00E-02	1	4.13E-01	1.98E-01	9.92E-01	8.66E-06
Trichloroethene	6.2	0.740	5.46	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	5.58E-07
Vinyl Chloride	4.2	0.717	3.48	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	2.42E-07
1,4-Dioxane	56.6	0.169	56.4	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	1.62E-07
2,6-Dinitrotoluene	8.6	0	8.60	Organic	Yes	3.70E-03	1	1.10E+00	1.92E-02	2.64E+00	3.21E-07
2-Methylnaphthalene	9.3	0.753	8.55	Organic	Yes	9.17E-02	1	6.58E-01	4.21E-01	1.58E+00	5.84E-06
Benzo(a)anthracene	0.26	0.001	0.259	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.12	0	0.120	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	0.009	1.19	Organic	Yes	1.78E-03	1	6.65E-01	8.19E-03	1.60E+00	1.97E-08
Naphthalene	8	0.645	7.36	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	2.73E-06
Pentadecafluorooctanoic Acid	1.85	0	1.85	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	0	0.260	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	0	0.490	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	7.91E-07
2,3,7,8-TCDD Equivalents	0.0000032	4.4018E-08	0.000003	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Aldrin	0.0011	0.00001	0.001	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.036	0	0.036	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	1.10E-08
Dieldrin	0.017	0	0.017	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.31E-08
Heptachlor	0.0011	0.00004	0.001	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	3.40E-09
Heptachlor Epoxide	0.00095	0.000006	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	4.93E-10
Dioxin-Like PCBs	0.0000014	7.4264E-08	0.000001	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	0.213	0.011	0.202	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	7920	0	7920	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.34E-05
Antimony	5.3	0	5.30	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.24E-08
Arsenic	18.7	0	18.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.50E-07
Barium	515	0	515	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.12E-06
Boron	738	0	738	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.90E-06
Cadmium	1.84	0	1.84	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.47E-08
Chromium	8.03	0	8.03	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.42E-08
Cobalt	13	0	13.0	Inorganic	Yes	4.00E-04	1	NA	NA	NA	4.16E-08
Copper	22.4	0	22.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.79E-07
Cyanide	16.8	4.23	12.6	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.01E-07
Iron	39590	0	39590	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.17E-04
Lead	87.6	0	87.6	Inorganic	Yes	1.00E-04	1	NA	NA	NA	7.01E-08
Manganese	10800	0	10800	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.64E-05
Mercury	0.075	0	0.075	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.00E-10
Silver	25.3	0	25.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.21E-07

TABLE 9
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
INDUSTRIAL WORKERS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Thallium	3.9	0	3.90	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.12E-08
Vanadium	11.1	0	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.88E-08
Zinc	37.2	0	37.2	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.79E-07

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 10
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
INDUSTRIAL WORKERS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	4	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1,2-Trichloroethane	0.12	0.011	0.109	Organic	Yes	5.04E-03	1	5.87E-01	2.24E-02	1.41E+00	2.80E-09
1,2-Dibromo-3-Chloropropane	0.23	0.008	0.222	Organic	Yes	6.85E-03	1	2.21E+00	4.05E-02	5.32E+00	1.25E-08
1,2-Dichloroethane	1.1	0.128	0.972	Organic	Yes	4.20E-03	1	3.77E-01	1.61E-02	9.04E-01	1.92E-08
1,4-Dichlorobenzene	0.92	0.097	0.823	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	1.86E-07
2-Hexanone	5.6	0.222	5.38	Organic	Yes	3.55E-03	1	3.83E-01	1.37E-02	9.18E-01	9.01E-08
Benzene	5.8	0.866	4.93	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	3.24E-07
cis-1,2-Dichloroethene	54	7.19	46.8	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	2.37E-06
Ethylbenzene	4.4	0.577	3.82	Organic	Yes	4.93E-02	1	4.13E-01	1.95E-01	9.92E-01	8.16E-07
m+p-Xylenes	26	3.39	22.6	Organic	Yes	5.00E-02	1	4.13E-01	1.98E-01	9.92E-01	4.89E-06
Trichloroethene	6.2	0.740	5.46	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	3.17E-07
Vinyl Chloride	4.2	0.717	3.48	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	1.28E-07
1,4-Dioxane	56.6	0.169	56.4	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	8.71E-08
2,6-Dinitrotoluene	8.6	0	8.60	Organic	Yes	3.70E-03	1	1.10E+00	1.92E-02	2.64E+00	1.96E-07
2-Methylnaphthalene	9.3	0.753	8.55	Organic	Yes	9.17E-02	1	6.58E-01	4.21E-01	1.58E+00	3.63E-06
Benzo(a)anthracene	0.26	0.001	0.259	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.12	0	0.120	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	0.009	1.19	Organic	Yes	1.78E-03	1	6.65E-01	8.19E-03	1.60E+00	1.12E-08
Naphthalene	8	0.645	7.36	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	1.59E-06
Pentadecafluorooctanoic Acid	1.85	0	1.85	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	0	0.260	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	0	0.490	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	5.59E-07
2,3,7,8-TCDD Equivalents	0.0000032	4.4018E-08	0.000003	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Aldrin	0.0011	0.00001	0.001	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.036	0	0.036	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	7.80E-09
Dieldrin	0.017	0	0.017	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	9.26E-09
Heptachlor	0.0011	0.00004	0.001	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	2.40E-09
Heptachlor Epoxide	0.00095	0.000006	0.0009	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	3.48E-10
Dioxin-Like PCBs	0.0000014	7.4264E-08	0.000001	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	0.213	0.011	0.202	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	7920	0	7920	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.17E-05
Antimony	5.3	0	5.30	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.12E-08
Arsenic	18.7	0	18.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.48E-08
Barium	515	0	515	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.06E-06
Boron	738	0	738	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.95E-06
Cadmium	1.84	0	1.84	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.36E-09
Chromium	8.03	0	8.03	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.21E-08
Cobalt	13	0	13.0	Inorganic	Yes	4.00E-04	1	NA	NA	NA	2.08E-08
Copper	22.4	0	22.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.96E-08
Cyanide	16.8	4.23	12.6	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.03E-08
Iron	39590	0	39590	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.58E-04
Lead	87.6	0	87.6	Inorganic	Yes	1.00E-04	1	NA	NA	NA	3.50E-08
Manganese	10800	0	10800	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.32E-05
Mercury	0.075	0	0.075	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.00E-10
Silver	25.3	0	25.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	6.07E-08

TABLE 10
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
INDUSTRIAL WORKERS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Thallium	3.9	0	3.90	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.56E-08
Vanadium	11.1	0	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.44E-08
Zinc	37.2	0	37.2	Inorganic	Yes	6.00E-04	1	NA	NA	NA	8.93E-08

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 11
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
CHILD RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	0.54	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1,2-Trichloroethane	0.12	Organic	Yes	5.04E-03	1	5.87E-01	2.24E-02	1.41E+00	9.41E-10
1,2-Dibromo-3-Chloropropane	0.23	Organic	Yes	6.85E-03	1	2.21E+00	4.05E-02	5.32E+00	4.76E-09
1,2-Dichloroethane	1.1	Organic	Yes	4.20E-03	1	3.77E-01	1.61E-02	9.04E-01	5.76E-09
1,4-Dichlorobenzene	0.92	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	7.08E-08
2-Hexanone	5.6	Organic	Yes	3.55E-03	1	3.83E-01	1.37E-02	9.18E-01	2.50E-08
Benzene	5.8	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	9.42E-08
cis-1,2-Dichloroethene	54	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	7.31E-07
Ethylbenzene	4.4	Organic	Yes	4.93E-02	1	4.13E-01	1.95E-01	9.92E-01	2.83E-07
m+p-Xylenes	26	Organic	Yes	5.00E-02	1	4.13E-01	1.98E-01	9.92E-01	1.70E-06
Trichloroethene (Mutagenic)	6.2	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	1.11E-07
Vinyl Chloride	4.2	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	3.47E-08
1,4-Dioxane	56.6	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	2.18E-08
2,6-Dinitrotoluene	8.6	Organic	Yes	3.70E-03	1	1.10E+00	1.92E-02	2.64E+00	6.78E-08
2-Methylnaphthalene	9.3	Organic	Yes	9.17E-02	1	6.58E-01	4.21E-01	1.58E+00	1.40E-06
Benzo(a)anthracene	0.26	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.12	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	Organic	Yes	1.78E-03	1	6.65E-01	8.19E-03	1.60E+00	3.54E-09
Naphthalene	8	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	5.61E-07
Pentadecafluorooctanoic Acid	1.85	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	2.05E-07
2,3,7,8-TCDD Equivalents	0.0000032	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Aldrin	0.0011	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.036	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	2.87E-09
Dieldrin	0.017	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	3.40E-09
Heptachlor	0.0011	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	9.20E-10
Heptachlor Epoxide	0.00095	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	1.29E-10
Dioxin-Like PCBs	0.0000014	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	0.213	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	7920	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.28E-06
Antimony	5.3	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.86E-09
Arsenic	18.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.01E-08
Barium	515	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.78E-07
Boron	738	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.99E-07
Cadmium	1.84	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.94E-10
Chromium	8.03	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.34E-09
Cobalt	13	Inorganic	Yes	4.00E-04	1	NA	NA	NA	2.81E-09
Copper	22.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.21E-08
Cyanide	16.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.07E-09

TABLE 11
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
CHILD RESIDENTS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Iron	39590	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.14E-05
Lead	87.6	Inorganic	Yes	1.00E-04	1	NA	NA	NA	4.73E-09
Manganese	10800	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.83E-06
Mercury	0.075	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.05E-11
Silver	25.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	8.20E-09
Thallium	3.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.11E-09
Vanadium	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.99E-09
Zinc	37.2	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.21E-08

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 12
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
CHILD RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	0.33	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1,2-Trichloroethane	0.12	Organic	Yes	5.04E-03	1	5.87E-01	2.24E-02	1.41E+00	7.36E-10
1,2-Dibromo-3-Chloropropane	0.23	Organic	Yes	6.85E-03	1	2.21E+00	4.05E-02	5.32E+00	3.72E-09
1,2-Dichloroethane	1.1	Organic	Yes	4.20E-03	1	3.77E-01	1.61E-02	9.04E-01	4.50E-09
1,4-Dichlorobenzene	0.92	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	5.54E-08
2-Hexanone	5.6	Organic	Yes	3.55E-03	1	3.83E-01	1.37E-02	9.18E-01	1.95E-08
Benzene	5.8	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	7.36E-08
cis-1,2-Dichloroethene	54	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	5.71E-07
Ethylbenzene	4.4	Organic	Yes	4.93E-02	1	4.13E-01	1.95E-01	9.92E-01	2.21E-07
m+p-Xylenes	26	Organic	Yes	5.00E-02	1	4.13E-01	1.98E-01	9.92E-01	1.33E-06
Trichloroethene	6.2	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	8.64E-08
Vinyl Chloride	4.2	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	2.71E-08
1,4-Dioxane	56.6	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	1.71E-08
2,6-Dinitrotoluene	8.6	Organic	Yes	3.70E-03	1	1.10E+00	1.92E-02	2.64E+00	5.30E-08
2-Methylnaphthalene	9.3	Organic	Yes	9.17E-02	1	6.58E-01	4.21E-01	1.58E+00	1.10E-06
Benzo(a)anthracene	0.26	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.12	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	Organic	Yes	1.78E-03	1	6.65E-01	8.19E-03	1.60E+00	2.77E-09
Naphthalene	8	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	4.39E-07
Pentadecafluorooctanoic Acid	1.85	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	1.61E-07
2,3,7,8-TCDD Equivalents	0.0000032	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Aldrin	0.0011	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.036	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	2.24E-09
Dieldrin	0.017	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	2.66E-09
Heptachlor	0.0011	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	7.19E-10
Heptachlor Epoxide	0.00095	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	1.01E-10
Dioxin-Like PCBs	0.0000014	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	0.213	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	7920	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.61E-06
Antimony	5.3	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.75E-09
Arsenic	18.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.17E-09
Barium	515	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.70E-07
Boron	738	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.44E-07
Cadmium	1.84	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.07E-10
Chromium	8.03	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.65E-09
Cobalt	13	Inorganic	Yes	4.00E-04	1	NA	NA	NA	1.72E-09
Copper	22.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.39E-09
Cyanide	16.8	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.54E-09

TABLE 12
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
CHILD RESIDENTS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Iron	39590	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.31E-05
Lead	87.6	Inorganic	Yes	1.00E-04	1	NA	NA	NA	2.89E-09
Manganese	10800	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.56E-06
Mercury	0.075	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.48E-11
Silver	25.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	5.01E-09
Thallium	3.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.29E-09
Vanadium	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.66E-09
Zinc	37.2	Inorganic	Yes	6.00E-04	1	NA	NA	NA	7.37E-09

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 13
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	0.71	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1,2-Trichloroethane	0.12	0.011	0.109	Organic	Yes	5.04E-03	1	5.87E-01	2.24E-02	1.41E+00	9.78E-10
1,2-Dibromo-3-Chloropropane	0.23	0.008	0.222	Organic	Yes	6.85E-03	1	2.21E+00	4.05E-02	5.32E+00	5.27E-09
1,2-Dichloroethane	1.1	0.128	0.972	Organic	Yes	4.20E-03	1	3.77E-01	1.61E-02	9.04E-01	5.83E-09
1,4-Dichlorobenzene	0.92	0.097	0.823	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	7.26E-08
2-Hexanone	5.6	0.222	5.38	Organic	Yes	3.55E-03	1	3.83E-01	1.37E-02	9.18E-01	2.75E-08
Benzene	5.8	0.866	4.93	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	9.42E-08
cis-1,2-Dichloroethene	54	7.19	46.8	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	7.27E-07
Ethylbenzene	4.4	0.577	3.82	Organic	Yes	4.93E-02	1	4.13E-01	1.95E-01	9.92E-01	2.82E-07
m+p-Xylenes	26	3.39	22.6	Organic	Yes	5.00E-02	1	4.13E-01	1.98E-01	9.92E-01	1.69E-06
Trichloroethene	6.2	0.740	5.46	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	1.12E-07
Vinyl Chloride	4.2	0.717	3.48	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	3.43E-08
1,4-Dioxane	56.6	0.169	56.4	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	2.50E-08
2,6-Dinitrotoluene	8.6	0	8.6	Organic	Yes	3.70E-03	1	1.10E+00	1.92E-02	2.64E+00	7.78E-08
2-Methylnaphthalene	9.3	0.753	8.55	Organic	Yes	9.17E-02	1	6.58E-01	4.21E-01	1.58E+00	1.48E-06
Benzo(a)anthracene	0.26	0.001	0.259	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.12	0	0.12	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	0.009	1.19	Organic	Yes	1.78E-03	1	6.65E-01	8.19E-03	1.60E+00	4.02E-09
Naphthalene	8	0.645	7.36	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	5.92E-07
Pentadecafluorooctanoic Acid	1.85	0	1.85	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	0	0.26	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	0	0.49	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	2.36E-07
2,3,7,8-TCDD Equivalents	0.0000032	4.4018E-08	0.0000032	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Aldrin	0.0011	0.00001	0.001	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.036	0	0.036	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	3.29E-09
Dieldrin	0.017	0	0.017	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	3.90E-09
Heptachlor	0.0011	0.00004	0.0011	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	1.01E-09
Heptachlor Epoxide	0.00095	0.000006	0.00094	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	1.47E-10
Dioxin-Like PCBs	0.0000014	7.4264E-08	0.0000013	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	0.213	0.011	0.202	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	7920	0	7920	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.62E-06
Antimony	5.3	0	5.3	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.76E-09
Arsenic	18.7	0	18.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.33E-08
Barium	515	0	515	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.66E-07
Boron	738	0	738	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.24E-07
Cadmium	1.84	0	1.84	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.31E-09
Chromium	8.03	0	8.03	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.70E-09
Cobalt	13	0	13	Inorganic	Yes	4.00E-04	1	NA	NA	NA	3.69E-09
Copper	22.4	0	22.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.59E-08
Cyanide	16.8	4.23	12.6	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.93E-09
Iron	39590	0	39590	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.81E-05
Lead	87.6	0	87.6	Inorganic	Yes	1.00E-04	1	NA	NA	NA	6.22E-09
Manganese	10800	0	10800	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.67E-06
Mercury	0.075	0	0.075	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.33E-11

TABLE 13
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
Silver	25.3	0	25.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.08E-08
Thallium	3.9	0	3.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.77E-09
Vanadium	11.1	0	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.88E-09
Zinc	37.2	0	37.2	Inorganic	Yes	6.00E-04	1	NA	NA	NA	1.58E-08

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 14
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	0.25	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1,2-Trichloroethane	0.12	0.011	0.109	Organic	Yes	5.04E-03	1	5.87E-01	2.24E-02	1.41E+00	5.80E-10
1,2-Dibromo-3-Chloropropane	0.23	0.008	0.222	Organic	Yes	6.85E-03	1	2.21E+00	4.05E-02	5.32E+00	3.13E-09
1,2-Dichloroethane	1.1	0.128	0.972	Organic	Yes	4.20E-03	1	3.77E-01	1.61E-02	9.04E-01	3.46E-09
1,4-Dichlorobenzene	0.92	0.097	0.823	Organic	Yes	4.53E-02	1	7.00E-01	2.11E-01	1.68E+00	4.31E-08
2-Hexanone	5.6	0.222	5.38	Organic	Yes	3.55E-03	1	3.83E-01	1.37E-02	9.18E-01	1.63E-08
Benzene	5.8	0.866	4.93	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	5.45E-08
cis-1,2-Dichloroethene	54	7.19	46.8	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	4.31E-07
Ethylbenzene	4.4	0.577	3.82	Organic	Yes	4.93E-02	1	4.13E-01	1.95E-01	9.92E-01	1.67E-07
m+p-Xylenes	26	3.39	22.6	Organic	Yes	5.00E-02	1	4.13E-01	1.98E-01	9.92E-01	1.00E-06
Trichloroethene	6.2	0.740	5.46	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	6.62E-08
Vinyl Chloride	4.2	0.717	3.48	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	1.96E-08
1,4-Dioxane	56.6	0.169	56.4	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	1.48E-08
2,6-Dinitrotoluene	8.6	0	8.6	Organic	Yes	3.70E-03	1	1.10E+00	1.92E-02	2.64E+00	4.61E-08
2-Methylnaphthalene	9.3	0.753	8.55	Organic	Yes	9.17E-02	1	6.58E-01	4.21E-01	1.58E+00	8.79E-07
Benzo(a)anthracene	0.26	0.001	0.259	Organic	No	5.52E-01	1	2.00E+00	3.21E+00	8.48E+00	0.00E+00
Benzo(a)pyrene	0.12	0	0.12	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	0.009	1.19	Organic	Yes	1.78E-03	1	6.65E-01	8.19E-03	1.60E+00	2.39E-09
Naphthalene	8	0.645	7.36	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	3.51E-07
Pentadecafluorooctanoic Acid	1.85	0	1.85	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	0	0.26	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	0	0.49	Organic	No	1.27E-01	0.9	3.26E+00	7.97E-01	1.25E+01	1.40E-07
2,3,7,8-TCDD Equivalents	0.0000032	4.4018E-08	0.000003	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Aldrin	0.0011	0.00001	0.0011	Organic	No	2.93E-01	1	1.16E+01	2.15E+00	4.77E+01	0.00E+00
beta-BHC	0.036	0	0.036	Organic	Yes	2.06E-02	0.9	4.47E+00	1.35E-01	1.07E+01	1.95E-09
Dieldrin	0.017	0	0.017	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	2.32E-09
Heptachlor	0.0011	0.00004	0.0011	Organic	Yes	1.43E-01	0.8	1.30E+01	1.06E+00	5.01E+01	6.00E-10
Heptachlor Epoxide	0.00095	0.000006	0.00094	Organic	Yes	2.09E-02	0.8	1.59E+01	1.59E-01	3.82E+01	8.71E-11
Dioxin-Like PCBs	0.0000014	7.4264E-08	0.0000013	Organic	No	5.45E-01	0 - 0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Nondioxin-Like PCBs	0.213	0.011	0.202	Organic	No	5.45E-01	0.7	4.54E+00	3.58E+00	1.94E+01	0.00E+00
Aluminum	7920	0	7920	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.98E-06
Antimony	5.3	0	5.3	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.33E-09
Arsenic	18.7	0	18.7	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.68E-09
Barium	515	0	515	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.29E-07
Boron	738	0	738	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.85E-07
Cadmium	1.84	0	1.84	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.60E-10
Chromium	8.03	0	8.03	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.01E-09
Cobalt	13	0	13	Inorganic	Yes	4.00E-04	1	NA	NA	NA	1.30E-09
Copper	22.4	0	22.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.60E-09
Cyanide	16.8	4.23	12.6	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.14E-09
Iron	39590	0	39590	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.90E-06
Lead	87.6	0	87.6	Inorganic	Yes	1.00E-04	1	NA	NA	NA	2.19E-09
Manganese	10800	0	10800	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.70E-06
Mercury	0.075	0	0.075	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.88E-11
Silver	25.3	0	25.3	Inorganic	Yes	6.00E-04	1	NA	NA	NA	3.80E-09

TABLE 14
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
SHALLOW GROUNDWATER OUTSIDE THE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?[1]	Estimated Kp[2] (cm/hr)	FA[2]	tau-event[2] (hr)	B[2]	t*[2] (hr)	DAevent (mg/cm^2 - event)
Thallium	3.9	0	3.9	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.75E-10
Vanadium	11.1	0	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.78E-09
Zinc	37.2	0	37.2	Inorganic	Yes	6.00E-04	1	NA	NA	NA	5.58E-09

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 15
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
DEEP GROUNDWATER OUTSIDE THE LANDFILL
INDUSTRIAL WORKERS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then: DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	8	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1-Dichloroethane	3.7	0.495	3.20	Organic	Yes	6.75E-03	1	3.77E-01	2.58E-02	9.04E-01	1.85E-07
Benzene	0.76	0.113	0.647	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	7.92E-08
Chloroform	1.2	0.144	1.06	Organic	Yes	6.83E-03	1	4.90E-01	2.87E-02	1.18E+00	6.34E-08
cis-1,2-Dichloroethene	2000	266	1734	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	1.61E-04
Trichloroethene	330	39.4	291	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	2.97E-05
Vinyl Chloride	11	1.88	9.12	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	6.33E-07
1,4-Dioxane	22	0.066	21.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	6.30E-08
Benzo(a)pyrene	0.077	0	0.077	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	7	0	7.00	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.32	0	0.320	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	0	0.390	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	0.15	0.012	0.138	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	5.12E-08
2,3,7,8-TCDD Equivalents	0.0000028	3.8516E-08	0.000003	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.05	0	0.050	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	0	0.044	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	0.00224	0	0.002	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.73E-09
delta-BHC	0.013	0	0.013	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	3.89E-09
Aluminum	31226	0	31226	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.50E-04
Antimony	5.5	0	5.50	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.40E-08
Arsenic	4.58	0	4.58	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.66E-08
Barium	207	0	207	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.66E-06
Beryllium	1.2	0	1.20	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.60E-09
Cadmium	1.4	0	1.40	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.12E-08
Chromium	30.4	0	30.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.43E-07
Cobalt	27.2	0	27.2	Inorganic	Yes	4.00E-04	1	NA	NA	NA	8.70E-08
Cyanide	11.1	2.79	8.31	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.65E-08
Iron	36694	0	36694	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.94E-04
Lead	3.65	0	3.65	Inorganic	Yes	1.00E-04	1	NA	NA	NA	2.92E-09
Manganese	3312	0	3312	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.65E-05
Vanadium	8.21	0	8.21	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.57E-08

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 16
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
DEEP GROUNDWATER OUTSIDE THE LANDFILL
INDUSTRIAL WORKERS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	4	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1-Dichloroethane	3.7	0.495	3.20	Organic	Yes	6.75E-03	1	3.77E-01	2.58E-02	9.04E-01	1.01E-07
Benzene	0.76	0.113	0.647	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	4.25E-08
Chloroform	1.2	0.144	1.06	Organic	Yes	6.83E-03	1	4.90E-01	2.87E-02	1.18E+00	3.53E-08
cis-1,2-Dichloroethene	2000	266	1734	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	8.78E-05
Trichloroethene	330	39.4	291	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	1.69E-05
Vinyl Chloride	11	1.88	9.12	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	3.35E-07
1,4-Dioxane	22	0.066	21.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	3.39E-08
Benzo(a)pyrene	0.077	0	0.077	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	7	0	7.00	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.32	0	0.320	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	0	0.390	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	0.15	0.012	0.138	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	2.98E-08
2,3,7,8-TCDD Equivalents	0.0000028	3.8516E-08	0.000003	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.05	0	0.050	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	0	0.044	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	0.00224	0	0.002	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	1.22E-09
delta-BHC	0.013	0	0.013	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	2.75E-09
Aluminum	31226	0	31226	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.25E-04
Antimony	5.5	0	5.50	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.20E-08
Arsenic	4.58	0	4.58	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.83E-08
Barium	207	0	207	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.28E-07
Beryllium	1.2	0	1.20	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.80E-09
Cadmium	1.4	0	1.40	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.60E-09
Chromium	30.4	0	30.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.22E-07
Cobalt	27.2	0	27.2	Inorganic	Yes	4.00E-04	1	NA	NA	NA	4.35E-08
Cyanide	11.1	2.79	8.31	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.32E-08
Iron	36694	0	36694	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.47E-04
Lead	3.65	0	3.65	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.46E-09
Manganese	3312	0	3312	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.32E-05
Vanadium	8.21	0	8.21	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.28E-08

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 17
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
DEEP GROUNDWATER OUTSIDE THE LANDFILL
CHILD RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	0.54	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1-Dichloroethane	3.7	Organic	Yes	6.75E-03	1	3.77E-01	2.58E-02	9.04E-01	3.11E-08
Benzene	0.76	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	1.23E-08
Chloroform	1.2	Organic	Yes	6.83E-03	1	4.90E-01	2.87E-02	1.18E+00	1.17E-08
cis-1,2-Dichloroethene	2000	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	2.71E-05
Trichloroethene	330	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	5.88E-06
Vinyl Chloride	11	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	9.08E-08
1,4-Dioxane	22	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	8.49E-09
Benzo(a)pyrene	0.077	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	7	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.32	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	0.15	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	1.05E-08
2,3,7,8-TCDD Equivalents	0.0000028	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.05	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	0.00224	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	4.48E-10
delta-BHC	0.013	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	1.01E-09
Aluminum	31226	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.69E-05
Antimony	5.5	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.97E-09
Arsenic	4.58	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.47E-09
Barium	207	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.12E-07
Beryllium	1.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.48E-10
Cadmium	1.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.56E-10
Chromium	30.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.64E-08
Cobalt	27.2	Inorganic	Yes	4.00E-04	1	NA	NA	NA	5.88E-09
Cyanide	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.99E-09
Iron	36694	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.98E-05
Lead	3.65	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.97E-10
Manganese	3312	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.79E-06
Vanadium	8.21	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.43E-09

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 18
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
DEEP GROUNDWATER OUTSIDE THE LANDFILL
CHILD RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \leq t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cw = :		Concentration of chemical in water (ug/L)
tevent = :	0.33	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1-Dichloroethane	3.7	Organic	Yes	6.75E-03	1	3.77E-01	2.58E-02	9.04E-01	2.43E-08
Benzene	0.76	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	9.65E-09
Chloroform	1.2	Organic	Yes	6.83E-03	1	4.90E-01	2.87E-02	1.18E+00	9.11E-09
cis-1,2-Dichloroethene	2000	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	2.12E-05
Trichloroethene (Mutagenic)	330	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	4.60E-06
Vinyl Chloride	11	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	7.10E-08
1,4-Dioxane	22	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	6.64E-09
Benzo(a)pyrene	0.077	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	7	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.32	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	0.15	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	8.22E-09
2,3,7,8-TCDD Equivalents	0.0000028	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.05	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	0.00224	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	3.51E-10
delta-BHC	0.013	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	7.90E-10
Aluminum	31226	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.03E-05
Antimony	5.5	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.82E-09
Arsenic	4.58	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.51E-09
Barium	207	Inorganic	Yes	1.00E-03	1	NA	NA	NA	6.83E-08
Beryllium	1.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.96E-10
Cadmium	1.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	4.62E-10
Chromium	30.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.00E-08
Cobalt	27.2	Inorganic	Yes	4.00E-04	1	NA	NA	NA	3.59E-09
Cyanide	11.1	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.66E-09
Iron	36694	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.21E-05
Lead	3.65	Inorganic	Yes	1.00E-04	1	NA	NA	NA	1.20E-10
Manganese	3312	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.09E-06
Vanadium	8.21	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.71E-09

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 19
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
DEEP GROUNDWATER OUTSIDE THE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \le t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	0.71	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1-Dichloroethane	3.7	0.495	3.20	Organic	Yes	6.75E-03	1	3.77E-01	2.58E-02	9.04E-01	3.09E-08
Benzene	0.76	0.113	0.647	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	1.23E-08
Chloroform	1.2	0.144	1.06	Organic	Yes	6.83E-03	1	4.90E-01	2.87E-02	1.18E+00	1.18E-08
cis-1,2-Dichloroethene	2000	266	1734	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	2.69E-05
Trichloroethene	330	39.4	291	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	5.94E-06
Vinyl Chloride	11	1.88	9.12	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	8.98E-08
1,4-Dioxane	22	0.066	21.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	9.71E-09
Benzo(a)pyrene	0.077	0	0.077	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	7	0	7	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.32	0	0.320	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	0	0.390	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	0.15	0.012	0.138	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	1.11E-08
2,3,7,8-TCDD Equivalents	0.0000028	3.8516E-08	0.0000028	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.05	0	0.05	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	0	0.044	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	0.002	0	0.002	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	5.14E-10
delta-BHC	0.013	0	0.013	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	1.16E-09
Aluminum	31226	0	31226	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.22E-05
Antimony	5.5	0	5.5	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.91E-09
Arsenic	4.58	0	4.58	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.25E-09
Barium	207	0	207	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.47E-07
Beryllium	1.2	0	1.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.52E-10
Cadmium	1.4	0	1.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.94E-10
Chromium	30.4	0	30.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.16E-08
Cobalt	27.2	0	27.2	Inorganic	Yes	4.00E-04	1	NA	NA	NA	7.72E-09
Cyanide	11.1	2.79	8.31	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.90E-09
Iron	36694	0	36694	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.61E-05
Lead	3.65	0	3.65	Inorganic	Yes	1.00E-04	1	NA	NA	NA	2.59E-10
Manganese	3312	0	3312	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.35E-06
Vanadium	8.21	0	8.21	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.83E-09

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

TABLE 20
CALCULATION OF DAevent FOR EXPOSURES TO GROUNDWATER
DEEP GROUNDWATER OUTSIDE THE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

For Inorganics DAevent = Kp x Cw x CF x tevent

For Organics $If\ t_{event} \leq t^*, then:\ DA_{event} = 2 \times FA \times KP \times C_w \times CF \times \sqrt{\frac{6 \times tau \times t_{event}}{\pi}}$

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

Cw = Cgw - Cwd

DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
Cgw = :		Concentration of chemical in water (ug/L)
Cwd = :		Concentration of chemical lost due to volatilization while showering (ug/L) See Appendix G-7 for calculation of Cwd.
Cw = :		Concentration of chemical in water available for dermal exposure (ug/L)
tevent = :	0.25	duration of event (hr/event)
tau = :		Chemical specific lag time (hr)
t* = :		Chemical specific time it takes to reach steady state (hr)
B = :		Chemical specific dimensionless constant
Kp = :		Chemical specific permeability constant (cm/hr)
CF = :	1.0E-06	(L/cm3)(mg/ug)
FA = :		Fraction absorbed (dimensionless)

CHEMICAL	Cgw (ug/L)	Cwd (ug/L)	Cw (ug/L)	Organic or Inorganic	In EPD?(1)	Estimated Kp(2) (cm/hr)	FA(2)	tau-event(2) (hr)	B(2)	t*(2) (hr)	DAevent (mg/cm^2 - event)
1,1-Dichloroethane	3.7	0.495	3.20	Organic	Yes	6.75E-03	1	3.77E-01	2.58E-02	9.04E-01	1.83E-08
Benzene	0.76	0.113	0.647	Organic	Yes	1.49E-02	1	2.88E-01	5.07E-02	6.91E-01	7.14E-09
Chloroform	1.2	0.144	1.06	Organic	Yes	6.83E-03	1	4.90E-01	2.87E-02	1.18E+00	6.98E-09
cis-1,2-Dichloroethene	2000	266	1734	Organic	Yes	1.10E-02	1	3.67E-01	4.17E-02	8.81E-01	1.60E-05
Trichloroethene	330	39.4	291	Organic	Yes	1.16E-02	1	5.72E-01	5.11E-02	1.37E+00	3.52E-06
Vinyl Chloride	11	1.88	9.12	Organic	Yes	8.38E-03	1	2.35E-01	2.55E-02	5.65E-01	5.13E-08
1,4-Dioxane	22	0.066	21.9	Organic	Yes	3.32E-04	1	3.28E-01	1.20E-03	7.86E-01	5.76E-09
Benzo(a)pyrene	0.077	0	0.077	Organic	No	7.13E-01	1	2.72E+00	4.36E+00	1.18E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	7	0	7	Organic	No	1.13E+00	1	1.62E+01	8.59E+00	7.29E+01	0.00E+00
Dibenzo(a,h)anthracene	0.32	0	0.320	Organic	No	9.53E-01	0.6	3.81E+00	6.12E+00	1.69E+01	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	0	0.390	Organic	No	1.24E+00	0.6	3.71E+00	7.93E+00	1.67E+01	0.00E+00
Naphthalene	0.15	0.012	0.138	Organic	Yes	4.66E-02	1	5.49E-01	2.03E-01	1.32E+00	6.58E-09
2,3,7,8-TCDD Equivalents	0.0000028	3.8516E-08	0.000003	Organic	No	8.08E-01	0.5	6.68E+00	5.58E+00	2.95E+01	0.00E+00
Pentadecafluorooctanoic Acid	0.05	0	0.05	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.044	0	0.044	Organic	No	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	0.00224	0	0.002	Organic	Yes	3.26E-02	0.8	1.43E+01	2.45E-01	3.43E+01	3.05E-10
delta-BHC	0.013	0	0.013	Organic	Yes	2.01E-02	0.9	4.47E+00	1.32E-01	1.07E+01	6.88E-10
Aluminum	31226	0	31226	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.81E-06
Antimony	5.5	0	5.5	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.38E-09
Arsenic	4.58	0	4.58	Inorganic	Yes	1.00E-03	1	NA	NA	NA	1.15E-09
Barium	207	0	207	Inorganic	Yes	1.00E-03	1	NA	NA	NA	5.18E-08
Beryllium	1.2	0	1.2	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.00E-10
Cadmium	1.4	0	1.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	3.50E-10
Chromium	30.4	0	30.4	Inorganic	Yes	1.00E-03	1	NA	NA	NA	7.60E-09
Cobalt	27.2	0	27.2	Inorganic	Yes	4.00E-04	1	NA	NA	NA	2.72E-09
Cyanide	11.1	2.79	8.31	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.08E-09
Iron	36694	0	36694	Inorganic	Yes	1.00E-03	1	NA	NA	NA	9.17E-06
Lead	3.65	0	3.65	Inorganic	Yes	1.00E-04	1	NA	NA	NA	9.13E-11
Manganese	3312	0	3312	Inorganic	Yes	1.00E-03	1	NA	NA	NA	8.28E-07
Vanadium	8.21	0	8.21	Inorganic	Yes	1.00E-03	1	NA	NA	NA	2.05E-09

Notes:
1 - Chemicals identified as being outside the effective prediction domain (EPD) on the May 2016 USEPA Regional Screening Level table were not evaluated for dermal exposures to groundwater as recommended by USEPA's RAGS Part E (2004).
2 - Values for Kp, FA, tau-event, D, and t* were obtained from the USEPA Regional Screening Level Table, May 2016.
NA - Not applicable.

APPENDIX G-7

PART 7 – FOSTER AND CHROSTOWSKI SHOWER MODEL

TABLE 1
FOSTER AND CHROSTOWSKI SHOWER MODEL
INSIDE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$

$K = Ds + \{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]\}/Ra$

$S = Cwd \times FR/SV$ $\qquad$ $Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$ $\qquad$ $Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$ $\qquad$ $kg = 3000\ cm/hr \times (18/MW)^{0.5}$

Parameter	Value	Definition
Ra =:	0.0167	air exchange rate, (min^{-1})
Ds =:	42.6	shower duration, (min)
Dt =:	60	total time in bathroom, (min)
Fr =:	10	shower water flow rate, (L/min)
Sv =:	12	shower room air volume, (m^3)
ts =:	0.5	shower dropler drop time, (sec)
d =:	1	shower droplet diameter, (mm)
T1 =:	293	calibration water temperature, (K)
Ts =:	318	shower water temperature, (K)
U1 =:	1.002	water viscosity at T1, (cp)
Us =:	0.596	water viscosity at Ts, (cp)
S =:	chemical-specific	volatile chemical generation rate (mg/m3-min - shower)
Cw =:	chemical-specific	chemical concentration in groundwater (mg/L)
MW =:	chemical-specific	molecular weight of compound (g/mole)
H =:	chemical-specific	Henry's Law constant (atm-m3/mole)
K =:	19.78	mass transfer coefficient, (min)

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
1,3-Dichlorobenzene	0.77	Yes	1.47E+02	2.63E-03	1.09E+01	1.05E+03	9.99E+00	1.35E+01	8.19E-05	6.83E-05	5.63E-05
1,4-Dichlorobenzene	1.89	Yes	1.47E+02	2.41E-03	1.09E+01	1.05E+03	9.91E+00	1.34E+01	2.00E-04	1.66E-04	1.37E-04
Benzene	1.6	Yes	7.81E+01	5.55E-03	1.50E+01	1.44E+03	1.44E+01	1.94E+01	2.39E-04	1.99E-04	1.64E-04
Chlorobenzene	30.3	Yes	1.13E+02	3.11E-03	1.25E+01	1.20E+03	1.16E+01	1.56E+01	3.70E-03	3.08E-03	2.54E-03
Trichloroethene	2.3	Yes	1.31E+02	9.85E-03	1.16E+01	1.11E+03	1.13E+01	1.52E+01	2.74E-04	2.29E-04	1.88E-04
1,4-Dioxane	91.9	Yes	8.81E+01	4.80E-06	1.41E+01	1.36E+03	2.66E-01	3.59E-01	2.75E-04	2.29E-04	1.89E-04
Benzo(a)anthracene	0.555	Yes	2.28E+02	1.20E-05	8.78E+00	8.42E+02	4.01E-01	5.42E-01	2.50E-06	2.09E-06	1.72E-06
Benzo(a)pyrene	0.83	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Benzo(b)fluoranthene	1.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Benzo(k)fluoranthene	0.53	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dibenzo(a,h)anthracene	0.061	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dibenzofuran	7.4	Yes	1.68E+02	2.13E-04	1.02E+01	9.81E+02	4.70E+00	6.35E+00	3.81E-04	3.18E-04	2.62E-04
Indeno(1,2,3-cd)pyrene	0.48	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Naphthalene	1.1	Yes	1.28E+02	4.40E-04	1.17E+01	1.12E+03	7.47E+00	1.01E+01	8.87E-05	7.39E-05	6.09E-05
Pentachlorophenol	0.191	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Phenanthrene	8.21	Yes	1.78E+02	4.22E-05	9.94E+00	9.54E+02	1.43E+00	1.94E+00	1.31E-04	1.10E-04	9.03E-05
2,3,7,8-TCDD Equivalents	0.0025	Yes	3.22E+02	5.00E-05	7.39E+00	7.09E+02	1.23E+00	1.66E+00	3.44E-08	2.87E-08	2.36E-08

TABLE 1
FOSTER AND CHROSTOWSKI SHOWER MODEL
INSIDE LANDFILL
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
Pentadecafluorooctanoic Acid	0.29	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	1.00E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDE	5.50E-02	Yes	3.18E+02	4.16E-05	7.44E+00	7.14E+02	1.06E+00	1.43E+00	6.52E-07	5.43E-07	4.48E-07
Aldrin	4.70E-02	Yes	3.65E+02	4.40E-05	6.94E+00	6.66E+02	1.04E+00	1.40E+00	5.46E-07	4.55E-07	3.75E-07
beta-BHC	4.20E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
delta-BHC	3.40E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	2.20E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Heptachlor	4.90E-03	Yes	3.73E+02	2.94E-04	6.87E+00	6.59E+02	3.71E+00	5.01E+00	2.00E-07	1.67E-07	1.38E-07
Heptachlor Epoxide	9.00E-04	Yes	3.89E+02	2.10E-05	6.72E+00	6.45E+02	5.20E-01	7.03E-01	5.25E-09	4.38E-09	3.61E-09
gamma-BHC (Lindane)	4.40E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dioxin-Like PCBs	2.50E-04	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	1.33E-08	1.11E-08	9.11E-09
Nondioxin-Like PCBs	132	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	7.00E-03	5.83E-03	4.81E-03
Aluminum	11,530	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Antimony	27.8	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Arsenic	25.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Barium	1,222	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Beryllium	8	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Boron	2,351	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cadmium	21.9	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Chromium	151	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cobalt	12.6	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Copper	280	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cyanide	108	Yes	2.60E+01	2.42E-02	2.60E+01	2.50E+03	2.57E+01	3.48E+01	2.72E-02	2.26E-02	1.87E-02
Iron	52,850	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Lead	226	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Manganese	4,642	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Mercury	8.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Nickel	132	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Silver	26.3	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Thallium	2.9	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Vanadium	90.7	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Zinc	1,626	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

Notes:
1 - An air concentration is only calculated for those chemicals identified as being volatile on the USEPA Regional Screening Level Table, May 2016.
2 - Molecular weight (MW) and Henry's Law Constant (H) are from the May 2016 USEPA Regional Screening Level Table.
NA - Not applicable.

TABLE 2
FOSTER AND CHROSTOWSKI SHOWER MODEL
INSIDE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$

$K = Ds + \{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]\}/Ra$

$S = Cwd \times FR/SV$

$Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$

$Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$

$kg = 3000\ cm/hr \times (18/MW)^{0.5}$

Parameter	Value	Definition
Ra =:	0.0167	air exchange rate, (min^{-1})
Ds =:	10	shower duration, (min)
Dt =:	15	total time in bathroom, (min)
Fr =:	10	shower water flow rate, (L/min)
Sv =:	12	shower room air volume, (m^3)
ts =:	0.5	shower dropler drop time, (sec)
d =:	1	shower droplet diameter, (mm)
T1 =:	293	calibration water temperature, (K)
Ts =:	318	shower water temperature, (K)
U1 =:	1.002	water viscosity at T1, (cp)
Us =:	0.596	water viscosity at Ts, (cp)
S =:	chemical-specific	volatile chemical generation rate (mg/m3-min - shower)
Cw =:	chemical-specific	chemical concentration in groundwater (mg/L)
MW =:	chemical-specific	molecular weight of compound (g/mole)
H =:	chemical-specific	Henry's Law constant (atm-m3/mole)
K =:	1.53	mass transfer coefficient, (min)

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
1,3-Dichlorobenzene	0.77	Yes	1.47E+02	2.63E-03	1.09E+01	1.05E+03	9.99E+00	1.35E+01	8.19E-05	6.83E-05	4.34E-06
1,4-Dichlorobenzene	1.89	Yes	1.47E+02	2.41E-03	1.09E+01	1.05E+03	9.91E+00	1.34E+01	2.00E-04	1.66E-04	1.06E-05
Benzene	1.6	Yes	7.81E+01	5.55E-03	1.50E+01	1.44E+03	1.44E+01	1.94E+01	2.39E-04	1.99E-04	1.27E-05
Chlorobenzene	30.3	Yes	1.13E+02	3.11E-03	1.25E+01	1.20E+03	1.16E+01	1.56E+01	3.70E-03	3.08E-03	1.96E-04
Trichloroethene	2.3	Yes	1.31E+02	9.85E-03	1.16E+01	1.11E+03	1.13E+01	1.52E+01	2.74E-04	2.29E-04	1.45E-05
1,4-Dioxane	91.9	Yes	8.81E+01	4.80E-06	1.41E+01	1.36E+03	2.66E-01	3.59E-01	2.75E-04	2.29E-04	1.45E-05
Benzo(a)anthracene	0.555	Yes	2.28E+02	1.20E-05	8.78E+00	8.42E+02	4.01E-01	5.42E-01	2.50E-06	2.09E-06	1.33E-07
Benzo(a)pyrene	0.83	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Benzo(b)fluoranthene	1.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Benzo(k)fluoranthene	0.53	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Bis(2-ethylhexyl)phthalate	12.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dibenzo(a,h)anthracene	0.061	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dibenzofuran	7.4	Yes	1.68E+02	2.13E-04	1.02E+01	9.81E+02	4.70E+00	6.35E+00	3.81E-04	3.18E-04	2.02E-05
Indeno(1,2,3-cd)pyrene	0.48	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Naphthalene	1.1	Yes	1.28E+02	4.40E-04	1.17E+01	1.12E+03	7.47E+00	1.01E+01	8.87E-05	7.39E-05	4.70E-06
Pentachlorophenol	0.191	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Phenanthrene	8.21	Yes	1.78E+02	4.22E-05	9.94E+00	9.54E+02	1.43E+00	1.94E+00	1.31E-04	1.10E-04	6.96E-06
2,3,7,8-TCDD Equivalents	0.0025	Yes	3.22E+02	5.00E-05	7.39E+00	7.09E+02	1.23E+00	1.66E+00	3.44E-08	2.87E-08	1.82E-09

TABLE 2
FOSTER AND CHROSTOWSKI SHOWER MODEL
INSIDE LANDFILL
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
Pentadecafluorooctanoic Acid	0.29	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.52	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDD	1.00E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
4,4'-DDE	5.50E-02	Yes	3.18E+02	4.16E-05	7.44E+00	7.14E+02	1.06E+00	1.43E+00	6.52E-07	5.43E-07	3.45E-08
Aldrin	4.70E-02	Yes	3.65E+02	4.40E-05	6.94E+00	6.66E+02	1.04E+00	1.40E+00	5.46E-07	4.55E-07	2.89E-08
beta-BHC	4.20E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
delta-BHC	3.40E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	2.20E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Heptachlor	4.90E-03	Yes	3.73E+02	2.94E-04	6.87E+00	6.59E+02	3.71E+00	5.01E+00	2.00E-07	1.67E-07	1.06E-08
Heptachlor Epoxide	9.00E-04	Yes	3.89E+02	2.10E-05	6.72E+00	6.45E+02	5.20E-01	7.03E-01	5.25E-09	4.38E-09	2.78E-10
gamma-BHC (Lindane)	4.40E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dioxin-Like PCBs	2.50E-04	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	1.33E-08	1.11E-08	7.02E-10
Nondioxin-Like PCBs	132	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	7.00E-03	5.83E-03	3.71E-04
Aluminum	11,530	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Antimony	27.8	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Arsenic	25.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Barium	1,222	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Beryllium	8	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Boron	2,351	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cadmium	21.9	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Chromium	151	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cobalt	12.6	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Copper	280	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cyanide	108	Yes	2.60E+01	2.42E-02	2.60E+01	2.50E+03	2.57E+01	3.48E+01	2.72E-02	2.26E-02	1.44E-03
Iron	52,850	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Lead	226	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Manganese	4,642	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Mercury	8.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Nickel	132	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Silver	26.3	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Thallium	2.9	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Vanadium	90.7	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Zinc	1,626	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

Notes:
1 - An air concentration is only calculated for those chemicals identified as being volatile on the USEPA Regional Screening Level Table, May 2016.
2 - Molecular weight (MW) and Henry's Law Constant (H) are from the May 2016 USEPA Regional Screening Level Table.
NA - Not applicable.

TABLE 3
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - SHALLOW WELLS
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

Cair = [(S x 1 shower/day)/(Ra x 1440 min/day)] x K

K = Ds + {exp(-Ra x Dt) - exp[Ra x (Ds - Dt)]}/Ra

S = Cwd x FR/SV

Cwd = Cw x [1-exp(-Kal x ts/60d)]

Kal = Kl x $[(T1 \times Us)/(Ts \times U1)^{-0.5}$

Kl = 1/[1/k1 + RT/(H x kg)]

k1 = 20 cm/hr x $(44/MW)^{0.5}$

kg = 3000 cm/hr x $(18/MW)^{0.5}$

Parameter	Value	Definition
Ra =:	0.0167	air exchange rate, (min^{-1})
Ds =:	42.6	shower duration, (min)
Dt =:	60	total time in bathroom, (min)
Fr =:	10	shower water flow rate, (L/min)
Sv =:	12	shower room air volume, (m^3)
ts =:	0.5	shower dropler drop time, (sec)
d =:	1	shower droplet diameter, (mm)
T1 =:	293	calibration water temperature, (K)
Ts =:	318	shower water temperature, (K)
U1 =:	1.002	water viscosity at T1, (cp)
Us =:	0.596	water viscosity at Ts, (cp)
S =:	chemical-specific	volatile chemical generation rate (mg/m3-min - shower)
Cw =:	chemical-specific	chemical concentration in groundwater (mg/L)
MW =:	chemical-specific	molecular weight of compound (g/mole)
H =:	chemical-specific	Henry's Law constant (atm-m3/mole)
K =:	19.78	mass transfer coefficient, (min)

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] ($atm\text{-}m^3/mol$)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S ($mg/m^3\text{-}min$)	Cair (mg/m^3)
1,1,2-Trichloroethane	0.12	Yes	1.33E+02	8.24E-04	1.15E+01	1.10E+03	8.81E+00	1.19E+01	1.13E-05	9.44E-06	7.78E-06
1,2-Dibromo-3-Chloropropane	0.23	Yes	2.36E+02	1.47E-04	8.63E+00	8.28E+02	3.19E+00	4.31E+00	8.12E-06	6.76E-06	5.57E-06
1,2-Dichloroethane	1.1	Yes	9.90E+01	1.18E-03	1.33E+01	1.28E+03	1.10E+01	1.49E+01	1.28E-04	1.07E-04	8.80E-05
1,4-Dichlorobenzene	0.92	Yes	1.47E+02	2.41E-03	1.09E+01	1.05E+03	9.91E+00	1.34E+01	9.71E-05	8.09E-05	6.67E-05
2-Hexanone	5.6	Yes	1.00E+02	9.32E-05	1.33E+01	1.27E+03	3.60E+00	4.86E+00	2.22E-04	1.85E-04	1.53E-04
Benzene	5.8	Yes	7.81E+01	5.55E-03	1.50E+01	1.44E+03	1.44E+01	1.94E+01	8.66E-04	7.22E-04	5.95E-04
cis-1,2-Dichloroethene	54	Yes	9.69E+01	4.08E-03	1.35E+01	1.29E+03	1.27E+01	1.71E+01	7.19E-03	5.99E-03	4.94E-03
Ethylbenzene	4.4	Yes	1.06E+02	7.88E-03	1.29E+01	1.24E+03	1.25E+01	1.69E+01	5.77E-04	4.81E-04	3.96E-04
m+p-Xylenes	26	Yes	1.06E+02	6.63E-03	1.29E+01	1.24E+03	1.24E+01	1.68E+01	3.39E-03	2.82E-03	2.33E-03
Trichloroethene	6.2	Yes	1.31E+02	9.85E-03	1.16E+01	1.11E+03	1.13E+01	1.52E+01	7.40E-04	6.16E-04	5.08E-04
Vinyl Chloride	4.2	Yes	6.25E+01	2.78E-02	1.68E+01	1.61E+03	1.66E+01	2.25E+01	7.17E-04	5.98E-04	4.92E-04
1,4-Dioxane	56.6	Yes	8.81E+01	4.80E-06	1.41E+01	1.36E+03	2.66E-01	3.59E-01	1.69E-04	1.41E-04	1.16E-04
2,6-Dinitrotoluene	8.6	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
2-Methylnaphthalene	9.3	Yes	1.42E+02	5.18E-04	1.11E+01	1.07E+03	7.50E+00	1.01E+01	7.53E-04	6.27E-04	5.17E-04
Benzo(a)anthracene	0.26	Yes	2.28E+02	1.20E-05	8.78E+00	8.42E+02	4.01E-01	5.42E-01	1.17E-06	9.77E-07	8.05E-07
Benzo(a)pyrene	0.12	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	Yes	1.43E+02	1.70E-05	1.11E+01	1.06E+03	7.05E-01	9.53E-01	9.49E-06	7.91E-06	6.52E-06
Naphthalene	8	Yes	1.28E+02	4.40E-04	1.17E+01	1.12E+03	7.47E+00	1.01E+01	6.45E-04	5.37E-04	4.43E-04

TABLE 3
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - SHALLOW WELLS
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	KI (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
Pentadecafluorooctanoic Acid	1.85	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
2,3,7,8-TCDD Equivalents	3.20E-06	Yes	3.22E+02	5.00E-05	7.39E+00	7.09E+02	1.23E+00	1.66E+00	4.40E-11	3.67E-11	3.02E-11
Aldrin	1.10E-03	Yes	3.65E+02	4.40E-05	6.94E+00	6.66E+02	1.04E+00	1.40E+00	1.28E-08	1.06E-08	8.77E-09
beta-BHC	3.60E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	1.70E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Heptachlor	1.10E-03	Yes	3.73E+02	2.94E-04	6.87E+00	6.59E+02	3.71E+00	5.01E+00	4.50E-08	3.75E-08	3.09E-08
Heptachlor Epoxide	9.50E-04	Yes	3.89E+02	2.10E-05	6.72E+00	6.45E+02	5.20E-01	7.03E-01	5.55E-09	4.62E-09	3.81E-09
Dioxin-Like PCBs	1.40E-06	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	7.43E-11	6.19E-11	5.10E-11
Nondioxin-Like PCBs	0.213	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	1.13E-05	9.42E-06	7.76E-06
Aluminum	7,920	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Antimony	5.3	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Arsenic	18.7	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Barium	515	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Boron	738	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cadmium	1.84	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Chromium	8.03	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cobalt	13	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Copper	22.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cyanide	16.8	Yes	2.60E+01	2.42E-02	2.60E+01	2.50E+03	2.57E+01	3.48E+01	4.23E-03	3.52E-03	2.90E-03
Iron	39,590	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Lead	87.6	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Manganese	10,800	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Mercury	0.075	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Silver	25.3	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Thallium	3.9	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Vanadium	11.1	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Zinc	37.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

Notes:
1 - An air concentration is only calculated for those chemicals identified as being volatile on the USEPA Regional Screening Level Table, May 2016.
2 - Molecular weight (MW) and Henry's Law Constant (H) are from the May 2016 USEPA Regional Screening Level Table.
NA - Not applicable.

TABLE 4
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - SHALLOW WELLS
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$

$K = Ds + \{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]\}/Ra$

$S = Cwd \times FR/SV$

$Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$

$Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$

$kg = 3000\ cm/hr \times (18/MW)^{0.5}$

Parameter	Value	Definition
Ra =:	0.0167	air exchange rate, (min^{-1})
Ds =:	10	shower duration, (min)
Dt =:	15	total time in bathroom, (min)
Fr =:	10	shower water flow rate, (L/min)
Sv =:	12	shower room air volume, (m^3)
ts =:	0.5	shower dropler drop time, (sec)
d =:	1	shower droplet diameter, (mm)
T1 =:	293	calibration water temperature, (K)
Ts =:	318	shower water temperature, (K)
U1 =:	1.002	water viscosity at T1, (cp)
Us =:	0.596	water viscosity at Ts, (cp)
S =:	chemical-specific	volatile chemical generation rate (mg/m3-min - shower)
Cw =:	chemical-specific	chemical concentration in groundwater (mg/L)
MW =:	chemical-specific	molecular weight of compound (g/mole)
H =:	chemical-specific	Henry's Law constant (atm-m3/mole)
K =:	1.53	mass transfer coefficient, (min)

Chemical	Cw (ug/L)	Volatile[(1)]	MW[(2)] (g/mole)	H[(2)] ($atm\text{-}m^3/mol$)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
1,1,2-Trichloroethane	0.12	Yes	1.33E+02	8.24E-04	1.15E+01	1.10E+03	8.81E+00	1.19E+01	1.13E-05	9.44E-06	6.00E-07
1,2-Dibromo-3-Chloropropane	0.23	Yes	2.36E+02	1.47E-04	8.63E+00	8.28E+02	3.19E+00	4.31E+00	8.12E-06	6.76E-06	4.30E-07
1,2-Dichloroethane	1.1	Yes	9.90E+01	1.18E-03	1.33E+01	1.28E+03	1.10E+01	1.49E+01	1.28E-04	1.07E-04	6.79E-06
1,4-Dichlorobenzene	0.92	Yes	1.47E+02	2.41E-03	1.09E+01	1.05E+03	9.91E+00	1.34E+01	9.71E-05	8.09E-05	5.14E-06
2-Hexanone	5.6	Yes	1.00E+02	9.32E-05	1.33E+01	1.27E+03	3.60E+00	4.86E+00	2.22E-04	1.85E-04	1.18E-05
Benzene	5.8	Yes	7.81E+01	5.55E-03	1.50E+01	1.44E+03	1.44E+01	1.94E+01	8.66E-04	7.22E-04	4.59E-05
cis-1,2-Dichloroethene	54	Yes	9.69E+01	4.08E-03	1.35E+01	1.29E+03	1.27E+01	1.71E+01	7.19E-03	5.99E-03	3.81E-04
Ethylbenzene	4.4	Yes	1.06E+02	7.88E-03	1.29E+01	1.24E+03	1.25E+01	1.69E+01	5.77E-04	4.81E-04	3.05E-05
m+p-Xylenes	26	Yes	1.06E+02	6.63E-03	1.29E+01	1.24E+03	1.24E+01	1.68E+01	3.39E-03	2.82E-03	1.79E-04
Trichloroethene	6.2	Yes	1.31E+02	9.85E-03	1.16E+01	1.11E+03	1.13E+01	1.52E+01	7.40E-04	6.16E-04	3.92E-05
Vinyl Chloride	4.2	Yes	6.25E+01	2.78E-02	1.68E+01	1.61E+03	1.66E+01	2.25E+01	7.17E-04	5.98E-04	3.80E-05
1,4-Dioxane	56.6	Yes	8.81E+01	4.80E-06	1.41E+01	1.36E+03	2.66E-01	3.59E-01	1.69E-04	1.41E-04	8.96E-06
2,6-Dinitrotoluene	8.6	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
2-Methylnaphthalene	9.3	Yes	1.42E+02	5.18E-04	1.11E+01	1.07E+03	7.50E+00	1.01E+01	7.53E-04	6.27E-04	3.99E-05
Benzo(a)anthracene	0.26	Yes	2.28E+02	1.20E-05	8.78E+00	8.42E+02	4.01E-01	5.42E-01	1.17E-06	9.77E-07	6.21E-08
Benzo(a)pyrene	0.12	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Bis(2-Chloroethyl)Ether	1.2	Yes	1.43E+02	1.70E-05	1.11E+01	1.06E+03	7.05E-01	9.53E-01	9.49E-06	7.91E-06	5.03E-07
Naphthalene	8	Yes	1.28E+02	4.40E-04	1.17E+01	1.12E+03	7.47E+00	1.01E+01	6.45E-04	5.37E-04	3.42E-05

TABLE 4
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - SHALLOW WELLS
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
Pentadecafluorooctanoic Acid	1.85	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	0.26	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Pentachlorophenol	0.49	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
2,3,7,8-TCDD Equivalents	3.20E-06	Yes	3.22E+02	5.00E-05	7.39E+00	7.09E+02	1.23E+00	1.66E+00	4.40E-11	3.67E-11	2.33E-12
Aldrin	1.10E-03	Yes	3.65E+02	4.40E-05	6.94E+00	6.66E+02	1.04E+00	1.40E+00	1.28E-08	1.06E-08	6.77E-10
beta-BHC	3.60E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	1.70E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Heptachlor	1.10E-03	Yes	3.73E+02	2.94E-04	6.87E+00	6.59E+02	3.71E+00	5.01E+00	4.50E-08	3.75E-08	2.38E-09
Heptachlor Epoxide	9.50E-04	Yes	3.89E+02	2.10E-05	6.72E+00	6.45E+02	5.20E-01	7.03E-01	5.55E-09	4.62E-09	2.94E-10
Dioxin-Like PCBs	1.40E-06	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	7.43E-11	6.19E-11	3.93E-12
Nondioxin-Like PCBs	0.213	Yes	2.92E+02	4.15E-04	7.76E+00	7.45E+02	4.84E+00	6.54E+00	1.13E-05	9.42E-06	5.98E-07
Aluminum	7,920	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Antimony	5.3	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Arsenic	18.7	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Barium	515	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Boron	738	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cadmium	1.84	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Chromium	8.03	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cobalt	13	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Copper	22.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cyanide	16.8	Yes	2.60E+01	2.42E-02	2.60E+01	2.50E+03	2.57E+01	3.48E+01	4.23E-03	3.52E-03	2.24E-04
Iron	39,590	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Lead	87.6	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Manganese	10,800	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Mercury	0.075	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Silver	25.3	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Thallium	3.9	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Vanadium	11.1	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Zinc	37.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

Notes:
1 - An air concentration is only calculated for those chemicals identified as being volatile on the USEPA Regional Screening Level Table, May 2016.
2 - Molecular weight (MW) and Henry's Law Constant (H) are from the May 2016 USEPA Regional Screening Level Table.
NA - Not applicable.

TABLE 5
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - DEEP WELLS
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

RELEVANT EQUATIONS:

$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$

$K = Ds + \{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]\}/Ra$

$S = Cwd \times FR/SV$ $\qquad$ $Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$ $\qquad$ $Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$ $\qquad$ $kg = 3000\ cm/hr \times (18/MW)^{0.5}$

Parameter	Value	Definition
Ra =:	0.02	air exchange rate, (min^{-1})
Ds =:	42.6	shower duration, (min)
Dt =:	60	total time in bathroom, (min)
Fr =:	10	shower water flow rate, (L/min)
Sv =:	12	shower room air volume, (m^3)
ts =:	0.5	shower dropler drop time, (sec)
d =:	1	shower droplet diameter, (mm)
T1 =:	293	calibration water temperature, (K)
Ts =:	318	shower water temperature, (K)
U1 =:	1.002	water viscosity at T1, (cp)
Us =:	0.596	water viscosity at Ts, (cp)
Cw =:	chemical-specific	chemical concentration in groundwater (mg/L)
MW =:	chemical-specific	molecular weight of compound (g/mole)
H =:	chemical-specific	Henry's Law constant (atm-m3/mole)
K =:	19.78	mass transfer coefficient, (min)

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
1,1-Dichloroethane	3.7	Yes	9.90E+01	5.62E-03	1.33E+01	1.28E+03	1.28E+01	1.72E+01	4.95E-04	4.13E-04	3.40E-04
Benzene	0.76	Yes	7.81E+01	5.55E-03	1.50E+01	1.44E+03	1.44E+01	1.94E+01	1.13E-04	9.45E-05	7.79E-05
Chloroform	1.2	Yes	1.19E+02	3.67E-03	1.21E+01	1.16E+03	1.14E+01	1.54E+01	1.44E-04	1.20E-04	9.90E-05
cis-1,2-Dichloroethene	2,000	Yes	9.69E+01	4.08E-03	1.35E+01	1.29E+03	1.27E+01	1.71E+01	2.66E-01	2.22E-01	1.83E-01
Trichloroethene	330	Yes	1.31E+02	9.85E-03	1.16E+01	1.11E+03	1.13E+01	1.52E+01	3.94E-02	3.28E-02	2.70E-02
Vinyl Chloride	11	Yes	6.25E+01	2.78E-02	1.68E+01	1.61E+03	1.66E+01	2.25E+01	1.88E-03	1.57E-03	1.29E-03
1,4-Dioxane	22	Yes	8.81E+01	4.80E-06	1.41E+01	1.36E+03	2.66E-01	3.59E-01	6.57E-05	5.48E-05	4.51E-05
Benzo(a)pyrene	0.077	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Bis(2-ethylhexyl)phthalate	7	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dibenzo(a,h)anthracene	0.32	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Naphthalene	0.15	Yes	1.28E+02	4.40E-04	1.17E+01	1.12E+03	7.47E+00	1.01E+01	1.21E-05	1.01E-05	8.30E-06
2,3,7,8-TCDD Equivalents	2.80E-06	Yes	3.22E+02	5.00E-05	7.39E+00	7.09E+02	1.23E+00	1.66E+00	3.85E-11	3.21E-11	2.64E-11
Pentadecafluorooctanoic Acid	5.00E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	4.40E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	2.24E-03	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
delta-BHC	1.30E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Aluminum	31,226	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Antimony	5.5	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

TABLE 5
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - DEEP WELLS
ADULT RESIDENTS - REASONABLE MAXIMUM EXPOSURES

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
Arsenic	4.58	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Barium	207	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Beryllium	1.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cadmium	1.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Chromium	30.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cobalt	27.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cyanide	11.1	Yes	2.60E+01	2.42E-02	2.60E+01	2.50E+03	2.57E+01	3.48E+01	2.79E-03	2.33E-03	1.92E-03
Iron	36,694	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Lead	3.65	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Manganese	3,312	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Vanadium	8.21	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

Notes:
1 - An air concentration is only calculated for those chemicals identified as being volatile on the USEPA Regional Screening Level Table, May 2016.
2 - Molecular weight (MW) and Henry's Law Constant (H) are from the May 2016 USEPA Regional Screening Level Table.
NA - Not applicable.

TABLE 6
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - DEEP WELLS
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

RELEVANT EQUATIONS:

$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$

$K = Ds + \{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]\}/Ra$

$S = Cwd \times FR/SV$ $\qquad$ $Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$ $\qquad$ $Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$ $\qquad$ $kg = 3000\ cm/hr \times (18/MW)^{0.5}$

Parameter	Value	Definition
Ra =:	0.0167	air exchange rate, (min^{-1})
Ds =:	10	shower duration, (min)
Dt =:	15	total time in bathroom, (min)
Fr =:	10	shower water flow rate, (L/min)
Sv =:	12	shower room air volume, (m^3)
ts =:	0.5	shower dropler drop time, (sec)
d =:	1	shower droplet diameter, (mm)
T1 =:	293	calibration water temperature, (K)
Ts =:	318	shower water temperature, (K)
U1 =:	1.002	water viscosity at T1, (cp)
Us =:	0.596	water viscosity at Ts, (cp)
Cw =:	chemical-specific	chemical concentration in groundwater (mg/L)
MW =:	chemical-specific	molecular weight of compound (g/mole)
H =:	chemical-specific	Henry's Law constant (atm-m3/mole)
K =:	1.53	mass transfer coefficient, (min)

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
1,1-Dichloroethane	3.7	Yes	9.90E+01	5.62E-03	1.33E+01	1.28E+03	1.28E+01	1.72E+01	4.95E-04	4.13E-04	2.62E-05
Benzene	0.76	Yes	7.81E+01	5.55E-03	1.50E+01	1.44E+03	1.44E+01	1.94E+01	1.13E-04	9.45E-05	6.01E-06
Chloroform	1.2	Yes	1.19E+02	3.67E-03	1.21E+01	1.16E+03	1.14E+01	1.54E+01	1.44E-04	1.20E-04	7.63E-06
cis-1,2-Dichloroethene	2,000	Yes	9.69E+01	4.08E-03	1.35E+01	1.29E+03	1.27E+01	1.71E+01	2.66E-01	2.22E-01	1.41E-02
Trichloroethene	330	Yes	1.31E+02	9.85E-03	1.16E+01	1.11E+03	1.13E+01	1.52E+01	3.94E-02	3.28E-02	2.09E-03
Vinyl Chloride	11	Yes	6.25E+01	2.78E-02	1.68E+01	1.61E+03	1.66E+01	2.25E+01	1.88E-03	1.57E-03	9.95E-05
1,4-Dioxane	22	Yes	8.81E+01	4.80E-06	1.41E+01	1.36E+03	2.66E-01	3.59E-01	6.57E-05	5.48E-05	3.48E-06
Benzo(a)pyrene	0.077	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Bis(2-ethylhexyl)phthalate	7	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dibenzo(a,h)anthracene	0.32	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Indeno(1,2,3-cd)pyrene	0.39	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Naphthalene	0.15	Yes	1.28E+02	4.40E-04	1.17E+01	1.12E+03	7.47E+00	1.01E+01	1.21E-05	1.01E-05	6.41E-07
2,3,7,8-TCDD Equivalents	2.80E-06	Yes	3.22E+02	5.00E-05	7.39E+00	7.09E+02	1.23E+00	1.66E+00	3.85E-11	3.21E-11	2.04E-12
Pentadecafluorooctanoic Acid	5.00E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Perfluorooctane Sulfonic Acid	4.40E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Dieldrin	2.24E-03	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
delta-BHC	1.30E-02	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Aluminum	31,226	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Antimony	5.5	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

TABLE 6
FOSTER AND CHROSTOWSKI SHOWER MODEL
OUTSIDE LANDFILL - DEEP WELLS
ADULT RESIDENTS - CENTRAL TENDENCY EXPOSURES

Chemical	Cw (ug/L)	Volatile[1]	MW[2] (g/mole)	H[2] (atm-m^3/mol)	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S (mg/m^3-min)	Cair (mg/m^3)
Arsenic	4.58	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Barium	207	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Beryllium	1.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cadmium	1.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Chromium	30.4	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cobalt	27.2	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Cyanide	11.1	Yes	2.60E+01	2.42E-02	2.60E+01	2.50E+03	2.57E+01	3.48E+01	2.79E-03	2.33E-03	1.48E-04
Iron	36,694	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Lead	3.65	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Manganese	3312	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00
Vanadium	8.21	No	NA	NA	NA	NA	NA	NA	NA	NA	0.00E+00

Notes:
1 - An air concentration is only calculated for those chemicals identified as being volatile on the USEPA Regional Screening Level Table, May 2016.
2 - Molecular weight (MW) and Henry's Law Constant (H) are from the May 2016 USEPA Regional Screening Level Table.
NA - Not applicable.

APPENDIX G-8

PART 8 - VDEQ TRENCH MODEL

Inside Landfill

VDEQ TRENCH MODEL RESULTS
GROUNDWATER WELLS INSIDE LANDFILL
LOWER DARBY CREEK AREA

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	**53**	F	ACH	2	hr-1	Depth	**8**	ft
T	285	K					2.44	m
R	8.20E-05	atm-m3/mol-K				Width/Depth	0.38	

VDEQ TRENCH MODEL RESULTS
GROUNDWATER WELLS INSIDE LANDFILL
LOWER DARBY CREEK AREA

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	Concentration of Contaminant in Trench Ctrench mg/m3
1,3-Dichlorobenzene	541-73-1	147.00	2.63E-03	3.94E-01	8.92E-04	8.75E-04	0.77	6.46E+00	4.97E+00	4.97E-03
1,4-Dichlorobenzene	106-46-7	147.00	2.41E-03	3.94E-01	8.92E-04	8.73E-04	1.89	6.45E+00	1.22E+01	1.22E-02
Benzene	71-43-2	78.10	5.55E-03	4.87E-01	1.22E-03	1.21E-03	1.6	8.94E+00	1.43E+01	1.43E-02
Chlorobenzene	108-90-7	113.00	3.11E-03	4.30E-01	1.02E-03	1.00E-03	30.3	7.38E+00	2.24E+02	2.24E-01
Trichloroethene	79-01-6	131.00	9.85E-03	4.10E-01	9.45E-04	9.40E-04	2.3	6.94E+00	1.60E+01	1.60E-02
1,4-Dioxane	123-91-1	88.10	4.80E-06	4.68E-01	1.15E-03	8.87E-05	91.9	6.55E-01	6.02E+01	6.02E-02
Benzo(a)anthracene	56-55-3	228.00	1.20E-05	3.40E-01	7.17E-04	1.40E-04	0.555	1.04E+00	5.75E-01	5.75E-04
Benzo(a)pyrene	50-32-8						0.83			
Benzo(b)fluoranthene	205-99-2						1.4			
Benzo(k)fluoranthene	207-08-9						0.53			
Bis(2-ethylhexyl)phthalate	117-81-7						12.2			
Dibenzo(a,h)anthracene	53-70-3						0.061			
Dibenzofuran	132-64-9	168.00	2.13E-04	3.77E-01	8.35E-04	6.72E-04	7.4	4.96E+00	3.67E+01	3.67E-02
Indeno(1,2,3-cd)pyrene	193-39-5						0.48			
Naphthalene	91-20-3	128.00	4.40E-04	4.13E-01	9.56E-04	8.52E-04	1.1	6.29E+00	6.92E+00	6.92E-03
Pentachlorophenol	87-86-5						0.191			
Phenanthrene	85-01-8	178.00	4.22E-05	3.70E-01	8.11E-04	3.66E-04	8.21	2.70E+00	2.22E+01	2.22E-02
2,3,7,8-TCDD Equivalents	--	322.00	5.00E-05	3.03E-01	6.03E-04	3.12E-04	0.0025	2.31E+00	5.77E-03	5.77E-06
Pentadecafluorooctanoic Acid	335-67-1						0.29			
Perfluorooctane Sulfonic Acid	1763-23-1						0.52			
4,4'-DDD	72-54-8						0.01			
4,4'-DDE	72-55-9	318.00	4.16E-05	3.04E-01	6.07E-04	2.86E-04	0.055	2.11E+00	1.16E-01	1.16E-04
Aldrin	309-00-2	365.00	4.40E-05	2.91E-01	5.66E-04	2.78E-04	0.047	2.05E+00	9.66E-02	9.66E-05
beta-BHC	319-85-7						0.042			
delta-BHC	319-86-8						0.034			
Dieldrin	60-57-1						0.022			
Heptachlor	76-44-8	373.00	2.94E-04	2.89E-01	5.60E-04	4.85E-04	0.0049	3.58E+00	1.76E-02	1.76E-05
Heptachlor Epoxide	1024-57-3	389.00	2.10E-05	2.84E-01	5.49E-04	1.74E-04	0.0009	1.29E+00	1.16E-03	1.16E-06
gamma-BHC (Lindane)	58-89-9						0.044			
Dioxin-Like PCBs	--	292.00	4.15E-04	3.13E-01	6.33E-04	5.68E-04	0.00025	4.20E+00	1.05E-03	1.05E-06
Nondioxin-Like PCBs	--	292	4.15E-04	3.13E-01	6.33E-04	5.68E-04	132	4.20E+00	5.54E+02	5.54E-01
Aluminum	7429-90-5						11,530			
Antimony	7440-36-0						27.8			
Arsenic	7440-38-2						25.2			
Barium	7440-39-3						1,222			
Beryllium	7440-41-7						8			
Boron	7440-42-8						2,351			
Cadmium	7440-43-9						21.9			
Chromium	7440-47-3						151			
Cobalt	7440-48-4						12.6			
Copper	7440-50-8						280			
Cyanide	57-12-5	26.00	2.42E-02	7.04E-01	2.12E-03	2.12E-03	108	1.56E+01	1.69E+03	1.69E+00
Iron	7439-89-6						52,850			
Lead	7439-92-1						226			
Manganese	7439-96-5						4,642			
Mercury	7439-97-6						8.2			
Nickel	7440-02-0						132			
Silver	7440-22-4						26.3			
Thallium	7440-28-0						2.9			
Vanadium	7440-62-2						90.7			
Zinc	7440-66-6						1,626			

Air concentrations were only calculated for those chemicals designated as being volatile in the USEPA RSL Table.

Outside Landfill – Shallow Wells

VDEQ TRENCH MODEL RESULTS
SHALLOW GROUNDWATER WELLS - OUTSIDE LANDFILL
LOWER DARBY CREEK AREA

For Mass-Transfer Coefficients

Kg,H2O	0.833	cm/s
MWH2O	18	
Kl,O2	0.002	cm/s
MWO2	32	
T	**53**	F
T	285	K
R	8.20E-05	atm-m3/mol-K

For Emission Flux and Concentration in Trench

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

Trench dimensions

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

VDEQ TRENCH MODEL RESULTS
SHALLOW GROUNDWATER WELLS - OUTSIDE LANDFILL
LOWER DARBY CREEK AREA

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	Concentration of Contaminant in Trench Ctrench mg/m3
1,1,2-Trichloroethane	79-00-5	133.00	8.24E-04	4.08E-01	9.38E-04	8.81E-04	0.12	6.50E+00	7.80E-01	7.80E-04
1,2-Dibromo-3-Chloropropane	96-12-8	236.00	1.47E-04	3.36E-01	7.04E-04	5.28E-04	0.23	3.90E+00	8.97E-01	8.97E-04
1,2-Dichloroethane	107-06-2	99.00	1.18E-03	4.50E-01	1.09E-03	1.04E-03	1.1	7.66E+00	8.43E+00	8.43E-03
1,4-Dichlorobenzene	106-46-7	147.00	2.41E-03	3.94E-01	8.92E-04	8.73E-04	0.92	6.45E+00	5.93E+00	5.93E-03
2-Hexanone	591-78-6	100.00	9.32E-05	4.48E-01	1.08E-03	6.74E-04	5.6	4.98E+00	2.79E+01	2.79E-02
Benzene	71-43-2	78.10	5.55E-03	4.87E-01	1.22E-03	1.21E-03	5.8	8.94E+00	5.19E+01	5.19E-02
cis-1,2-Dichloroethene	156-59-2	96.90	4.08E-03	4.53E-01	1.10E-03	1.08E-03	54	8.00E+00	4.32E+02	4.32E-01
Ethylbenzene	100-41-4	106.00	7.88E-03	4.40E-01	1.05E-03	1.04E-03	4.4	7.70E+00	3.39E+01	3.39E-02
m+p-Xylenes	--	106.00	6.63E-03	4.40E-01	1.05E-03	1.04E-03	26	7.69E+00	2.00E+02	2.00E-01
Trichloroethene	79-01-6	131.00	9.85E-03	4.10E-01	9.45E-04	9.40E-04	6.2	6.94E+00	4.30E+01	4.30E-02
Vinyl Chloride	75-01-4	62.50	2.78E-02	5.25E-01	1.37E-03	1.37E-03	4.2	1.01E+01	4.23E+01	4.23E-02
1,4-Dioxane	123-91-1	88.10	4.80E-06	4.68E-01	1.15E-03	8.87E-05	56.6	6.55E-01	3.71E+01	3.71E-02
2,6-Dinitrotoluene	606-20-2						8.6			
2-Methylnaphthalene	91-57-6	142.00	5.18E-04	3.99E-01	9.08E-04	8.23E-04	9.3	6.08E+00	5.65E+01	5.65E-02
Benzo(a)anthracene	56-55-3	228.00	1.20E-05	3.40E-01	7.17E-04	1.40E-04	0.26	1.04E+00	2.70E-01	2.70E-04
Benzo(a)pyrene	50-32-8						0.12			
Bis(2-Chloroethyl)Ether	111-44-4	143.00	1.70E-05	3.98E-01	9.05E-04	2.19E-04	1.2	1.62E+00	1.94E+00	1.94E-03
Naphthalene	91-20-3	128.00	4.40E-04	4.13E-01	9.56E-04	8.52E-04	8	6.29E+00	5.03E+01	5.03E-02
Pentadecafluorooctanoic Acid	335-67-1						1.85			
Perfluorooctane Sulfonic Acid	1763-23-1						0.26			
Pentachlorophenol	87-86-5						0.49			
2,3,7,8-TCDD Equivalents	--	322.00	5.00E-05	3.03E-01	6.03E-04	3.12E-04	0.0000032	2.31E+00	7.38E-06	7.38E-09
Aldrin	309-00-2	365.00	4.40E-05	2.91E-01	5.66E-04	2.78E-04	0.0011	2.05E+00	2.26E-03	2.26E-06
beta-BHC	319-85-7						0.036			
Dieldrin	60-57-1						0.017			
Heptachlor	76-44-8	373	2.94E-04	2.89E-01	5.60E-04	4.85E-04	0.0011	3.58E+00	3.94E-03	3.94E-06
Heptachlor Epoxide	1024-57-3	389.00	2.10E-05	2.84E-01	5.49E-04	1.74E-04	0.00095	1.29E+00	1.22E-03	1.22E-06
Dioxin-Like PCBs	--	292.00	4.15E-04	3.13E-01	6.33E-04	5.68E-04	0.0000014	4.20E+00	5.88E-06	5.88E-09
Nondioxin-Like PCBs	--	292.00	4.15E-04	3.13E-01	6.33E-04	5.68E-04	0.213	4.20E+00	8.94E-01	8.94E-04
Aluminum	7429-90-5						7,920			
Antimony	7440-36-0						5.3			
Arsenic	7440-38-2						18.7			
Barium	7440-39-3						515			
Boron	7440-42-8						738			
Cadmium	7440-43-9						1.84			
Chromium	7440-47-3						8.03			
Cobalt	7440-48-4						13			
Copper	7440-50-8						22.4			
Cyanide	57-12-5	26.00	2.42E-02	7.04E-01	2.12E-03	2.12E-03	16.8	1.56E+01	2.62E+02	2.62E-01
Iron	7439-89-6						39,590			
Lead	7439-92-1						87.6			
Manganese	7439-96-5						10,800			
Mercury	7439-97-6						0.075			
Silver	7440-22-4						25.3			
Thallium	7440-28-0						3.9			
Vanadium	7440-62-2						11.1			
Zinc	7440-66-6						37.2			

Air concentrations were only calculated for those chemicals designated as being volatile in the USEPA RSL Table.

APPENDIX G-9

PART 9 - IEUBK MODEL RESULTS

Groundwater Inside Landfill

LEAD MODEL FOR WINDOWS Version 1.1

User Name: Tetra Tech
Date: 07/21/2016
Site Name: Lower Darby Creek Area
Operable Unit: Inside Landfill
Run Mode: Site Risk Assessment

Water Data
Average concentration of lead in groundwater = 226 ug/L.

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 226.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 150.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	200.000	150.000
1-2	200.000	150.000
2-3	200.000	150.000
3-4	200.000	150.000
4-5	200.000	150.000
5-6	200.000	150.000
6-7	200.000	150.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

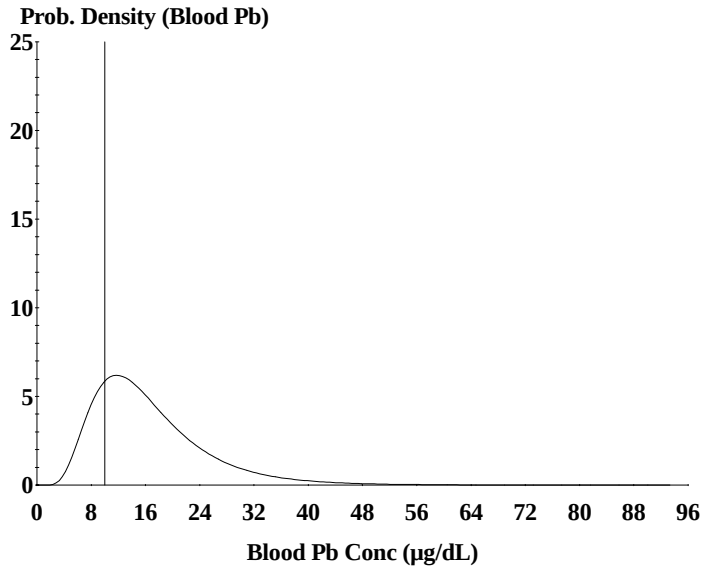
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	0.875	0.000	17.493
1-2	0.034	0.659	0.000	37.965
2-3	0.062	0.741	0.000	40.902
3-4	0.067	0.737	0.000	43.250
4-5	0.067	0.728	0.000	46.431
5-6	0.093	0.779	0.000	49.826
6-7	0.093	0.857	0.000	51.485

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	3.405	21.793	11.4
1-2	4.694	43.353	16.7
2-3	4.863	46.568	16.7
3-4	5.045	49.098	16.5
4-5	3.866	51.092	16.3
5-6	3.541	54.240	16.0
6-7	3.397	55.832	15.3

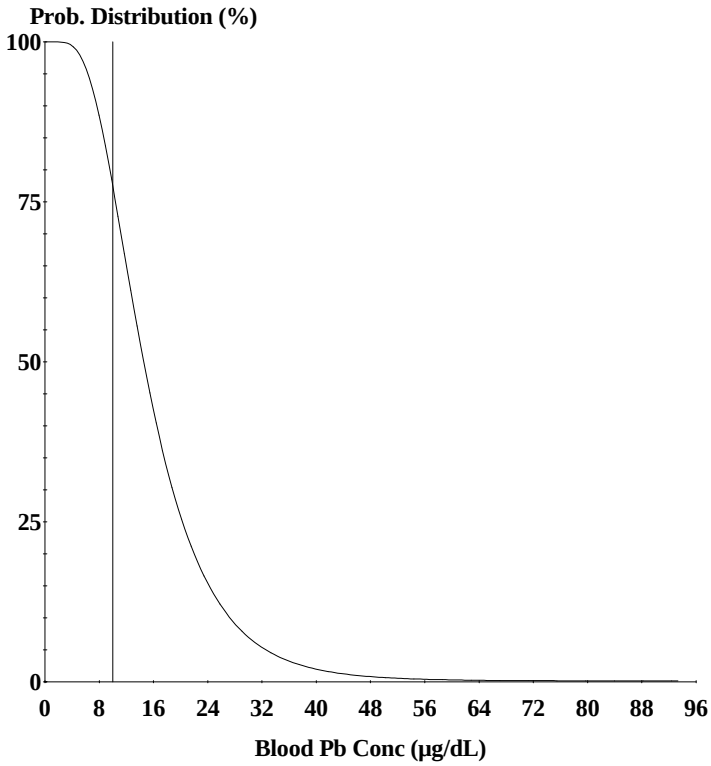


Cutoff = 10.000 µg/dl
Geo Mean = 15.268
GSD = 1.600
% Above = 81.602
% Below = 18.398

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Inside Landfill

User Name: Tetra Tech
Date: 07/21/2016
Site Name: Lower Darby Creek Area
Operable Unit: Inside Landfill
Run Mode: Site Risk Assessment



Cutoff = 10.000 µg/dl
Geo Mean = 15.268
GSD = 1.600
% Above = 81.602

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Inside Landfill

Shallow Groundwater Outside Landfill

LEAD MODEL FOR WINDOWS Version 1.1

User Name: Tetra Tech
Date: 07/21/2016
Site Name: Lower Darby Creek Area
Operable Unit: Outside Landfill - Shallow Groundwater
Run Mode: Site Risk Assessment

Water Data
Average concentration of lead in groundwater = 87.6 ug/L.

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 87.600 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 150.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	200.000	150.000
1-2	200.000	150.000
2-3	200.000	150.000
3-4	200.000	150.000
4-5	200.000	150.000
5-6	200.000	150.000
6-7	200.000	150.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

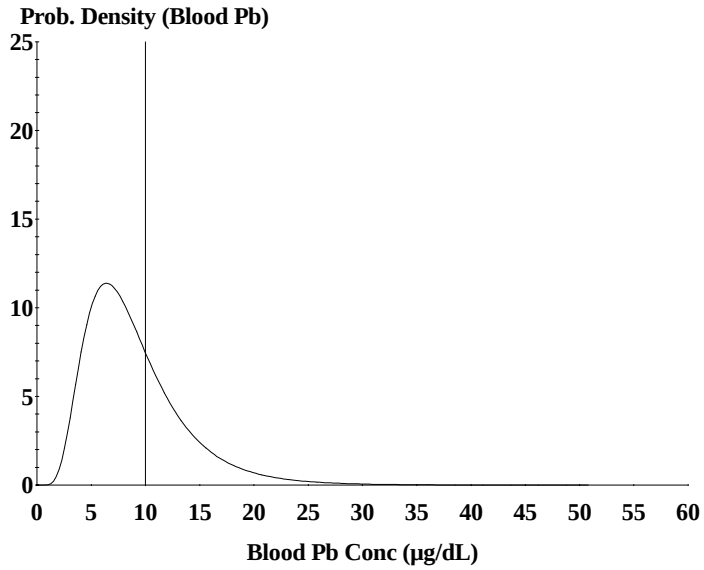
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	0.979	0.000	7.591
1-2	0.034	0.789	0.000	17.631
2-3	0.062	0.877	0.000	18.759
3-4	0.067	0.860	0.000	19.562
4-5	0.067	0.842	0.000	20.815
5-6	0.093	0.896	0.000	22.205
6-7	0.093	0.979	0.000	22.795

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	3.812	12.403	6.6
1-2	5.624	24.079	9.5
2-3	5.754	25.453	9.3
3-4	5.887	26.376	9.1
4-5	4.471	26.195	8.6
5-6	4.071	27.265	8.2
6-7	3.880	27.747	7.8

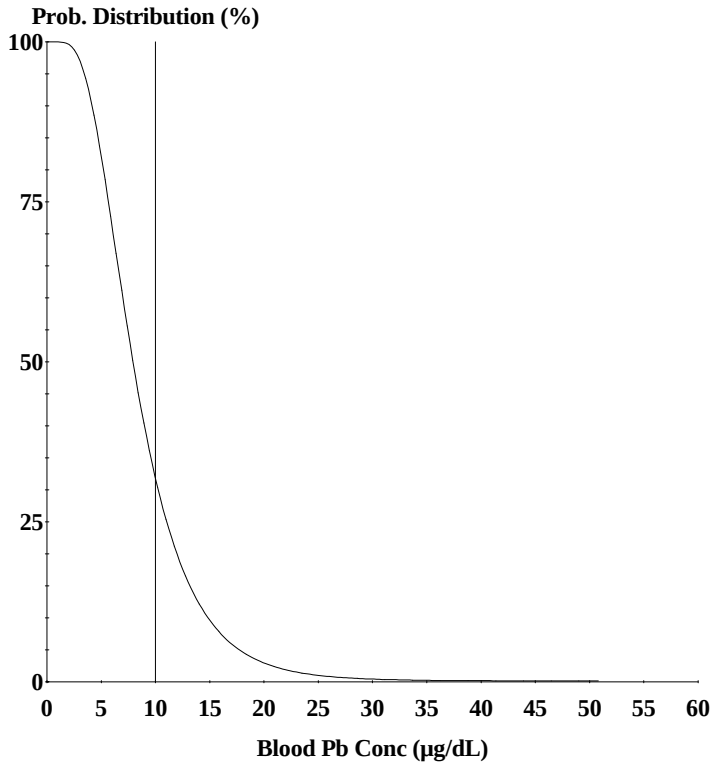


Cutoff = 10.000 µg/dl
Geo Mean = 8.312
GSD = 1.600
% Above = 34.700
% Below = 65.300

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Shallow Groundwater

User Name: Tetra Tech
Date: 07/21/2016
Site Name: Lower Darby Creek Area
Operable Unit: Outside Landfill - Shallow Groundwater
Run Mode: Site Risk Assessment



Cutoff = 10.000 µg/dl
Geo Mean = 8.312
GSD = 1.600
% Above = 34.700

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Shallow Groundwater

Deep Groundwater Outside Landfill

LEAD MODEL FOR WINDOWS Version 1.1

User Name: Tetra Tech
Date: 07/21/2016
Site Name: Lower Darby Creek Area
Operable Unit: Outside Landfill - Deep Groundwater
Run Mode: Site Risk Assessment

Water Data
Average concentration of lead in groundwater = 3.65 ug/L.

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 3.650 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 150.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	200.000	150.000
1-2	200.000	150.000
2-3	200.000	150.000
3-4	200.000	150.000
4-5	200.000	150.000
5-6	200.000	150.000
6-7	200.000	150.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

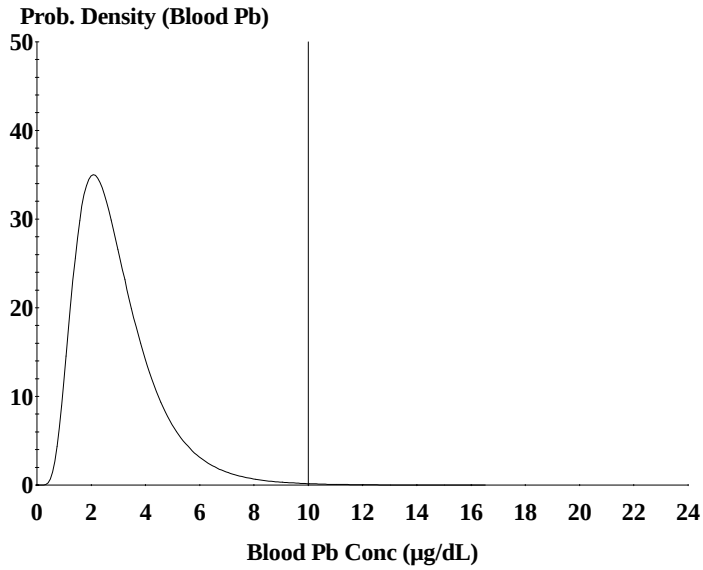
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.061	0.000	0.343
1-2	0.034	0.911	0.000	0.849
2-3	0.062	1.000	0.000	0.891
3-4	0.067	0.966	0.000	0.916
4-5	0.067	0.939	0.000	0.967
5-6	0.093	0.993	0.000	1.026
6-7	0.093	1.079	0.000	1.047

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	4.130	5.555	3.0
1-2	6.498	8.292	3.4
2-3	6.560	8.513	3.2
3-4	6.619	8.568	3.0
4-5	4.984	6.956	2.5
5-6	4.512	6.624	2.1
6-7	4.275	6.494	1.9

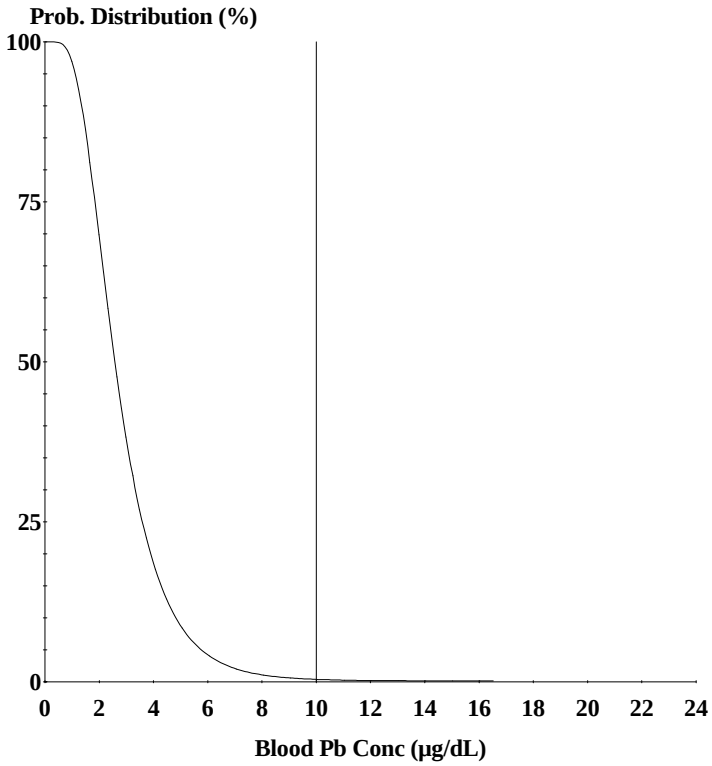


Cutoff = 10.000 µg/dl
Geo Mean = 2.703
GSD = 1.600
% Above = 0.269
% Below = 99.731

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Deep Groundwater

User Name: Tetra Tech
Date: 07/21/2016
Site Name: Lower Darby Creek Area
Operable Unit: Outside Landfill - Deep Groundwater
Run Mode: Site Risk Assessment



Cutoff = 10.000 µg/dl
Geo Mean = 2.703
GSD = 1.600
% Above = 0.269

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Deep Groundwater

APPENDIX G-10

PART 10 – SAMPLE CALCULATIONS

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IR \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
IR	=	0.05	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	30	days/year	
ED	=	1	years	
BW	=	80	kg	
ATc	=	25,550	days	
ATnc	=	365	days	
CSFo	=	5.5E-02	$(mg/kg/day)^{-1}$	
RfDo	=	1.0E-02	(mg/kg/day)	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 0.05\ L/day \times 30\ days/year \times 1\ years}{80\ kg \times 25550\ days}$$

IEXc = 1.17E-09 mg/kg/day

ILCR = 1.17E-09 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 6.5E-11

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 0.05\ L/day \times 30\ days/year \times 1\ years}{80\ kg \times 365\ days}$$

IEXnc = 8.22E-08 mg/kg/day

$$HQ = \frac{8.22E\text{-}08\ mg/kg/day}{1.00E\text{-}02\ (mg/kg/day)} = \text{Hazard Quotient}$$

HQ = 8.2E-06

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:** L. Crofton	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)-1
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
Kp	=	1.49E-02	cm/hr	
FA	=	1	unitless	
tevent	=	8	hr/event	
CF1	=	0.001	L/cm^3	
CF1	=	0.001	mg/ug	
t*	=	0.69	hr/event	
τ	=	0.29	hr/event	
B	=	0.051		

tevent > t*, therefore,

DAevent = (0.0149 cm/hr) (1.6 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\left[\frac{8 \text{ hr/event}}{1 + 0.0507} + 2 \times 0.288 \text{ hr/event} \times \frac{(1 + 3 \times 0.0507 + 3 \times 0.0507 \times 0.0507)}{(1 + 0.0507)^{\wedge}2}\right]$$

DAevent = 1.96E-07 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	3,527	cm^2
EV	=	1	event/day
ED	=	1	years
EF	=	30	days/year
BW	=	80	kg
ATc	=	25,550	days
ATnc	=	365	days
CSFd	=	5.5E-02	$(mg/kg/day)^{-1}$
RfDd	=	1.0E-02	(mg/kg/day)

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{1.96E\text{-}07 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 1 \text{ years} \times 30 \text{ days/year} \times 3527 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}}$$

DADc = 1.01E-08 mg/kg/day

ILCR = 1.01E-08 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 5.6E-10

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{1.96E\text{-}07 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 1 \text{ years} \times 30 \text{ days/year} \times 3527 \text{ cm2}}{80 \text{ kg} \times 365 \text{ days}}$$

DADnc = 7.10E-07 mg/kg/day

HQ = 7.10E-07 mg/kg/day / 1.00E-02 (mg/kg/day) = Hazard Quotient

HQ = 7.1E-05

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS IN A TRENCH RESULTING FROM VOLATILE EMISSIONS FROM GROUNDWATER.		
BASED ON: VDEQ, AUGUST 2014		
BY: R. JUPIN	**CHECKED BY:** L. Crofani	**DATE:** 10/11/2017

PURPOSE: To calculate ambient air concentrations resulting from volatilization of benzene from groundwater.

Ctrench = C_{GW} x VF

Where:

Ctrench = concentration of contaminant in the trench µg/m^3
C_{GW} = concentration of contaminant in groundwater µg/L
VF = volatilization factor L/m^3

1. Calculate kiG (gas-phase mass transfer coefficient of component i)

$kiG = (MWH2O/MWi)^{0.335} \times (T/298)^{1.005} \times kG, H2O$

Where:

kiG = gas-phase mass transfer coefficient of component i cm/s
MW_{H2O} = molecular weight of water = 18 g/mol
MW_{Ben} = molecular weight of Benzene = 78.115 g/mol
kG,H_2O = gas-phase mass transfer coefficient of water vapor at 25°C cm/s = 0.833 cm/s
T = average system absolute temperature = 285
The value of kG, H_2O is 0.833 cm/s (Superfund Exposure Assessment Manual, U. S. EPA, April 1988)

$kiG = (18/78.115)^{0.335} \times (285/298)^{1.005} \times 0.833$ cm/s = 4.87E-01 cm/s

2. Calculate kiL (liquid-phase mass transfer coefficient of component i)

$kiL = (MWO_2/MWi)^{0.5} \times (T/298) \times kL, O_2$

Where:
kiL = liquid-phase mass transfer coefficient of component i cm/s
MW_{O2} = molecular weight of O_2 = 32 g/mol
MW_{Ben} = molecular weight of Benzene = 78.115 g/mol
T = average system absolute temperature = 285
kL, O_2 = liquid-phase mass transfer coefficient of oxygen at 25°C cm/s = 0.002 cm/s

$kiL = (32/78.115)^{0.5} \times (285/298) \times 0.002$ cm/s = 1.22E-03 cm/s

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS IN A TRENCH RESULTING FROM VOLATILE EMISSIONS FROM GROUNDWATER.		
BASED ON: VDEQ, AUGUST 2014		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

3. Calculate Ki (overall mass transfer coefficient of contaminant)

Ki = 1 / {(1/kiL) + [(RT) / (Hi x kiG)]}

Where:

kiL = liquid-phase mass transfer coefficient of i cm/s =	1.22E-03
R = ideal gas constant atm-m^3/mole-°K =	8.20E-05
T = average system absolute temperature =	285
Hi = Henry's Law constant of Benzene (atm-m^3/mol) =	5.55E-03
KiG = gas-phase mass transfer coefficient of i cm/s	4.87E-01

Ki = 1 / {(1/1.22E-3) + [(8.2E-5 x 285) / (5.50E-3 x 4.87E-1]} = 1.21E-03 cm/s

4. Calculation of VF (Volatilization Factor)

VF = (Ki x A x F x 10^{-3} x 10^4 x 3,600) / (ACH x V)

Where:

VF = volatilization factor (L/m^3)		
Ki = overall mass transfer coefficient of contaminant =		1.21E-03 cm/s
A = area of the trench =		2.23 m^2
F = fraction of floor through which contaminant can enter (unitless) =		1
ACH = air changes per hour =		2 h^{-1}
V = volume of trench =		5.44 m^3
10^{-3} = conversion factor L/cm^3	0.001	
10^4 = conversion factor cm^2/m^2	10000	
3,600 = conversion factor seconds/hr	3600	

VF = (1.21E-3 x 2.23 x 1 x 10^{-3} x 10^4 x 3,600) / (2 x 5.44) = 8.94E+00 L/m^3

5. Calculation of C_{trench} (concentration of contaminant in the trench)

C_{trench} = C_{GW} x VF

Where:

C_{trench} = concentration of contaminant in the trench (µg/m^3)		
C_{GW} = concentration of Benzene in groundwater =	1.6	µg/L
VF = volatilization factor =	8.94E+00	L/m^3

C_{trench} = 1.6 µg/L x 8.94E+00 L/m3 = **1.43E+01 µg/m^3**

1.43E-02 mg/m^3

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciufani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles from groundwater.

EQUATION:

$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$$

Where:

EC	=	exposure concentration (mg/m^3)
Ca	=	exposure point concentration in air (mg/m^3)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
AT	=	averaging time (days)
IURi	=	inhalation unit risk ($(ug/m^3)^{-1}$)
RfCi	=	inhalation reference concentration (mg/m3)

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m^3) x IURi $(ug/m^3)^{-1}$ x 1000 ug/mg

HQ (Noncarcinogens) = Exposure Concentration (mg/m^3) / RFCi (mg/m^3)

ASSUMPTIONS:

Ca	=	1.43E-02 mg/m3	Chemical: Benzene
ET	=	8 hr/day	
EF	=	30 days/year	
ED	=	1 years	
ATc	=	25,550 days	
ATnc	=	365 days	
IURi	=	7.8E-06 $(ug/m^3)^{-1}$	
RfCi	=	8.0E-02 mg/m^3	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER CONSTRUCTION WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.43E\text{-}02 \text{ mg/m3} \times 8 \text{ hr/day} \times 30 \text{ days/year} \times 1 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}}$$

IEXc = 5.60E-06 mg/m3

ILCR = 5.60E-06 mg/m3 x 7.80E-06 (ug/m3)-1 x 1000 ug/mg = Incremental Lifetime Cancer Risk

ILCR = 4.4E-08

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.43E\text{-}02 \text{ mg/m3} \times 8 \text{ hr/day} \times 30 \text{ days/year} \times 1 \text{ years}}{365 \text{ days} \times 24 \text{ hours/day}}$$

IEXnc = 3.92E-04 mg/m3

HQ = 3.92E-04 mg/m3 / 8.00E-02 mg/m3 = Hazard Quotient

HQ **4.9E-03**

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER INDUSTRIAL WORKER - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IR \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
IR	=	0.01	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	250	days/year	
ED	=	25	years	
BW	=	80	kg	
ATc	=	25,550	days	
ATnc	=	9,125	days	
CSFo	=	5.5E-02	$(mg/kg/day)^{-1}$	
RfDo	=	4.0E-03	(mg/kg/day)	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER INDUSTRIAL WORKER - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 250\ days/year \times 25\ years}{80\ kg \times 25550\ days}$$

IEXc = 4.89E-08 mg/kg/day

ILCR = 4.89E-08 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 2.7E-09

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 250\ days/year \times 25\ years}{80\ kg \times 9125\ days}$$

IEXnc = 1.37E-07 mg/kg/day

$$HQ = \frac{1.37E\text{-}07\ mg/kg/day}{4.00E\text{-}03\ (mg/kg/day)} = \text{Hazard Quotient}$$

HQ = 3.4E-05

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER INDUSTRIAL WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:** Le Cofaut	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)-1
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER INDUSTRIAL WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
Kp	=	1.49E-02	cm/hr	
FA	=	1	unitless	
tevent	=	8	hr/event	
CF1	=	0.001	L/cm^3	
CF1	=	0.001	mg/ug	
t*	=	0.69	hr/event	
τ	=	0.29	hr/event	
B	=	0.051		

tevent > t*, therefore,

DAevent = (0.0149 cm/hr) (1.6 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\left[\frac{8 \text{ hr/event}}{1 + 0.0507} + 2 \times 0.288 \text{ hr/event} \times \frac{(1 + 3 \times 0.0507 + 3 \times 0.0507 \times 0.0507)}{(1 + 0.0507)^2}\right]$$

DAevent = 1.96E-07 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	3,527	cm^2
EV	=	1	event/day
ED	=	25	years
EF	=	250	days/year
BW	=	80	kg
ATc	=	25,550	days
ATnc	=	9,125	days
CSFd	=	5.5E-02	$(mg/kg/day)^{-1}$
RfDd	=	4.0E-03	(mg/kg/day)

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER INDUSTRIAL WORKERS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{1.96E\text{-}07 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 25 \text{ years} \times 250 \text{ days/year} \times 3527 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}}$$

DADc = 2.11E-06 mg/kg/day

ILCR = 2.11E-06 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 1.2E-07

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{1.96E\text{-}07 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 25 \text{ years} \times 250 \text{ days/year} \times 3527 \text{ cm2}}{80 \text{ kg} \times 9125 \text{ days}}$$

DADnc = 5.92E-06 mg/kg/day

HQ = 5.92E-06 mg/kg/day / 4.00E-03 (mg/kg/day) = Hazard Quotient

HQ = 1.5E-03

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER INDUSTRIAL WORKERS - TRENCH ACTIVITIES - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles from groundwater.

EQUATION:

$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$$

Where:

EC	=	exposure concentration (mg/m^3)
Ca	=	exposure point concentration in air (mg/m^3)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
AT	=	averaging time (days)
IURi	=	inhalation unit risk ($(ug/m^3)^{-1}$)
RfCi	=	inhalation reference concentration (mg/m3)

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m^3) x IURi $(ug/m^3)^{-1}$ x 1000 ug/mg

HQ (Noncarcinogens) = Exposure Concentration (mg/m^3) / RFCi (mg/m^3)

ASSUMPTIONS:

Ca	=	1.43E-02	mg/m3	Chemical: Benzene
ET	=	8	hr/day	
EF	=	30	days/year	
ED	=	25	years	
ATc	=	25,550	days	
ATnc	=	9125	days	
IURi	=	7.8E-06	$(ug/m^3)^{-1}$	
RfCi	=	3.0E-02	mg/m^3	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER INDUSTRIAL WORKERS - TRENCH ACTIVITIES - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.43E\text{-}02 \text{ mg/m3} \times 8 \text{ hr/day} \times 30 \text{ days/year} \times 25 \text{ years}}{25550 \text{ days} \times 24 \text{ hours/day}}$$

IEXc = 1.40E-04 mg/m3

ILCR = 1.40E-04 mg/m3 x 7.80E-06 (ug/m3)-1 x 1000 ug/mg = Incremental Lifetime Cancer Risk

ILCR = 1.1E-06

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.43E\text{-}02 \text{ mg/m3} \times 8 \text{ hr/day} \times 30 \text{ days/year} \times 25 \text{ years}}{9125 \text{ days} \times 24 \text{ hours/day}}$$

IEXnc = 3.92E-04 mg/m3

HQ = 3.92E-04 mg/m3 / 3.00E-02 mg/m3 = Hazard Quotient

HQ **1.3E-02**

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER INDUSTRIAL WORKERS - IRRIGATION ACTIVITIES - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles from groundwater.

EQUATION:

$$EC = \frac{Ca \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$$

Where:

EC	=	exposure concentration (mg/m^3)
Ca	=	exposure point concentration in air (mg/m^3)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
AT	=	averaging time (days)
IURi	=	inhalation unit risk ($(ug/m^3)^{-1}$)
RfCi	=	inhalation reference concentration (mg/m3)

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m^3) x IURi $(ug/m^3)^{-1}$ x 1000 ug/mg

HQ (Noncarcinogens) = Exposure Concentration (mg/m^3) / RFCi (mg/m^3)

ASSUMPTIONS:

Ca	=	4.20E-05	mg/m3	Chemical: Benzene
ET	=	8	hr/day	
EF	=	250	days/year	
ED	=	25	years	
ATc	=	25,550	days	
ATnc	=	9125	days	
IURi	=	7.8E-06	$(ug/m^3)^{-1}$	
RfCi	=	3.0E-02	mg/m^3	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES FROM GROUNDWATER INDUSTRIAL WORKERS - IRRIGATION ACTIVITIES - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{\text{4.20E-05 mg/m3 x 8 hr/day x 250 days/year x 25 years}}{\text{25550 days x 24 hours/day}}$$

IEXc = 3.42E-06 mg/m3

ILCR = 3.42E-06 mg/m3 x 7.80E-06 (ug/m3)-1 x 1000 ug/mg = Incremental Lifetime Cancer Risk

ILCR = 2.7E-08

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{\text{4.20E-05 mg/m3 x 8 hr/day x 250 days/year x 25 years}}{\text{9125 days x 24 hours/day}}$$

IEXnc = 9.59E-06 mg/m3

HQ = 9.59E-06 mg/m3 / 3.00E-02 mg/m3 = Hazard Quotient

HQ **3.2E-04**

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING INDUSTRIAL WORKERS - INSIDE LANDFILL		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: R. JUPIN	**CHECKED BY:** L Cifone	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles while showering.

EQUATIONS:

$$EC = \frac{Cair \times EF \times ED}{AT}$$

Where:

$$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$$

$$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$$

$$S = Cwd \times FR/SV \qquad Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$$

$$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}] \qquad Kl = 1/[1/k1 + RT/(H \times kg)]$$

$$k1 = 20\ cm/hr \times (44/MW)^{0.5} \qquad kg = 3000\ cm/hr \times (18/MW)^{0.5}$$

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg
HQ (Noncarcinogens) = Exposure Concentration (mg/m3) / RFCi (mg/m3)

Where:

Cair	=	air concentration in shower (mg/m3)
EC	=	exposure concentration (mg/m3)
S	=	volatile chemical generation rate (mg/m3-min - shower)
EF	=	exposure frequency (showers/year)
ED	=	exposure duration (years)
AT	=	averaging time (days)
Ra	=	air exchange rate (1/min)
Ds	=	shower duration (min)
Dt	=	total time in bathroom (min)
FR	=	shower water flow rate (L/min)
SV	=	shower room air volume (m3)
CW	=	chemical concentration in groundwater (mg/L)
ts	=	shower droplet drop time (sec)
d	=	shower droplet diameter (mm)
MW	=	molecular weight of compound (g/mole)
H	=	Henry's Law constant (atm-m3/mole)
RT	=	Ideal gas constant x absolute temperature (2.4E-02 atm-m3/mole)
T1	=	calibration water temperature (K)
Ts	=	shower water temperature (K)
U1	=	water viscosity at T1 (cp)
Us	=	water viscosity at Ts (cp)
IURi	=	inhalation unit risk $((ug/m3)^{-1})$
RfCi	=	inhalation reference concentration (mg/m3)

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING INDUSTRIAL WORKERS - INSIDE LANDFILL		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: R. JUPIN	**CHECKED BY:** L. Cifani	**DATE:** 10/11/2017

ASSUMPTIONS: Chemical: Benzene

EF	=	250	days/year
ED	=	25	years
ATc	=	25550	days
ATn	=	9125	days
Ra	=	0.0167	1/min
CF	=	1440	min/day
Ds	=	10	min
Dt	=	15	min
FR	=	10	L/min
SV	=	12	m3
Cw	=	0.0016	mg/L
ts	=	0.5	sec
d	=	1	mm
MW	=	78.1	g/mole
H	=	5.55E-03	atm-m3/mole
RT	=	2.40E-02	atm-m3/mole
T1	=	293	K
Ts	=	318	K
U1	=	1.002	centipoise
Us	=	0.596	centipoise
CSFi	=	7.8E-06	(ug/m3)-1
RfDi	=	3.0E-02	(mg/m3)

EXAMPLE CALCULATION:

k1 = 20 cm/hr x (44 g/mole / 78.1 g/mole)^0.5

k1 = **15.01 cm/hr**

kg = 3000 cm/hr x (18 g/mole / 78.1 g/mole)^0.5

kg = **1440.23 cm/hr**

Kl = 1/[1/15.0 cm/hr + 2.40E-02 atm-m3/mole/(5.55E-03 atm-m3/mole x 1440.2 cm/hr)]

Kl = **1.44E+01 cm/hr**

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING INDUSTRIAL WORKERS - INSIDE LANDFILL		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

Kal = 1.44E+01 cm/hr x [(293 K x 0.596 centipoise)/(318 K x 1.002 centipoise)]^-0.5

Kal = **19.4 cm/hr**

Cwd = 0.0016 mg/L x [1 - exp((-19.4 cm/hr x 0.5 sec)/(60 x 1 mm))]

Cwd = **2.39E-04 mg/L**

S = 2.39E-04 mg/L x 10 L/min / 12 m3

S = **1.99E-04 mg/m3-min-shower**

$$K = 10 \text{ min} + \frac{\exp(-0.0167 \text{ 1/min} \times 15 \text{ min}) - \exp[0.0167 \text{ 1/min} \times (10 \text{ min} - 15 \text{ min})]}{0.0167 \text{ 1/min}}$$

K = **1.53 min**

Cair = [(1.99E-04 mg/m3-min-shower x 1 shower/day)/(1.67E-02 1/min) x 1440 min/day] x 1.53 min

Cair = **1.26E-05 mg/m3**

CARCINOGENIC INTAKE:

$$EC = \frac{1.26E\text{-}05 \text{ mg/m3} \times 250 \text{ days/year} \times 25 \text{ years}}{25550 \text{ days}}$$

EC = **3.09E-06 mg/m3**

Risk = 3.09E-06 mg/m3 x 7.80E-06 (ug/m3)-1 x 1000 ug/mg

Risk = **2.4E-08**

NONCARCINOGENIC INTAKE:

$$EC = \frac{1.26E\text{-}05 \text{ mg/m3} \times 250 \text{ days/year} \times 25 \text{ years}}{9125 \text{ days}}$$

EC = **8.66E-06 mg/m3**

HQ = 8.66E-06 mg/m3 / 3.00E-02 (mg/m3)

HQ = **2.9E-04**

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER CHILD RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Cifani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IR \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
IR	=	0.78	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	350	days/year	
ED	=	6	years	
BW	=	15	kg	
ATc	=	25,550	days	
ATnc	=	2,190	days	
CSFo	=	5.5E-02	$(mg/kg/day)^{-1}$	
RfDo	=	4.0E-03	(mg/kg/day)	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER CHILD RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:** L. Cifelli	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 6\ years}{15\ kg \times 25550\ days}$$

IEXc = 6.84E-06 mg/kg/day

ILCR = 6.84E-06 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 3.8E-07

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 6\ years}{15\ kg \times 2190\ days}$$

IEXnc = 7.98E-05 mg/kg/day

$$HQ = \frac{7.98E\text{-}05\ mg/kg/day}{4.00E\text{-}03\ (mg/kg/day)} = \text{Hazard Quotient}$$

HQ = 2.0E-02

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)-1
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
Kp	=	1.49E-02	cm/hr	
FA	=	1	unitless	
tevent	=	0.54	hr/event	
CF1	=	0.001	L/cm^3	
CF1	=	0.001	mg/ug	
t*	=	0.691	hr/event	
τ	=	0.288	hr/event	
B	=	0.051		

tevent < t*, therefore,

$$DAevent = (2 \times 0.0149\ cm/hr)\ (1)\ (1.6\ ug/L)\ (0.001\ L/cm3) \times (0.001\ mg/ug) \times \sqrt{\frac{6 \times 0.288\ hr/event \times 0.54\ hr/event}{\pi}}$$

DAevent = 2.60E-08 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	6,365	cm^2
EV	=	1	event/day
ED	=	6	years
EF	=	350	days/year
BW	=	15	kg
ATc	=	25,550	days
ATnc	=	2,190	days
CSFd	=	5.5E-02	$(mg/kg/day)^{-1}$
RfDd	=	4.0E-03	(mg/kg/day)

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER CHILD RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{2.60E\text{-}08 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 6 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 25550 \text{ days}}$$

DADc = 9.06E-07 mg/kg/day

ILCR = 9.06E-07 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 5.0E-08

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{2.60E\text{-}08 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 6 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 2190 \text{ days}}$$

DADnc = 1.06E-05 mg/kg/day

HQ = 1.06E-05 mg/kg/day / 4.00E-03 (mg/kg/day) = Hazard Quotient

HQ = 2.6E-03

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER ADULT RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IR \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)-1
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1.6	ug/L	Chemical: Benzene
IR	=	2.5	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	350	days/year	
ED	=	20	years	
BW	=	80	kg	
ATc	=	25,550	days	
ATnc	=	7,300	days	
CSFo	=	5.5E-02	$(mg/kg/day)^{-1}$	
RfDo	=	4.0E-03	(mg/kg/day)	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER ADULT RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 20\ years}{80\ kg \times 25550\ days}$$

IEXc = 1.37E-05 mg/kg/day

ILCR = 1.37E-05 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 7.5E-07

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1.6\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 20\ years}{80\ kg \times 7300\ days}$$

IEXnc = 4.79E-05 mg/kg/day

$$HQ = \frac{4.79E\text{-}05\ mg/kg/day}{4.00E\text{-}03\ (mg/kg/day)} = \text{Hazard Quotient}$$

HQ = 1.2E-02

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER ADULT RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)-1
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER ADULT RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	1.36	ug/L	Chemical: Benzene
Kp	=	1.49E-02	cm/hr	
FA	=	1	unitless	
tevent	=	0.71	hr/event	
CF1	=	0.001	L/cm^3	
CF1	=	0.001	mg/ug	
t*	=	0.691	hr/event	
τ	=	0.288	hr/event	
B	=	0.051		

tevent > t*, therefore,

DAevent = (0.0149 cm/hr) (1.36 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\left[\frac{0.71 \text{ hr/event}}{1 + 0.0507} + 2 \times 0.288 \text{ hr/event} \times \frac{(1 + 3 \times 0.0507 + 3 \times 0.0507 \times 0.0507)}{(1 + 0.0507)\text{^}2}\right]$$

DAevent = 2.60E-08 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	19,652	cm^2
EV	=	1	event/day
ED	=	20	years
EF	=	350	days/year
BW	=	80	kg
ATc	=	25,550	days
ATnc	=	7,300	days
CSFd	=	5.5E-02	$(mg/kg/day)^{-1}$
RfDd	=	4.0E-03	(mg/kg/day)

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER ADULT RESIDENTS - INSIDE LANDFILL		
BASED ON: USEPA, DECEMBER 1989, JULY 2004		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{2.53E\text{-}08 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 20 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}}$$

DADc = 1.70E-06 mg/kg/day

ILCR = 1.70E-06 mg/kg/day x 5.50E-02 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ILCR = 9.4E-08

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{2.53E\text{-}08 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 20 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 7300 \text{ days}}$$

DADnc = 5.97E-06 mg/kg/day

HQ = 5.97E-06 mg/kg/day / 4.00E-03 (mg/kg/day) = Hazard Quotient

HQ = 1.5E-03

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING ADULT RESIDENT - INSIDE LANDFILL		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: R. JUPIN	**CHECKED BY:** L. Cifuentes	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles while showering.

EQUATIONS:

$$EC = \frac{Cair \times EF \times ED}{AT}$$

Where:

$$Cair = [(S \times 1\ shower/day)/(Ra \times 1440\ min/day)] \times K$$

$$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$$

$$S = Cwd \times FR/SV \qquad Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$$

$$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}] \qquad Kl = 1/[1/k1 + RT/(H \times kg)]$$

$$k1 = 20\ cm/hr \times (44/MW)^{0.5} \qquad kg = 3000\ cm/hr \times (18/MW)^{0.5}$$

RISKS:

ILCR (Carcinogens) = Exposure Concentration (mg/m3) x IURi (ug/m3)-1 x 1000 ug/mg
HQ (Noncarcinogens) = Exposure Concentration (mg/m3) / RFCi (mg/m3)

Where:

Cair	=	air concentration in shower (mg/m3)
EC	=	exposure concentration (mg/m3)
S	=	volatile chemical generation rate (mg/m3-min - shower)
EF	=	exposure frequency (showers/year)
ED	=	exposure duration (years)
AT	=	averaging time (days)
Ra	=	air exchange rate (1/min)
Ds	=	shower duration (min)
Dt	=	total time in bathroom (min)
FR	=	shower water flow rate (L/min)
SV	=	shower room air volume (m3)
CW	=	chemical concentration in groundwater (mg/L)
ts	=	shower droplet drop time (sec)
d	=	shower droplet diameter (mm)
MW	=	molecular weight of compound (g/mole)
H	=	Henry's Law constant (atm-m3/mole)
RT	=	Ideal gas constant x absolute temperature (2.4E-02 atm-m3/mole)
T1	=	calibration water temperature (K)
Ts	=	shower water temperature (K)
U1	=	water viscosity at T1 (cp)
Us	=	water viscosity at Ts (cp)
IURi	=	inhalation unit risk $((ug/m3)^{-1})$
RfCi	=	inhalation reference concentration (mg/m3)

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING ADULT RESIDENT - INSIDE LANDFILL		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: R. JUPIN	**CHECKED BY:** L. Cifone	**DATE:** 10/11/2017

ASSUMPTIONS: Chemical: Benzene

EF	=	350	days/year
ED	=	20	years
ATc	=	25550	days
ATn	=	7300	days
Ra	=	0.0167	1/min
CF	=	1440	min/day
Ds	=	42.6	min
Dt	=	60	min
FR	=	10	L/min
SV	=	12	m3
Cw	=	0.0016	mg/L
ts	=	0.5	sec
d	=	1	mm
MW	=	78.1	g/mole
H	=	5.55E-03	atm-m3/mole
RT	=	2.40E-02	atm-m3/mole
T1	=	293	K
Ts	=	318	K
U1	=	1.002	centipoise
Us	=	0.596	centipoise
CSFi	=	7.8E-06	(ug/m3)-1
RfDi	=	3.0E-02	(mg/m3)

EXAMPLE CALCULATION:

k1 = 20 cm/hr x (44 g/mole / 78.1 g/mole)^0.5

k1 = **15.01 cm/hr**

kg = 3000 cm/hr x (18 g/mole / 78.1 g/mole)^0.5

kg = **1440.23 cm/hr**

Kl = 1/[1/15.0 cm/hr + 2.40E-02 atm-m3/mole/(5.55E-03 atm-m3/mole x 1440.2 cm/hr)]

Kl = **1.44E+01 cm/hr**

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING ADULT RESIDENT - INSIDE LANDFILL		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

Kal = 1.44E+01 cm/hr x [(293 K x 0.596 centipoise)/(318 K x 1.002 centipoise)]^-0.5

Kal = **19.4 cm/hr**

Cwd = 0.0016 mg/L x [1 - exp((-19.4 cm/hr x 0.5 sec)/(60 x 1 mm))]

Cwd = **2.39E-04 mg/L**

S = 2.39E-04 mg/L x 10 L/min / 12 m3

S = **1.99E-04 mg/m3-min-shower**

$$K = 42.6 \text{ min} + \frac{\exp(-0.0167 \text{ 1/min} \times 60 \text{ min}) - \exp[0.0167 \text{ 1/min} \times (42.6 \text{ min} - 60 \text{ min})]}{0.0167 \text{ 1/min}}$$

K = **19.80 min**

Cair = [(1.99E-04 mg/m3-min-shower x 1 shower/day)/(1.67E-02 1/min) x 1440 min/day] x 19.80 min

Cair = **1.64E-04 mg/m3**

CARCINOGENIC INTAKE:

$$EC = \frac{1.64E\text{-}04 \text{ mg/m3} \times 350 \text{ days/year} \times 20 \text{ years}}{25550 \text{ days}}$$

EC = **4.49E-05 mg/m3**

Risk = 4.49E-05 mg/m3 x 7.80E-06 (ug/m3)-1 x 1000 ug/mg

Risk = **3.5E-07**

NONCARCINOGENIC INTAKE:

$$EC = \frac{1.64E\text{-}04 \text{ mg/m3} \times 350 \text{ days/year} \times 20 \text{ years}}{7300 \text{ days}}$$

EC = **1.57E-04 mg/m3**

HQ = 1.57E-04 mg/m3 / 3.00E-02 (mg/m3)

HQ = **5.2E-03**

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR MUTAGENIC CHEMICALS - CHILD RESIDENTS OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Crofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IF \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$

ASSUMPTIONS:

Cgw	=	0.26	ug/L	Chemical: Benzo(a)anthracene
IR	=	0.78	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	350	days/year	
ED_1	=	2	years	
ED_2	=	4	years	
BW	=	15	kg	
ATc	=	25550	days	
CSFo	=	1.0E-01	$(mg/kg/day)^{-1}$	
$ADAF_1$	=	10		
$ADAF_2$	=	3		

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR MUTAGENIC CHEMICALS - CHILD RESIDENTS OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciafani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{0.26\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 2\ years}{15\ kg \times 25550\ days} \times 10$$

IEXc = 3.70E-06 mg/kg/day

$$IEXc = \frac{0.26\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 4\ years}{15\ kg \times 25550\ days} \times 3$$

IEXc = 2.22E-06 mg/kg/day

ILCR = (3.70E-06 mg/kg/day + 2.22E-06 mg/kg/day) x 1.00E-01 (mg/kg/day)-1

ILCR = 5.9E-07

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR MUTAGENIC CHEMICALS - ADULT RESIDENTS OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** Le Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IF \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$

ASSUMPTIONS:

Cgw	=	0.26	ug/L	Chemical: Benzo(a)anthracene
IR	=	2.5	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	350	days/year	
ED_1	=	10	years	
ED_2	=	10	years	
BW	=	80	kg	
ATc	=	25550	days	
CSFo	=	1.0E-01	$(mg/kg/day)^{-1}$	
$ADAF_1$	=	3		
$ADAF_2$	=	1		

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR MUTAGENIC CHEMICALS - ADULT RESIDENTS OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{0.26\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 10\ years}{80\ kg \times 25550\ days} \times 3$$

IEXc = 3.34E-06 mg/kg/day

$$IEXc = \frac{0.26\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 10\ years}{80\ kg \times 25550\ days} \times 1$$

IEXc = 1.11E-06 mg/kg/day

ILCR = (3.34E-06 mg/kg/day + 1.11E-06 mg/kg/day) x 1.00E-01 (mg/kg/day)-1

ILCR = 4.5E-07

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR MUTAGENIC CHEMICALS - CHILD RESIDENT - OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake and carcinogenic risks for mutagenic chemicals from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT} \times ADAF$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
ADAF	=	age-dependent adjustment factor

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR MUTAGENIC CHEMICALS - CHILD RESIDENT - OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	0.23	ug/L	Chemical: 1,2-Dibromo-3-Chloropropane
Kp	=	6.85E-03	cm/hr	
FA	=	1	unitless	
tevent	=	0.54	hr/event	
CF1	=	0.001	L/cm^3	
CF2	=	0.001	mg/ug	
t*	=	5.32	hr/event	
τ	=	2.21	hr/event	
B	=	0.041		

tevent < t*, therefore,

DAevent = (2 x 0.00685 cm/hr) (1) (0.23 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\sqrt{\frac{6 \times 2.21 \text{ hr/event} \times 0.54 \text{ hr/event}}{\pi}}$$

DAevent = 4.76E-09 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	6,365	cm^2
EV	=	1	event/day
ED_1	=	2	years
ED_2	=	4	years
EF	=	350	days/year
BW	=	15	kg
ATc	=	25550	days
CSFd	=	8.0E-01	(mg/kg/day)$^{-1}$
$ADAF_1$	=	10	
$ADAF_2$	=	3	

CLIENT: LOWER DARBY		JOB NUMBER: 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR MUTAGENIC CHEMICALS - CHILD RESIDENT - OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	CHECKED BY: L. Ciofani	DATE: 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{4.76E\text{-}09 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 2 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 25550 \text{ days}} \times 10$$

DADc = 5.53E-07 mg/kg/day

$$DADc = \frac{4.76E\text{-}09 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 4 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 25550 \text{ days}} \times 3$$

DADc = 3.32E-07 mg/kg/day

ILCR = (5.53E-07 mg/kg/day + 3.32E-07 mg/kg/day) x 8.00E-01 (mg/kg/day)-1

ILCR = 7.1E-07

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR MUTAGENIC CHEMICALS - ADULT RESIDENT - OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake and carcinogenic risks for mutagenic chemicals from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT} \times ADAF$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
ADAF	=	age-dependent adjustment factor

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR MUTAGENIC CHEMICALS - ADULT RESIDENT - OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Cuifani	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	0.222	ug/L	Chemical: 1,2-Dibromo-3-Chloropropane
Kp	=	6.85E-03	cm/hr	
FA	=	1	unitless	
tevent	=	0.71	hr/event	
CF1	=	0.001	L/cm^3	
CF2	=	0.001	mg/ug	
t*	=	5.32	hr/event	
τ	=	2.21	hr/event	
B	=	0.041		

tevent < t*, therefore,

DAevent = (2 x 0.00685 cm/hr) (1) (0.222 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\sqrt{\frac{6 \times 2.21 \text{ hr/event} \times 0.71 \text{ hr/event}}{\pi}}$$

DAevent = 5.27E-09 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	19,652	cm^2
EV	=	1	event/day
ED_1	=	10	years
ED_2	=	10	years
EF	=	350	days/year
BW	=	80	kg
ATc	=	25550	days
CSFd	=	8.0E-01	$(mg/kg/day)^{-1}$
$ADAF_1$	=	3	
$ADAF_2$	=	1	

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR MUTAGENIC CHEMICALS - ADULT RESIDENT - OUTSIDE LANDFILL SHALLOW WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{5.27E\text{-}09 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 10 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}} \times 3$$

DADc = 5.32E-07 mg/kg/day

$$DADc = \frac{5.27E\text{-}09 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 10 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}} \times 1$$

DADc = 1.77E-07 mg/kg/day

ILCR = (5.32E-07 mg/kg/day + 1.77E-07 mg/kg/day) x 8.00E-01 (mg/kg/day)-1

ILCR = 5.7E-07

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR TCE CHILD RESIDENTS OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IF \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$

ASSUMPTIONS:

Cgw	=	330	ug/L	Chemical: Trichloroethene
IR	=	0.78	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	350	days/year	
ED_1	=	2	years	
ED_2	=	4	years	
BW	=	15	kg	
ATc	=	25550	days	
CSFo	=	9.3E-03	$(mg/kg/day)^{-1}$	Mutagenic
CSFo		3.7E-02	$(mg/kg/day)^{-1}$	Nonmutagenic
$ADAF_1$	=	10		
$ADAF_2$	=	3		

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR TCE CHILD RESIDENTS OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciofani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

Mutagenic Component

$$IEXc = \frac{330\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 2\ years}{15\ kg \times 25550\ days} \times 10$$

IEXc = 4.70E-03 mg/kg/day

$$IEXc = \frac{330\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 4\ years}{15\ kg \times 25550\ days} \times 3$$

IEXc = 2.82E-03 mg/kg/day

ILCR = (4.70E-03 mg/kg/day + 2.82E-03 mg/kg/day) x 9.30E-03 (mg/kg/day)-1

ILCR = 7.0E-05

Nonmutagenic Component

$$IEXc = \frac{330\ ug/L \times 0.001\ mg/ug \times 0.78\ L/day \times 350\ days/year \times 6\ years}{15\ kg \times 25550\ days}$$

IEXc = 1.41E-03 mg/kg/day

ILCR = 1.41E-03 mg/kg/day x 3.70E-02 (mg/kg/day)-1

ILCR = 5.22E-05

Risk for Ingestion of Trichloroethene in Groundwater

ILCR = 7.00E-05 + 5.22E-05

ILCR = 1.22E-04

CALCULATION WORKSHEET

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR TCE ADULT RESIDENTS OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

PURPOSE: To estimate intake, carcinogenic risks for mutagenic chemicals from ingestion of groundwater.

EQUATION:

$$IEX = \frac{Cgw \times CF \times IF \times EF \times ED}{BW \times AT} \times ADAF$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (ug/L)
CF	=	conversion factor (1.0E-3 mg/ug)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
ADAF	=	age-dependent adjustment factor
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)

RISKS:

ILCR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$

ASSUMPTIONS:

Cgw	=	330	ug/L	Chemical: Trichloroethene
IR	=	2.5	L/day	
CF	=	1.0E-03	mg/ug	
EF	=	350	days/year	
ED_1	=	10	years	
ED_2	=	10	years	
BW	=	80	kg	
ATc	=	25550	days	
CSFo	=	9.3E-03	$(mg/kg/day)^{-1}$	Mutagenic
CSFo		3.7E-02	$(mg/kg/day)^{-1}$	Nonmutagenic
$ADAF_1$	=	3		
$ADAF_2$	=	1		

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FOR TCE ADULT RESIDENTS OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, DECEMBER 1989, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciafani	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

Mutagenic Component

$$IEXc = \frac{330\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 10\ years}{80\ kg \times 25550\ days} \times 3$$

IEXc = 4.24E-03 mg/kg/day

$$IEXc = \frac{330\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 10\ years}{80\ kg \times 25550\ days} \times 1$$

IEXc = 1.41E-03 mg/kg/day

ILCR = (4.24E-03 mg/kg/day + 1.41E-03 mg/kg/day) x 9.30E-03 (mg/kg/day)-1

ILCR = 5.3E-05

Nonmutagenic Component

$$IEXc = \frac{330\ ug/L \times 0.001\ mg/ug \times 2.5\ L/day \times 350\ days/year \times 20\ years}{80\ kg \times 25550\ days}$$

IEXc = 2.83E-03 mg/kg/day

ILCR = 2.83E-03 mg/kg/day x 3.70E-02 (mg/kg/day)-1

ILCR = 1.05E-04

Risk for Ingestion of Trichloroethene in Groundwater

ILCR = 5.26E-05 + 1.05E-04

ILCR = 1.57E-04

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR TCE CHILD RESIDENTS - OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Cifani	**DATE:** 10/11/2017

PURPOSE: To estimate intake and carcinogenic risks for mutagenic chemicals from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT} \times ADAF$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
ADAF	=	age-dependent adjustment factor

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		JOB NUMBER: 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR TCE CHILD RESIDENTS - OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	CHECKED BY: L. Cifani	DATE: 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	330	ug/L	Chemical: Trichloroethene
Kp	=	1.16E-02	cm/hr	
FA	=	1	unitless	
tevent	=	0.54	hr/event	
CF1	=	0.001	L/cm^3	
CF2	=	0.001	mg/ug	
t*	=	1.37	hr/event	
τ	=	0.57	hr/event	
B	=	0.051		

tevent < t*, therefore,

DAevent = (2 x 0.0116 cm/hr) (1) (330 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\sqrt{\frac{6 \times 0.57 \text{ hr/event} \times 0.54 \text{ hr/event}}{\pi}}$$

DAevent = 5.88E-06 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	6,365	cm^2	
EV	=	1	event/day	
ED_1	=	2	years	
ED_2	=	4	years	
EF	=	350	days/year	
BW	=	15	kg	
ATc	=	25550	days	
CSFd	=	9.3E-03	$(mg/kg/day)^{-1}$	Mutagenic
CSFd		3.7E-02	$(mg/kg/day)^{-1}$	Nonmutagenic
$ADAF_1$	=	10		
$ADAF_2$	=	3		

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR TCE CHILD RESIDENTS - OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Lefauin	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

Mutagenic Component

$$DADc = \frac{5.88E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 2 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 25550 \text{ days}} \times 10$$

DADc = 6.84E-04 mg/kg/day

$$DADc = \frac{5.88E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 4 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 25550 \text{ days}} \times 3$$

DADc = 4.10E-04 mg/kg/day

ILCR = (6.84E-04 mg/kg/day + 4.10E-04 mg/kg/day) x 9.30E-03 (mg/kg/day)-1

ILCR = 1.0E-05

Nonmutagenic Component

$$DAD = \frac{5.88E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 6 \text{ years} \times 350 \text{ days/year} \times 6365 \text{ cm2}}{15 \text{ kg} \times 25550 \text{ days}}$$

DAD = 2.05E-04 mg/kg/day

DAD = 2.05E-04 mg/kg/day x 3.70E-02 (mg/kg/day)-1

ILCR = 7.6E-06

Risk for Dermal Contact with Trichloroethene in Groundwater

ILCR = 1.02E-05 + 7.59E-06

ILCR = 1.78E-05

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR TCE ADULT RESIDENT - OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Ciufani	**DATE:** 10/11/2017

PURPOSE: To estimate intake and carcinogenic risks for mutagenic chemicals from dermal contact with groundwater.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT} \times ADAF$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed dose per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
ADAF	=	age-dependent adjustment factor

RISKS:

ILCR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$

EQUATIONS for DAevent:

For Inorganics:

DAevent = Kp x Cw x CF x tevent

For Organics:

$$If\ tevent \leq t^*, then: DAevent = 2 \times FA \times K_p \times C_w \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$If\ tevent > t^*, then: DAevent = FA \times K_p \times C_w \times CF\ x \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR TCE ADULT RESIDENT - OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:** L. Crofani	**DATE:** 10/11/2017

Where:

FA	=	Fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	291	ug/L	Chemical: Trichloroethene
Kp	=	1.16E-02	cm/hr	
FA	=	1	unitless	
tevent	=	0.71	hr/event	
CF1	=	0.001	L/cm^3	
CF2	=	0.001	mg/ug	
t*	=	1.37	hr/event	
τ	=	0.57	hr/event	
B	=	0.051		

tevent < t*, therefore,

DAevent = (2 x 0.0116 cm/hr) (1) (291 ug/L) (0.001 L/cm3) x (0.001 mg/ug) x

$$\sqrt{\frac{6 \times 0.57 \text{ hr/event} \times 0.71 \text{ hr/event}}{\pi}}$$

DAevent = 5.95E-06 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	19,652	cm^2	
EV	=	1	event/day	
ED_1	=	10	years	
ED_2	=	10	years	
EF	=	350	days/year	
BW	=	80	kg	
ATc	=	25550	days	
CSFd	=	9.3E-03	$(mg/kg/day)^{-1}$	Mutagenic
CSFd		3.7E-02	$(mg/kg/day)^{-1}$	Nonmutagenic
$ADAF_1$	=	3		
$ADAF_2$	=	1		

CLIENT: LOWER DARBY		**JOB NUMBER:** 112G03943
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FOR TCE ADULT RESIDENT - OUTSIDE LANDFILL DEEP WELLS		
BASED ON: USEPA, JULY 2004, MARCH 2005		
BY: R. JUPIN	**CHECKED BY:**	**DATE:** 10/11/2017

EXAMPLE CARCINOGENIC CALCULATION

Mutagenic Component

$$DADc = \frac{5.95E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 10 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}} \times 3$$

DADc = 6.00E-04 mg/kg/day

$$DADc = \frac{5.95E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 10 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}} \times 1$$

DADc = 2.00E-04 mg/kg/day

ILCR = (6.00E-04 mg/kg/day + 2.00E-04 mg/kg/day) x 9.30E-03 (mg/kg/day)-1

ILCR = 7.4E-06

Nonmutagenic Component

$$DAD = \frac{5.95E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 20 \text{ years} \times 350 \text{ days/year} \times 19652 \text{ cm2}}{80 \text{ kg} \times 25550 \text{ days}}$$

DAD = 4.00E-04 mg/kg/day

DAD = 4.00E-04 mg/kg/day x 3.70E-02 (mg/kg/day)-1

ILCR = 1.5E-05

Risk for Dermal Contact with Trichloroethene in Groundwater

ILCR = 7.44E-06 + 1.48E-05

ILCR = 2.23E-05

APPENDIX G-11

PART 11 - VISL CALCULATOR OUTPUTS

Inside Landfill

Industrial Exposures

Site-specific VISL Results
Commercial Equation Inputs

*** Inputted values different from Commercial defaults are highlighted.**
Output generated 14SEP2018:13:21:28

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	0.1
LT (lifetime) yr	70	70
TR (target risk) unitless	1.0E-06	1.0E-06

Commercial Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:21:28

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN($C_{ia,c}$,$C_{ia,nc}$) ($\mu g/m^3$)	Toxicity Basis
Benzene	71-43-2	Yes	Yes	Yes	Yes	1.57E+00	CA
Chlorobenzene	108-90-7	Yes	Yes	Yes	Yes	2.19E+01	NC
Cyanide (CN-)	57-12-5	Yes	Yes	Yes	Yes	3.50E-01	NC
Dichlorobenzene, 1,4-	106-46-7	Yes	Yes	Yes	Yes	1.11E+00	CA
TCDD, 2,3,7,8-	1746-01-6	Yes	Yes	Yes	Yes	3.23E-07	CA
Mercury (elemental)	7439-97-6	Yes	Yes	Yes	Yes	1.31E-01	NC
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	Yes	Yes	Yes	Yes	1.08E-02	CA
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	Yes	Yes	Yes	Yes	1.08E-02	CA
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	8.76E-01	NC

Commercial Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:21:28

Chemical	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) C_{sg},Target (µg/m³)	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} \ (25 ℃)\ (µg/m³)	Maximum Groundwater Vapor Concentration C_{hc} \ (µg/m³)	Temperature for Maximum Groundwater Vapor Concentration (℃)
Benzene	5.24E+01	6.93E+00	No (5)	3.98E+08	4.06E+08	25
Chlorobenzene	7.30E+02	1.72E+02	No (100)	7.25E+07	6.33E+07	25
Cyanide (CN-)	1.17E+01	8.44E+01	Yes (200)	4.31E+08	3.96E+08	25
Dichlorobenzene, 1,4-	3.72E+01	1.13E+01	Yes (75)	1.38E+07	8.01E+06	25
TCDD, 2,3,7,8-	1.08E-05	1.58E-04	No (0)	2.60E-02	4.09E-01	25
Mercury (elemental)	4.38E+00	3.73E-01	Yes (2)	2.11E+04	2.11E+04	25
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	3.59E-01	9.14E-01	--	1.58E+02	1.58E+02	25
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	3.59E-01	9.30E-01	--	1.15E+02	3.93E+01	25
Trichloroethylene	2.92E+01	2.18E+00	Yes (5)	4.88E+08	5.15E+08	25

Commercial Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:21:28

Chemical	Lower Explosive Limit LEL (% by volume)	LEL Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$ $(\mu g/m^3)$	Noncarcinogenic VISL THQ=0.1 $C_{ia,nc}$ $(\mu g/m^3)$
Benzene	1.20	CRC89	7.80E-06	I	3.00E-02	I	No	1.57E+00	1.31E+01
Chlorobenzene	1.30	CRC89			5.00E-02	P	No		2.19E+01
Cyanide (CN-)					8.00E-04	S	No		3.50E-01
Dichlorobenzene, 1,4-	1.80	YAWS	1.10E-05	C	8.00E-01	I	No	1.11E+00	3.50E+02
TCDD, 2,3,7,8-			3.80E+01	C	4.00E-08	C	No	3.23E-07	1.75E-05
Mercury (elemental)					3.00E-04	I	No		1.31E-01
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)			1.14E-03	E	1.33E-03	E	No	1.08E-02	5.84E-01
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)			1.14E-03	E	1.33E-03	E	No	1.08E-02	5.84E-01
Trichloroethylene	8.00	CRC89	4.10E-06	I	2.00E-03	I	Mut	2.99E+00	8.76E-01

Chemical	CAS Number	Site Groundwater Concentration C_{gw}\ (µg/L)	Site Indoor Air Concentration $C_{i,a}$\ (µg/m³)	VI Carcinogenic Risk CR	VI Hazard HQ
Benzene	71-43-2	1.6	3.63E-01	2.31E-07	2.76E-03
Chlorobenzene	108-90-7	30.3	3.85E+00		1.76E-02
Cyanide (CN-)	57-12-5	108	4.48E-01		1.28E-01
Dichlorobenzene, 1,4-	106-46-7	1.89	1.86E-01	1.67E-07	5.31E-05
TCDD, 2,3,7,8-	1746-01-6	0.0025	5.11E-06	1.58E-05	2.92E-02
Mercury (elemental)	7439-97-6	8.2	2.89E+00		2.20E+00
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.26	1.48E-02	1.38E-06	2.54E-03
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	0.52	6.02E-03	5.59E-07	1.03E-03
Trichloroethylene	79-01-6	2.3	9.26E-01	3.10E-07	1.06E-01
**Sum*				*1.85E-05*	*2.48E+00*

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Temperature (℃)\ for Groundwater Vapor Concentration	Mutagen?
Benzene	7.80E-06	I	3.00E-02	IRIS	25	No
Chlorobenzene			5.00E-02	PPRTV	25	No
Cyanide (CN-)			8.00E-04	SURROGATE	25	No
Dichlorobenzene, 1,4-	1.10E-05	C	8.00E-01	IRIS	25	No
TCDD, 2,3,7,8-	3.80E+01	C	4.00E-08	CALEPA	25	No
Mercury (elemental)			3.00E-04	IRIS	25	No
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	1.14E-03	E	1.33E-03	WHO/TEF	25	No
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	1.14E-03	E	1.33E-03	WHO/TEF	25	No
Trichloroethylene	4.10E-06	I	2.00E-03	IRIS	25	Mut
**Sum*						

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	MW Ref	Vapor Pressure VP (mm Hg)	VP Ref	S (mg/L)	S Ref	MCL (ug/L)
Benzene	71-43-2	Yes	Yes	78.12	PHYSPROP	9.48E+01	PHYSPROP	1.79E+03	PHYSPROP	5
Chlorobenzene	108-90-7	Yes	Yes	112.56	PHYSPROP	1.20E+01	PHYSPROP	4.98E+02	PHYSPROP	100
Cyanide (CN-)	57-12-5	Yes	Yes	26.02	PHYSPROP	3.08E+02	PHYSPROP	9.54E+04	PHYSPROP	200
Dichlorobenzene, 1,4-	106-46-7	Yes	Yes	147.00	PHYSPROP	1.74E+00	PHYSPROP	8.13E+01	PHYSPROP	75
TCDD, 2,3,7,8-	1746-01-6	Yes	Yes	321.98	PHYSPROP	1.50E-09	PHYSPROP	2.00E-04	PHYSPROP	0.00003
Mercury (elemental)	7439-97-6	Yes	Yes	200.59	PHYSPROP	1.96E-03	PHYSPROP	6.00E-02	PHYSPROP	2
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	Yes	Yes	326.44	PHYSPROP	8.97E-06	PHYSPROP	1.34E-02	PHYSPROP	
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	Yes	Yes	326.44	PHYSPROP	6.53E-06	PHYSPROP	3.40E-03	PHYSPROP	
Trichloroethylene	79-01-6	Yes	Yes	131.39	PHYSPROP	6.90E+01	PHYSPROP	1.28E+03	PHYSPROP	5

Chemical	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	D_{ia} \ (cm^2/s)	D_{ia} \ Ref	D_{iw} \ (cm^2/s)	D_{iw} \ Ref	Normal Boiling Point T_{boil} \ (K)	BP Ref
Benzene	5.55E-03	2.27E-01	PHYSPROP	2.27E-01	8.95E-02	WATER9 (U.S. EPA, 2001)	1.03E-05	WATER9 (U.S. EPA, 2001)	353.15	PHYSPROP
Chlorobenzene	3.11E-03	1.27E-01	PHYSPROP	1.27E-01	7.21E-02	WATER9 (U.S. EPA, 2001)	9.48E-06	WATER9 (U.S. EPA, 2001)	404.85	PHYSPROP
Cyanide (CN-)	1.01E-04	4.15E-03	Ma et al 2010	4.15E-03	2.11E-01	WATER9 (U.S. EPA, 2001)	2.46E-05	WATER9 (U.S. EPA, 2001)		
Dichlorobenzene, 1,4-	2.41E-03	9.85E-02	PHYSPROP	9.85E-02	5.50E-02	WATER9 (U.S. EPA, 2001)	8.68E-06	WATER9 (U.S. EPA, 2001)	447.15	PHYSPROP
TCDD, 2,3,7,8-	5.00E-05	2.04E-03	EPI	2.04E-03	4.70E-02	WATER9 (U.S. EPA, 2001)	6.76E-06	WATER9 (U.S. EPA, 2001)	652.32	EPI
Mercury (elemental)	8.62E-03	3.52E-01	PHYSPROP VP/S	3.52E-01	3.07E-02	WATER9 (U.S. EPA, 2001)	6.30E-06	WATER9 (U.S. EPA, 2001)	629.75	PHYSPROP
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	2.88E-04	1.18E-02	EPI	1.18E-02	4.67E-02	WATER9 (U.S. EPA, 2001)	6.06E-06	WATER9 (U.S. EPA, 2001)	651.36	EPI
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	2.83E-04	1.16E-02	EPI	1.16E-02	4.67E-02	WATER9 (U.S. EPA, 2001)	6.06E-06	WATER9 (U.S. EPA, 2001)	651.36	EPI
Trichloroethylene	9.85E-03	4.03E-01	PHYSPROP	4.03E-01	6.87E-02	WATER9 (U.S. EPA, 2001)	1.02E-05	WATER9 (U.S. EPA, 2001)	360.35	PHYSPROP

Chemical	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	K_{oc} \ (cm^3/g)	K_{oc} \ Ref	Lower Explosive Limit LEL (% by volume)	LEL Ref
Benzene	5.62E+02	CRC89	7342.26	CRC89	145.8	EPI	1.20	CRC89
Chlorobenzene	6.32E+02	CRC89	8410.61	CRC89	233.9	EPI	1.30	CRC89
Cyanide (CN-)								
Dichlorobenzene, 1,4-	6.69E+02	CRC89	9271.03	CRC89	375.3	EPI	1.80	YAWS
TCDD, 2,3,7,8-	9.78E+02	Approx. from Tcrit=1.5xTBoil			249100	EPI		
Mercury (elemental)	1.76E+03	CRC89	14127.63	CRC89				
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	9.77E+02	Approx. from Tcrit=1.5xTBoil	13989.24	YAWS	127900	EPI		
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	9.77E+02	Approx. from Tcrit=1.5xTBoil	13989.24	YAWS	130500	EPI		
Trichloroethylene	5.71E+02	YAWS	7505.00	Weast	60.7	EPI	8.00	CRC89

Inside Landfill

Residential Exposures

Site-specific VISL Results
Resident Equation Inputs

*** Inputted values different from Resident defaults are highlighted.**
Output generated 14SEP2018:13:17:46

Variable	Resident 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
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration first phase) years	2	2
ED_{2-6} (mutagenic exposure duration second phase) years	4	4
ED_{6-16} (mutagenic exposure duration third phase) years	10	10
ED_{16-26} (mutagenic exposure duration fourth phase) years	10	10
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency first phase) days/year	350	350
EF_{2-6} (mutagenic exposure frequency second phase) days/year	350	350
EF_{6-16} (mutagenic exposure frequency third phase) days/year	350	350
EF_{16-26} (mutagenic exposure frequency fourth phase) days/year	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time first phase) hours/day	24	24
ET_{2-6} (mutagenic exposure time second phase) hours/day	24	24
ET_{6-16} (mutagenic exposure time third phase) hours/day	24	24
ET_{16-26} (mutagenic exposure time fourth phase) hours/day	24	24
THQ (target hazard quotient) unitless	0.1	0.1
LT (lifetime) years	70	70
TR (target risk) unitless	1.0E-06	1.0E-06

Resident Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:17:46

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN($C_{ia,c}$,$C_{ia,nc}$) ($\mu g/m^3$)	Toxicity Basis
Benzene	71-43-2	Yes	Yes	Yes	Yes	3.60E-01	CA
Chlorobenzene	108-90-7	Yes	Yes	Yes	Yes	5.21E+00	NC
Cyanide (CN-)	57-12-5	Yes	Yes	Yes	Yes	8.34E-02	NC
Dichlorobenzene, 1,4-	106-46-7	Yes	Yes	Yes	Yes	2.55E-01	CA
TCDD, 2,3,7,8-	1746-01-6	Yes	Yes	Yes	Yes	7.39E-08	CA
Mercury (elemental)	7439-97-6	Yes	Yes	Yes	Yes	3.13E-02	NC
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	Yes	Yes	Yes	Yes	2.46E-03	CA
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	Yes	Yes	Yes	Yes	2.46E-03	CA
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	2.09E-01	NC

Resident Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:17:46

Chemical	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) C_{sg},Target (µg/m³)	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} \ (25 ℃)\ (µg/m³)	Maximum Groundwater Vapor Concentration C_{hc} \ (µg/m³)	Temperature for Maximum Groundwater Vapor Concentration (℃)
Benzene	1.20E+01	1.59E+00	Yes (5)	3.98E+08	4.06E+08	25
Chlorobenzene	1.74E+02	4.10E+01	Yes (100)	7.25E+07	6.33E+07	25
Cyanide (CN-)	2.78E+00	2.01E+01	Yes (200)	4.31E+08	3.96E+08	25
Dichlorobenzene, 1,4-	8.51E+00	2.59E+00	Yes (75)	1.38E+07	8.01E+06	25
TCDD, 2,3,7,8-	2.46E-06	3.61E-05	No (0)	2.60E-02	4.09E-01	25
Mercury (elemental)	1.04E+00	8.89E-02	Yes (2)	2.11E+04	2.11E+04	25
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	8.21E-02	2.09E-01	--	1.58E+02	1.58E+02	25
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	8.21E-02	2.13E-01	--	1.15E+02	3.93E+01	25
Trichloroethylene	6.95E+00	5.18E-01	Yes (5)	4.88E+08	5.15E+08	25

Resident Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:17:46

Chemical	Lower Explosive Limit LEL (% by volume)	LEL Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$ $(\mu g/m^3)$	Noncarcinogenic VISL THQ=0.1 $C_{ia,nc}$ $(\mu g/m^3)$
Benzene	1.20	CRC89	7.80E-06	I	3.00E-02	I	No	3.60E-01	3.13E+00
Chlorobenzene	1.30	CRC89			5.00E-02	P	No		5.21E+00
Cyanide (CN-)					8.00E-04	S	No		8.34E-02
Dichlorobenzene, 1,4-	1.80	YAWS	1.10E-05	C	8.00E-01	I	No	2.55E-01	8.34E+01
TCDD, 2,3,7,8-			3.80E+01	C	4.00E-08	C	No	7.39E-08	4.17E-06
Mercury (elemental)					3.00E-04	I	No		3.13E-02
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)			1.14E-03	E	1.33E-03	E	No	2.46E-03	1.39E-01
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)			1.14E-03	E	1.33E-03	E	No	2.46E-03	1.39E-01
Trichloroethylene	8.00	CRC89	4.10E-06	I	2.00E-03	I	Mut	4.78E-01	2.09E-01

Chemical	CAS Number	Site Groundwater Concentration C_{gw}\ (μg/L)	Site Indoor Air Concentration $C_{i,a}$\ (μg/m³)	VI Carcinogenic Risk CR	VI Hazard HQ
Benzene	71-43-2	1.6	3.63E-01	1.01E-06	1.16E-02
Chlorobenzene	108-90-7	30.3	3.85E+00		7.39E-02
Cyanide (CN-)	57-12-5	108	4.48E-01		5.37E-01
Dichlorobenzene, 1,4-	106-46-7	1.89	1.86E-01	7.30E-07	2.23E-04
TCDD, 2,3,7,8-	1746-01-6	0.0025	5.11E-06	6.92E-05	1.23E-01
Mercury (elemental)	7439-97-6	8.2	2.89E+00		9.23E+00
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.26	1.48E-02	6.02E-06	1.07E-02
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	0.52	6.02E-03	2.44E-06	4.33E-03
Trichloroethylene	79-01-6	2.3	9.26E-01	1.94E-06	4.44E-01
**Sum*				*8.13E-05*	*1.04E+01*

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Temperature (℃)\ for Groundwater Vapor Concentration	Mutagen?
Benzene	7.80E-06	I	3.00E-02	IRIS	25	No
Chlorobenzene			5.00E-02	PPRTV	25	No
Cyanide (CN-)			8.00E-04	SURROGATE	25	No
Dichlorobenzene, 1,4-	1.10E-05	C	8.00E-01	IRIS	25	No
TCDD, 2,3,7,8-	3.80E+01	C	4.00E-08	CALEPA	25	No
Mercury (elemental)			3.00E-04	IRIS	25	No
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	1.14E-03	E	1.33E-03	WHO/TEF	25	No
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	1.14E-03	E	1.33E-03	WHO/TEF	25	No
Trichloroethylene	4.10E-06	I	2.00E-03	IRIS	25	Mut
**Sum*						

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	MW Ref	Vapor Pressure VP (mm Hg)	VP Ref	S (mg/L)	S Ref	MCL (ug/L)
Benzene	71-43-2	Yes	Yes	78.12	PHYSPROP	9.48E+01	PHYSPROP	1.79E+03	PHYSPROP	5
Chlorobenzene	108-90-7	Yes	Yes	112.56	PHYSPROP	1.20E+01	PHYSPROP	4.98E+02	PHYSPROP	100
Cyanide (CN-)	57-12-5	Yes	Yes	26.02	PHYSPROP	3.08E+02	PHYSPROP	9.54E+04	PHYSPROP	200
Dichlorobenzene, 1,4-	106-46-7	Yes	Yes	147.00	PHYSPROP	1.74E+00	PHYSPROP	8.13E+01	PHYSPROP	75
TCDD, 2,3,7,8-	1746-01-6	Yes	Yes	321.98	PHYSPROP	1.50E-09	PHYSPROP	2.00E-04	PHYSPROP	0.00003
Mercury (elemental)	7439-97-6	Yes	Yes	200.59	PHYSPROP	1.96E-03	PHYSPROP	6.00E-02	PHYSPROP	2
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	Yes	Yes	326.44	PHYSPROP	8.97E-06	PHYSPROP	1.34E-02	PHYSPROP	
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	Yes	Yes	326.44	PHYSPROP	6.53E-06	PHYSPROP	3.40E-03	PHYSPROP	
Trichloroethylene	79-01-6	Yes	Yes	131.39	PHYSPROP	6.90E+01	PHYSPROP	1.28E+03	PHYSPROP	5

Chemical	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	D_{ia} \ (cm^2/s)	D_{ia} \ Ref	D_{iw} \ (cm^2/s)	D_{iw} \ Ref	Normal Boiling Point T_{boil} \ (K)	BP Ref
Benzene	5.55E-03	2.27E-01	PHYSPROP	2.27E-01	8.95E-02	WATER9 (U.S. EPA, 2001)	1.03E-05	WATER9 (U.S. EPA, 2001)	353.15	PHYSPROP
Chlorobenzene	3.11E-03	1.27E-01	PHYSPROP	1.27E-01	7.21E-02	WATER9 (U.S. EPA, 2001)	9.48E-06	WATER9 (U.S. EPA, 2001)	404.85	PHYSPROP
Cyanide (CN-)	1.01E-04	4.15E-03	Ma et al 2010	4.15E-03	2.11E-01	WATER9 (U.S. EPA, 2001)	2.46E-05	WATER9 (U.S. EPA, 2001)		
Dichlorobenzene, 1,4-	2.41E-03	9.85E-02	PHYSPROP	9.85E-02	5.50E-02	WATER9 (U.S. EPA, 2001)	8.68E-06	WATER9 (U.S. EPA, 2001)	447.15	PHYSPROP
TCDD, 2,3,7,8-	5.00E-05	2.04E-03	EPI	2.04E-03	4.70E-02	WATER9 (U.S. EPA, 2001)	6.76E-06	WATER9 (U.S. EPA, 2001)	652.32	EPI
Mercury (elemental)	8.62E-03	3.52E-01	PHYSPROP VP/S	3.52E-01	3.07E-02	WATER9 (U.S. EPA, 2001)	6.30E-06	WATER9 (U.S. EPA, 2001)	629.75	PHYSPROP
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	2.88E-04	1.18E-02	EPI	1.18E-02	4.67E-02	WATER9 (U.S. EPA, 2001)	6.06E-06	WATER9 (U.S. EPA, 2001)	651.36	EPI
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	2.83E-04	1.16E-02	EPI	1.16E-02	4.67E-02	WATER9 (U.S. EPA, 2001)	6.06E-06	WATER9 (U.S. EPA, 2001)	651.36	EPI
Trichloroethylene	9.85E-03	4.03E-01	PHYSPROP	4.03E-01	6.87E-02	WATER9 (U.S. EPA, 2001)	1.02E-05	WATER9 (U.S. EPA, 2001)	360.35	PHYSPROP

Chemical	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	K_{oc} \ (cm^3/g)	K_{oc} \ Ref	Lower Explosive Limit LEL (% by volume)	LEL Ref
Benzene	5.62E+02	CRC89	7342.26	CRC89	145.8	EPI	1.20	CRC89
Chlorobenzene	6.32E+02	CRC89	8410.61	CRC89	233.9	EPI	1.30	CRC89
Cyanide (CN-)								
Dichlorobenzene, 1,4-	6.69E+02	CRC89	9271.03	CRC89	375.3	EPI	1.80	YAWS
TCDD, 2,3,7,8-	9.78E+02	Approx. from Tcrit=1.5xTBoil			249100	EPI		
Mercury (elemental)	1.76E+03	CRC89	14127.63	CRC89				
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	9.77E+02	Approx. from Tcrit=1.5xTBoil	13989.24	YAWS	127900	EPI		
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	9.77E+02	Approx. from Tcrit=1.5xTBoil	13989.24	YAWS	130500	EPI		
Trichloroethylene	5.71E+02	YAWS	7505.00	Weast	60.7	EPI	8.00	CRC89

Outside Landfill – Shallow Groundwater

Industrial Exposures

Site-specific VISL Results
Commercial Equation Inputs

*** Inputted values different from Commercial defaults are highlighted.**
Output generated 14SEP2018:13:25:41

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	0.1
LT (lifetime) yr	70	70
TR (target risk) unitless	1.0E-06	1.0E-06

Commercial Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:25:41

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN($C_{ia,c}$,$C_{ia,nc}$) ($\mu g/m^3$)	Toxicity Basis
Benzene	71-43-2	Yes	Yes	Yes	Yes	1.57E+00	CA
Cyanide (CN-)	57-12-5	Yes	Yes	Yes	Yes	3.50E-01	NC
Dibromo-3-chloropropane, 1,2-	96-12-8	Yes	Yes	Yes	Yes	2.04E-03	CA
Mercury (elemental)	7439-97-6	Yes	Yes	Yes	Yes	1.31E-01	NC
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	3.61E-01	CA
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	8.76E-01	NC
Vinyl Chloride	75-01-4	Yes	Yes	Yes	Yes	2.79E+00	CA

Commercial Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:25:41

Chemical	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) C_{sg},Target (μg/m³)	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) C_{gw},Target (μg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp}\ (25 ℃)\ (μg/m³)	Maximum Groundwater Vapor Concentration C_{hc}\ (μg/m³)	Temperature for Maximum Groundwater Vapor Concentration (℃)	Lower Explosive Limit LEL (% by volume)
Benzene	5.24E+01	6.93E+00	No (5)	3.98E+08	4.06E+08	25	1.20
Cyanide (CN-)	1.17E+01	8.44E+01	Yes (200)	4.31E+08	3.96E+08	25	
Dibromo-3-chloropropane, 1,2-	6.81E-02	3.40E-01	No (0)	7.37E+06	7.39E+06	25	
Mercury (elemental)	4.38E+00	3.73E-01	Yes (2)	2.11E+04	2.11E+04	25	
Naphthalene	1.20E+01	2.01E+01	--	5.86E+05	5.58E+05	25	0.90
Trichloroethylene	2.92E+01	2.18E+00	Yes (5)	4.88E+08	5.15E+08	25	8.00
Vinyl Chloride	9.29E+01	2.45E+00	No (2)	1.00E+10	1.00E+10	25	3.60

Commercial Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:25:41

Chemical	LEL Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$ $(\mu g/m^3)$	Noncarcinogenic VISL THQ=0.1 $C_{ia,nc}$ $(\mu g/m^3)$
Benzene	CRC89	7.80E-06	I	3.00E-02	I	No	1.57E+00	1.31E+01
Cyanide (CN-)				8.00E-04	S	No		3.50E-01
Dibromo-3-chloropropane, 1,2-		6.00E-03	P	2.00E-04	I	Mut	2.04E-03	8.76E-02
Mercury (elemental)				3.00E-04	I	No		1.31E-01
Naphthalene	CRC89	3.40E-05	C	3.00E-03	I	No	3.61E-01	1.31E+00
Trichloroethylene	CRC89	4.10E-06	I	2.00E-03	I	Mut	2.99E+00	8.76E-01
Vinyl Chloride	CRC89	4.40E-06	I	1.00E-01	I	Mut	2.79E+00	4.38E+01

Chemical	CAS Number	Site Groundwater Concentration C_{gw} \ (μg/L)	Site Indoor Air Concentration $C_{i,a}$ \ (μg/m³)	VI Carcinogenic Risk CR	VI Hazard HQ
Benzene	71-43-2	5.8	1.32E+00	8.37E-07	1.00E-02
Cyanide (CN-)	57-12-5	16.8	6.97E-02		1.99E-02
Dibromo-3-chloropropane, 1,2-	96-12-8	0.23	1.38E-03	6.76E-07	1.58E-03
Mercury (elemental)	7439-97-6	0.075	2.64E-02		2.01E-02
Naphthalene	91-20-3	8	1.44E-01	3.99E-07	1.10E-02
Trichloroethylene	79-01-6	6.2	2.50E+00	8.35E-07	2.85E-01
Vinyl Chloride	75-01-4	4.2	4.77E+00	1.71E-06	1.09E-02
**Sum*				*4.46E-06*	*3.58E-01*

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Temperature (℃)\ for Groundwater Vapor Concentration	Mutagen?
Benzene	7.80E-06	I	3.00E-02	IRIS	25	No
Cyanide (CN-)			8.00E-04	SURROGATE	25	No
Dibromo-3-chloropropane, 1,2-	6.00E-03	P	2.00E-04	IRIS	25	Mut
Mercury (elemental)			3.00E-04	IRIS	25	No
Naphthalene	3.40E-05	C	3.00E-03	IRIS	25	No
Trichloroethylene	4.10E-06	I	2.00E-03	IRIS	25	Mut
Vinyl Chloride	4.40E-06	I	1.00E-01	IRIS	25	Mut
**Sum*						

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	MW Ref	Vapor Pressure VP (mm Hg)	VP Ref	S (mg/L)	S Ref	MCL (ug/L)
Benzene	71-43-2	Yes	Yes	78.12	PHYSPROP	9.48E+01	PHYSPROP	1.79E+03	PHYSPROP	5
Cyanide (CN-)	57-12-5	Yes	Yes	26.02	PHYSPROP	3.08E+02	PHYSPROP	9.54E+04	PHYSPROP	200
Dibromo-3-chloropropane, 1,2-	96-12-8	Yes	Yes	236.33	PHYSPROP	5.80E-01	PHYSPROP	1.23E+03	PHYSPROP	0.2
Mercury (elemental)	7439-97-6	Yes	Yes	200.59	PHYSPROP	1.96E-03	PHYSPROP	6.00E-02	PHYSPROP	2
Naphthalene	91-20-3	Yes	Yes	128.18	PHYSPROP	8.50E-02	PHYSPROP	3.10E+01	PHYSPROP	
Trichloroethylene	79-01-6	Yes	Yes	131.39	PHYSPROP	6.90E+01	PHYSPROP	1.28E+03	PHYSPROP	5
Vinyl Chloride	75-01-4	Yes	Yes	62.50	PHYSPROP	2.98E+03	EPI	8.80E+03	PHYSPROP	2

Chemical	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	D_{ia} \ (cm^2/s)	D_{ia} \ Ref	D_{iw} \ (cm^2/s)	D_{iw} \ Ref	Normal Boiling Point T_{boil} \ (K)	BP Ref
Benzene	5.55E-03	2.27E-01	PHYSPROP	2.27E-01	8.95E-02	WATER9 (U.S. EPA, 2001)	1.03E-05	WATER9 (U.S. EPA, 2001)	353.15	PHYSPROP
Cyanide (CN-)	1.01E-04	4.15E-03	Ma et al 2010	4.15E-03	2.11E-01	WATER9 (U.S. EPA, 2001)	2.46E-05	WATER9 (U.S. EPA, 2001)		
Dibromo-3-chloropropane, 1,2-	1.47E-04	6.01E-03	EPI	6.01E-03	3.21E-02	WATER9 (U.S. EPA, 2001)	8.90E-06	WATER9 (U.S. EPA, 2001)	469.15	PHYSPROP
Mercury (elemental)	8.62E-03	3.52E-01	PHYSPROP VP/S	3.52E-01	3.07E-02	WATER9 (U.S. EPA, 2001)	6.30E-06	WATER9 (U.S. EPA, 2001)	629.75	PHYSPROP
Naphthalene	4.40E-04	1.80E-02	PHYSPROP	1.80E-02	6.05E-02	WATER9 (U.S. EPA, 2001)	8.38E-06	WATER9 (U.S. EPA, 2001)	491.05	PHYSPROP
Trichloroethylene	9.85E-03	4.03E-01	PHYSPROP	4.03E-01	6.87E-02	WATER9 (U.S. EPA, 2001)	1.02E-05	WATER9 (U.S. EPA, 2001)	360.35	PHYSPROP
Vinyl Chloride	2.78E-02	1.14E+00	PHYSPROP	1.14E+00	1.07E-01	WATER9 (U.S. EPA, 2001)	1.20E-05	WATER9 (U.S. EPA, 2001)	259.85	PHYSPROP

Chemical	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	K_{oc} \ (cm^3/g)	K_{oc} \ Ref	Lower Explosive Limit LEL (% by volume)	LEL Ref
Benzene	5.62E+02	CRC89	7342.26	CRC89	145.8	EPI	1.20	CRC89
Cyanide (CN-)								
Dibromo-3-chloropropane, 1,2-	7.04E+02	Approx. from Tcrit=1.5xTBoil	9960.05	MSDS (converted)	115.8	EPI		
Mercury (elemental)	1.76E+03	CRC89	14127.63	CRC89				
Naphthalene	7.48E+02	CRC89	10373.00	Weast	1544	EPI	0.90	CRC89
Trichloroethylene	5.71E+02	YAWS	7505.00	Weast	60.7	EPI	8.00	CRC89
Vinyl Chloride	4.25E+02	CRC89	4971.32	CRC89	21.73	EPI	3.60	CRC89

Outside Landfill – Shallow Groundwater

Residential Exposures

Site-specific VISL Results
Resident Equation Inputs

*** Inputted values different from Resident defaults are highlighted.**
Output generated 14SEP2018:13:24:28

Variable	Resident 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
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration first phase) years	2	2
ED_{2-6} (mutagenic exposure duration second phase) years	4	4
ED_{6-16} (mutagenic exposure duration third phase) years	10	10
ED_{16-26} (mutagenic exposure duration fourth phase) years	10	10
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency first phase) days/year	350	350
EF_{2-6} (mutagenic exposure frequency second phase) days/year	350	350
EF_{6-16} (mutagenic exposure frequency third phase) days/year	350	350
EF_{16-26} (mutagenic exposure frequency fourth phase) days/year	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time first phase) hours/day	24	24
ET_{2-6} (mutagenic exposure time second phase) hours/day	24	24
ET_{6-16} (mutagenic exposure time third phase) hours/day	24	24
ET_{16-26} (mutagenic exposure time fourth phase) hours/day	24	24
THQ (target hazard quotient) unitless	0.1	0.1
LT (lifetime) years	70	70
TR (target risk) unitless	1.0E-06	1.0E-06

Resident Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:24:28

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN($C_{ia,c}$,$C_{ia,nc}$) ($\mu g/m^3$)	Toxicity Basis
Benzene	71-43-2	Yes	Yes	Yes	Yes	3.60E-01	CA
Cyanide (CN-)	57-12-5	Yes	Yes	Yes	Yes	8.34E-02	NC
Dibromo-3-chloropropane, 1,2-	96-12-8	Yes	Yes	Yes	Yes	1.69E-04	CA
Mercury (elemental)	7439-97-6	Yes	Yes	Yes	Yes	3.13E-02	NC
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	8.26E-02	CA
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	2.09E-01	NC
Vinyl Chloride	75-01-4	Yes	Yes	Yes	Yes	1.68E-01	CA

Resident Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:24:28

Chemical	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) C_{sg},Target (µg/m³)	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp}\ (25 ℃)\ (µg/m³)	Maximum Groundwater Vapor Concentration C_{hc}\ (µg/m³)	Temperature for Maximum Groundwater Vapor Concentration (℃)	Lower Explosive Limit LEL (% by volume)
Benzene	1.20E+01	1.59E+00	Yes (5)	3.98E+08	4.06E+08	25	1.20
Cyanide (CN-)	2.78E+00	2.01E+01	Yes (200)	4.31E+08	3.96E+08	25	
Dibromo-3-chloropropane, 1,2-	5.63E-03	2.81E-02	Yes (0)	7.37E+06	7.39E+06	25	
Mercury (elemental)	1.04E+00	8.89E-02	Yes (2)	2.11E+04	2.11E+04	25	
Naphthalene	2.75E+00	4.59E+00	--	5.86E+05	5.58E+05	25	0.90
Trichloroethylene	6.95E+00	5.18E-01	Yes (5)	4.88E+08	5.15E+08	25	8.00
Vinyl Chloride	5.59E+00	1.47E-01	Yes (2)	1.00E+10	1.00E+10	25	3.60

Resident Vapor Intrusion Screening Levels (VISL)
<a href= \/guide.html#Table1 ⍈ User's Guide Variable References

Output generated 14SEP2018:13:24:28

Chemical	LEL Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$ $(\mu g/m^3)$	Noncarcinogenic VISL THQ=0.1 $C_{ia,nc}$ $(\mu g/m^3)$
Benzene	CRC89	7.80E-06	I	3.00E-02	I	No	3.60E-01	3.13E+00
Cyanide (CN-)				8.00E-04	S	No		8.34E-02
Dibromo-3-chloropropane, 1,2-		6.00E-03	P	2.00E-04	I	Mut	1.69E-04	2.09E-02
Mercury (elemental)				3.00E-04	I	No		3.13E-02
Naphthalene	CRC89	3.40E-05	C	3.00E-03	I	No	8.26E-02	3.13E-01
Trichloroethylene	CRC89	4.10E-06	I	2.00E-03	I	Mut	4.78E-01	2.09E-01
Vinyl Chloride	CRC89	4.40E-06	I	1.00E-01	I	Mut	1.68E-01	1.04E+01

Chemical	CAS Number	Site Groundwater Concentration C_{gw} \ (μg/L)	Site Indoor Air Concentration $C_{i,a}$ \ (μg/m³)	VI Carcinogenic Risk CR	VI Hazard HQ
Benzene	71-43-2	5.8	1.32E+00	3.66E-06	4.21E-02
Cyanide (CN-)	57-12-5	16.8	6.97E-02		8.36E-02
Dibromo-3-chloropropane, 1,2-	96-12-8	0.23	1.38E-03	8.18E-06	6.63E-03
Mercury (elemental)	7439-97-6	0.075	2.64E-02		8.44E-02
Naphthalene	91-20-3	8	1.44E-01	1.74E-06	4.60E-02
Trichloroethylene	79-01-6	6.2	2.50E+00	5.22E-06	1.20E+00
Vinyl Chloride	75-01-4	4.2	4.77E+00	2.85E-05	4.58E-02
**Sum*				*4.73E-05*	*1.51E+00*

Chemical	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Temperature (℃)\ for Groundwater Vapor Concentration	Mutagen?
Benzene	7.80E-06	I	3.00E-02	IRIS	25	No
Cyanide (CN-)			8.00E-04	SURROGATE	25	No
Dibromo-3-chloropropane, 1,2-	6.00E-03	P	2.00E-04	IRIS	25	Mut
Mercury (elemental)			3.00E-04	IRIS	25	No
Naphthalene	3.40E-05	C	3.00E-03	IRIS	25	No
Trichloroethylene	4.10E-06	I	2.00E-03	IRIS	25	Mut
Vinyl Chloride	4.40E-06	I	1.00E-01	IRIS	25	Mut
**Sum*						

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	MW Ref	Vapor Pressure VP (mm Hg)	VP Ref	S (mg/L)	S Ref	MCL (ug/L)
Benzene	71-43-2	Yes	Yes	78.12	PHYSPROP	9.48E+01	PHYSPROP	1.79E+03	PHYSPROP	5
Cyanide (CN-)	57-12-5	Yes	Yes	26.02	PHYSPROP	3.08E+02	PHYSPROP	9.54E+04	PHYSPROP	200
Dibromo-3-chloropropane, 1,2-	96-12-8	Yes	Yes	236.33	PHYSPROP	5.80E-01	PHYSPROP	1.23E+03	PHYSPROP	0.2
Mercury (elemental)	7439-97-6	Yes	Yes	200.59	PHYSPROP	1.96E-03	PHYSPROP	6.00E-02	PHYSPROP	2
Naphthalene	91-20-3	Yes	Yes	128.18	PHYSPROP	8.50E-02	PHYSPROP	3.10E+01	PHYSPROP	
Trichloroethylene	79-01-6	Yes	Yes	131.39	PHYSPROP	6.90E+01	PHYSPROP	1.28E+03	PHYSPROP	5
Vinyl Chloride	75-01-4	Yes	Yes	62.50	PHYSPROP	2.98E+03	EPI	8.80E+03	PHYSPROP	2

Chemical	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	D_{ia} \ (cm^2/s)	D_{ia} \ Ref	D_{iw} \ (cm^2/s)	D_{iw} \ Ref	Normal Boiling Point T_{boil} \ (K)	BP Ref
Benzene	5.55E-03	2.27E-01	PHYSPROP	2.27E-01	8.95E-02	WATER9 (U.S. EPA, 2001)	1.03E-05	WATER9 (U.S. EPA, 2001)	353.15	PHYSPROP
Cyanide (CN-)	1.01E-04	4.15E-03	Ma et al 2010	4.15E-03	2.11E-01	WATER9 (U.S. EPA, 2001)	2.46E-05	WATER9 (U.S. EPA, 2001)		
Dibromo-3-chloropropane, 1,2-	1.47E-04	6.01E-03	EPI	6.01E-03	3.21E-02	WATER9 (U.S. EPA, 2001)	8.90E-06	WATER9 (U.S. EPA, 2001)	469.15	PHYSPROP
Mercury (elemental)	8.62E-03	3.52E-01	PHYSPROP VP/S	3.52E-01	3.07E-02	WATER9 (U.S. EPA, 2001)	6.30E-06	WATER9 (U.S. EPA, 2001)	629.75	PHYSPROP
Naphthalene	4.40E-04	1.80E-02	PHYSPROP	1.80E-02	6.05E-02	WATER9 (U.S. EPA, 2001)	8.38E-06	WATER9 (U.S. EPA, 2001)	491.05	PHYSPROP
Trichloroethylene	9.85E-03	4.03E-01	PHYSPROP	4.03E-01	6.87E-02	WATER9 (U.S. EPA, 2001)	1.02E-05	WATER9 (U.S. EPA, 2001)	360.35	PHYSPROP
Vinyl Chloride	2.78E-02	1.14E+00	PHYSPROP	1.14E+00	1.07E-01	WATER9 (U.S. EPA, 2001)	1.20E-05	WATER9 (U.S. EPA, 2001)	259.85	PHYSPROP

Chemical	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	K_{oc} \ (cm^3/g)	K_{oc} \ Ref	Lower Explosive Limit LEL (% by volume)	LEL Ref
Benzene	5.62E+02	CRC89	7342.26	CRC89	145.8	EPI	1.20	CRC89
Cyanide (CN-)								
Dibromo-3-chloropropane, 1,2-	7.04E+02	Approx. from Tcrit=1.5xTBoil	9960.05	MSDS (converted)	115.8	EPI		
Mercury (elemental)	1.76E+03	CRC89	14127.63	CRC89				
Naphthalene	7.48E+02	CRC89	10373.00	Weast	1544	EPI	0.90	CRC89
Trichloroethylene	5.71E+02	YAWS	7505.00	Weast	60.7	EPI	8.00	CRC89
Vinyl Chloride	4.25E+02	CRC89	4971.32	CRC89	21.73	EPI	3.60	CRC89

APPENDIX G-12

PART 12 - PORE WATER EVALUATION

Pore Water RSLs

Recreational Users

CALCULATION OF RISK-BASED SCREENING LEVELS

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: COMBINED (CHILD AND ADULT) RECREATIONAL USERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

THIS SPREADSHEET CALCULATES RISK-BASED SCREENING LEVELS FOR EXPOSURES TO PORE WATER
THE INCIDENTAL INGESTION AND DERMAL CONTACT ROUTES OF EXPOSURE ARE CONSIDERED.

RELEVANT EQUATIONS:

Carcinogenic

$$RSL_{child} = \frac{TCR}{[IntakeFac_{oral(0\text{-}2)} \times CSF_{oral} + IntakeFac_{derm(0\text{-}2)} \times DA_{event} \times CSF_{derm}] \times ADAF_{(0\text{-}2)} + [IntakeFac_{oral(2\text{-}6)} \times CSF_{oral} + IntakeFac_{derm(2\text{-}6)} \times DAevent \times CSF_{derm}] \times ADAF_{(2\text{-}6)}}$$

$$RSL_{adult} = \frac{TCR}{[IntakeFac_{oral(6\text{-}16)} \times CSF_{oral} + IntakeFac_{derm(6\text{-}16)} \times DAevent \times CSF_{derm}] \times ADAF_{(6\text{-}16)} + [IntakeFac_{oral(16\text{-}18)} \times CSF_{oral} + IntakeFac_{derm(16\text{-}18)} \times DAevent \times CSF_{derm}] \times ADAF_{(16\text{-}18)}}$$

$$RSL_{Lifetime} = \frac{TCR}{Intake_{child(0\text{-}2)} \times CSF \times ADAF_{(0\text{-}2)} + Intake_{child(2\text{-}6)} \times CSF \times ADAF_{(2\text{-}6)} + Intake_{adult(6\text{-}16)} \times CSF \times ADAF_{(6\text{-}16)} + Intake_{adult(16\text{-}18)} \times CSF \times ADAF_{(16\text{-}18)}}$$

Noncarcinogenic

$$RSL = \frac{THI}{IntakeFac_{oral}/Rfd_{oral} + IntakeFac_{derm}/Rfd_{derm}}$$

$$IntakeFac_{oral} = \frac{CR \times ET \times EF \times ED}{BW \times AT}$$

$$IntakeFac_{derm} = \frac{DA_{Event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

WHERE:

Parameter	Child Ages 0 - 2	Child Ages 2 - 6	Adult Ages 6 - 16	Adult Ages 16 - 18	Definition
TCR = :	1E-06				Target Cancer Risk
HI = :	1				Target Hazard Index
IRW = :	0.01	0.01	0.01	0.01	Ingestion Rate (L/hour)
CF = :	1.0E-03	1.0E-03	1.0E-03	1.0E-03	Conversion Factor (mg/ug)
ET = :	2	2	2	2	Exposure time (hours/day)
SA = :	1,892	1,892	4,780	4,780	Skin surface available for contact (cm^2)
DA_{event} = :	Chemical Specific				Chemical specific absorbed dose per event (mg/cm2-event)
EV = :	1	1	1	1	Event frequency (events/day)
EF = :	52	52	52	52	Exposure Frequency (days/year)
ED = :	2	4	10	2	Exposure Duration (years)
BW = :	16.2	16.2	80	80	Body Weight (kg)
ATc = :	25,550	25,550	25,550	25,550	Averaging time for carcinogenic exposures (days)
ATn = :	730	1,460	3,650	730	Averaging time for noncarcinogenic exposures (days)

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 2)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: COMBINED (CHILD AND ADULT) RECREATIONAL USERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Organic or Inorganic	Estimated Kp (cm/hr)	FA	tau-event (hr)	B	t* (hr)	In EPD?	DAevent (L/cm^2- event)	
								Child	Adult
Aldrin	Organic	2.93E-01	1.00E+00	1.16E+01	2.15E+00	4.77E+01	No	0.00E+00	0.00E+00
Aluminum	Inorganic	1.00E-03	1.00E+00	1.49E-01	2.00E-03	3.57E-01	Yes	2.00E-06	2.00E-06
Antimony	Inorganic	1.00E-03	1.00E+00	5.25E-01	4.30E-03	1.26E+00	Yes	2.00E-06	2.00E-06
Aroclor-1016	Organic	3.05E-01	0.00E+00	1.26E+02	2.75E+00	5.27E+02	No	0.00E+00	0.00E+00
Aroclor-1242	Organic	5.45E-01	7.00E-01	4.54E+00	3.58E+00	1.94E+01	No	0.00E+00	0.00E+00
Aroclor-1248	Organic	4.75E-01	0.00E+00	3.06E+02	4.54E+00	1.33E+03	No	0.00E+00	0.00E+00
Aroclor-1260	Organic	9.86E-01	0.00E+00	1.72E+01	7.54E+00	7.71E+01	No	0.00E+00	0.00E+00
Dioxin-Like PCBs	Organic	NA	NA	NA	NA	NA	No	0.00E+00	0.00E+00
Non-Dioxin-Like PCBs	Organic	NA	NA	NA	NA	NA	No	0.00E+00	0.00E+00
Arsenic	Inorganic	1.00E-03	1.00E+00	2.87E-01	3.40E-03	6.90E-01	Yes	2.00E-06	2.00E-06
Atrazine	Organic	5.24E-03	1.00E+00	1.70E+00	2.96E-02	4.07E+00	Yes	2.67E-05	2.67E-05
Barium	Inorganic	1.00E-03	1.00E+00	6.34E-01	4.54E-03	1.52E+00	Yes	2.00E-06	2.00E-06
Benzo(a)anthracene	Organic	5.52E-01	1.00E+00	2.00E+00	3.21E+00	8.48E+00	No	0.00E+00	0.00E+00
Benzene	Organic	1.49E-02	1.00E+00	2.88E-01	5.07E-02	6.91E-01	Yes	3.74E-05	3.74E-05
Benzo(a)pyrene	Organic	7.13E-01	1.00E+00	2.72E+00	4.36E+00	1.18E+01	No	0.00E+00	0.00E+00
Benzo(b)fluoranthene	Organic	4.17E-01	1.00E+00	2.72E+00	2.55E+00	1.13E+01	No	0.00E+00	0.00E+00
Benzo(k)fluoranthene	Organic	6.91E-01	9.00E-01	2.72E+00	4.22E+00	1.18E+01	No	0.00E+00	0.00E+00
Beryllium	Inorganic	1.00E-03	1.00E+00	1.21E-01	1.28E-03	2.91E-01	Yes	2.00E-06	2.00E-06
Bis(2-chloro-1-methylethyl) ether	Organic	7.64E-03	1.00E+00	9.55E-01	3.84E-02	2.29E+00	Yes	2.92E-05	2.92E-05
Bis(2-ethylhexyl)phthalate	Organic	1.13E+00	8.00E-01	1.62E+01	8.59E+00	7.29E+01	No	0.00E+00	0.00E+00
Bromodichloromethane	Organic	4.02E-03	1.00E+00	8.70E-01	1.98E-02	2.09E+00	Yes	1.47E-05	1.47E-05
Cadmium	Inorganic	1.00E-03	1.00E+00	4.48E-01	4.08E-03	1.08E+00	Yes	2.00E-06	2.00E-06
Carbazole	Organic	5.36E-02	1.00E+00	9.08E-01	2.67E-01	2.18E+00	Yes	2.00E-04	2.00E-04
Carbon Tetrachloride	Organic	1.63E-02	1.00E+00	7.64E-01	7.78E-02	1.83E+00	Yes	5.71E-05	5.71E-05
alpha-Chlordane	Organic	3.38E-02	7.00E-01	2.07E+01	2.63E-01	4.98E+01	Yes	4.22E-04	4.22E-04
gamma-Chlordane	Organic	3.38E-02	7.00E-01	2.07E+01	2.63E-01	4.98E+01	No	0.00E+00	0.00E+00
Chlorobenzene	Organic	2.82E-02	1.00E+00	4.49E-01	1.15E-01	1.08E+00	Yes	7.88E-05	7.88E-05
Chromium (Trivalent)	Inorganic	1.00E-03	1.00E+00	2.06E-01	2.77E-03	4.93E-01	Yes	2.00E-06	2.00E-06
Chromium (Hexavalent)	Inorganic	2.00E-03	1.00E+00	2.06E-01	5.55E-03	4.93E-01	Yes	4.00E-06	4.00E-06
Chrysene	Organic	5.96E-01	1.00E+00	2.00E+00	3.46E+00	8.53E+00	No	0.00E+00	0.00E+00
Cobalt	Inorganic	4.00E-04	1.00E+00	2.25E-01	1.18E-03	5.40E-01	Yes	8.00E-07	8.00E-07
Copper	Inorganic	1.00E-03	1.00E+00	2.39E-01	3.07E-03	5.73E-01	Yes	2.00E-06	2.00E-06
Cyanide	Inorganic	1.00E-03	1.00E+00	1.47E-01	1.96E-03	3.53E-01	Yes	2.00E-06	2.00E-06
DDD	Organic	2.51E-01	8.00E-01	6.52E+00	1.73E+00	2.62E+01	Yes	2.00E-03	2.00E-03
DDE	Organic	5.45E-01	8.00E-01	6.35E+00	3.74E+00	2.73E+01	No	0.00E+00	0.00E+00
DDT	Organic	6.28E-01	7.00E-01	1.02E+01	4.55E+00	4.43E+01	No	0.00E+00	0.00E+00
Dibenzo(a,h)anthracene	Organic	9.53E-01	6.00E-01	3.81E+00	6.12E+00	1.69E+01	No	0.00E+00	0.00E+00
Dibenzofuran	Organic	9.75E-02	1.00E+00	9.20E-01	4.86E-01	2.21E+00	Yes	3.66E-04	3.66E-04
1,3-Dichlorobenzene	Organic	5.20E-02	1.00E+00	7.00E-01	2.42E-01	1.68E+00	Yes	1.73E-04	1.73E-04
1,4-Dichlorobenzene	Organic	4.53E-02	1.00E+00	7.00E-01	2.11E-01	1.68E+00	Yes	1.51E-04	1.51E-04
3,3'-Dichlorobenzidine	Organic	1.28E-02	1.00E+00	2.75E+00	7.83E-02	6.60E+00	Yes	8.30E-05	8.30E-05
cis-1,2-Dichloroethylene	Organic	1.10E-02	1.00E+00	3.67E-01	4.17E-02	8.81E-01	Yes	2.95E-05	2.95E-05
Dieldrin	Organic	3.26E-02	8.00E-01	1.43E+01	2.45E-01	3.43E+01	Yes	3.85E-04	3.85E-04
4,6-Dinitro-o-cresol	Organic	3.15E-03	1.00E+00	1.35E+00	1.71E-02	3.25E+00	Yes	1.43E-05	1.43E-05
2,4-Dinitrotoluene	Organic	3.08E-03	1.00E+00	1.10E+00	1.60E-02	2.64E+00	Yes	1.26E-05	1.26E-05
2,6-Dinitrotoluene	Organic	3.70E-03	1.00E+00	1.10E+00	1.92E-02	2.64E+00	Yes	1.52E-05	1.52E-05
1,4-Dioxane	Organic	3.32E-04	1.00E+00	3.28E-01	1.20E-03	7.86E-01	Yes	8.81E-07	8.81E-07
Endrin ketone	Organic	2.35E-02	8.00E-01	1.43E+01	1.76E-01	3.43E+01	Yes	2.78E-04	2.78E-04
Heptachlor	Organic	1.43E-01	8.00E-01	1.30E+01	1.06E+00	5.01E+01	Yes	1.61E-03	1.61E-03
Heptachlor Epoxide	Organic	2.09E-02	8.00E-01	1.59E+01	1.59E-01	3.82E+01	Yes	2.61E-04	2.61E-04
alpha-BHC	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	1.53E-04	1.53E-04
beta-BHC	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	1.53E-04	1.53E-04
delta-BHC	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	1.53E-04	1.53E-04
gamma-BHC (Lindane)	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	1.53E-04	1.53E-04
Indeno(1,2,3-cd)pyrene	Organic	1.24E+00	6.00E-01	3.71E+00	7.93E+00	1.67E+01	No	0.00E+00	0.00E+00
Iron	Inorganic	1.00E-03	1.00E+00	2.16E-01	2.87E-03	5.19E-01	Yes	2.00E-06	2.00E-06
Lead	Inorganic	1.00E-04	1.00E+00	1.52E+00	5.54E-04	3.65E+00	Yes	2.00E-07	2.00E-07
Manganese	Inorganic	1.00E-03	1.00E+00	2.14E-01	2.85E-03	5.13E-01	Yes	2.00E-06	2.00E-06
Mercuric Chloride	Inorganic	1.00E-03	1.00E+00	3.49E+00	6.34E-03	8.36E+00	Yes	2.00E-06	2.00E-06
Mercury (elemental)	Inorganic	1.00E-03	1.00E+00	1.40E+00	5.45E-03	3.35E+00	Yes	2.00E-06	2.00E-06
Methyl tert-Butyl Ether (MTBE)	Organic	2.11E-03	1.00E+00	3.28E-01	7.62E-03	7.87E-01	Yes	5.58E-06	5.58E-06
2-Methylnaphthalene	Organic	9.17E-02	1.00E+00	6.58E-01	4.21E-01	1.58E+00	Yes	2.96E-04	2.96E-04
Naphthalene	Organic	4.66E-02	1.00E+00	5.49E-01	2.03E-01	1.32E+00	Yes	1.39E-04	1.39E-04
Nickel	Inorganic	2.00E-04	1.00E+00	2.24E-01	5.89E-04	5.38E-01	Yes	4.00E-07	4.00E-07
2-Nitroaniline	Organic	4.46E-03	1.00E+00	6.24E-01	2.02E-02	1.50E+00	Yes	1.44E-05	1.44E-05
3-Nitroaniline	Organic	2.14E-03	1.00E+00	6.24E-01	9.67E-03	1.50E+00	Yes	6.94E-06	6.94E-06
4-Nitroaniline	Organic	2.21E-03	1.00E+00	6.24E-01	9.99E-03	1.50E+00	Yes	7.16E-06	7.16E-06
Nitrobenzene	Organic	5.41E-03	1.00E+00	5.14E-01	2.31E-02	1.23E+00	Yes	1.63E-05	1.63E-05
N-Nitroso-di-N-propylamine	Organic	2.33E-03	1.00E+00	5.64E-01	1.02E-02	1.35E+00	Yes	7.27E-06	7.27E-06
Phenanthrene	Organic	1.44E-01	1.00E+00	1.05E+00	7.39E-01	4.05E+00	Yes	5.76E-04	5.76E-04
Pyrene	Organic	2.01E-01	1.00E+00	1.43E+00	1.10E+00	5.54E+00	Yes	9.39E-04	9.39E-04
Selenium	Inorganic	1.00E-03	1.00E+00	2.91E-01	3.42E-03	6.99E-01	Yes	2.00E-06	2.00E-06
Silver	Inorganic	6.00E-04	1.00E+00	4.23E-01	2.40E-03	1.01E+00	Yes	1.20E-06	1.20E-06
2,3,7,8-TCDD Equivalents	Organic	8.08E-01	5.00E-01	6.68E+00	5.58E+00	2.95E+01	No	0.00E+00	0.00E+00
Tetrachloroethene	Organic	3.34E-02	1.00E+00	8.92E-01	1.65E-01	2.14E+00	Yes	1.23E-04	1.23E-04
Thallium	Inorganic	1.00E-03	1.00E+00	1.49E+00	5.51E-03	3.57E+00	Yes	2.00E-06	2.00E-06
Trichloroethene (mutagenic)	Organic	1.16E-02	1.00E+00	5.72E-01	5.11E-02	1.37E+00	Yes	3.60E-05	3.60E-05
Trichloroethene (nonmutagenic)	Organic	1.16E-02	1.00E+00	5.72E-01	5.11E-02	1.37E+00	Yes	3.60E-05	3.60E-05
Vanadium	Inorganic	1.00E-03	1.00E+00	2.03E-01	2.75E-03	4.87E-01	Yes	2.00E-06	2.00E-06
Vinyl Chloride	Organic	8.38E-03	1.00E+00	2.35E-01	2.55E-02	5.65E-01	Yes	2.04E-05	2.04E-05
Zinc	Inorganic	6.00E-04	1.00E+00	2.44E-01	1.87E-03	5.86E-01	Yes	1.20E-06	1.20E-06
2-Methylphenol	Organic	7.66E-03	1.00E+00	4.24E-01	3.06E-02	1.02E+00	Yes	2.16E-05	2.16E-05
4-Methylphenol	Organic	7.54E-03	1.00E+00	4.24E-01	3.02E-02	1.02E+00	Yes	2.12E-05	2.12E-05
Acenaphthene	Organic	8.60E-02	1.00E+00	7.68E-01	4.11E-01	1.84E+00	Yes	3.04E-04	3.04E-04
Acenaphthylene	Organic	9.11E-02	1.00E+00	7.48E-01	4.32E-01	1.80E+00	Yes	3.17E-04	3.17E-04

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 3)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: COMBINED (CHILD AND ADULT) RECREATIONAL USERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Organic or Inorganic	Estimated Kp (cm/hr)	FA	tau-event (hr)	B	t* (hr)	In EPD?	DAevent (L/cm^2- event)	
								Child	Adult
Anthracene	Organic	1.42E-01	1.00E+00	1.05E+00	7.29E-01	4.05E+00	Yes	5.68E-04	5.68E-04
Benzaldehyde	Organic	3.83E-03	1.00E+00	4.13E-01	1.52E-02	9.92E-01	Yes	1.08E-05	1.08E-05
Benzo(g,h,i)perylene	Organic	1.12E+00	7.00E-01	3.71E+00	7.16E+00	1.66E+01	No	0.00E+00	0.00E+00
Caprolactam	Organic	1.00E-03	1.00E+00	4.52E-01	4.09E-03	1.09E+00	Yes	2.90E-06	2.90E-06
Di-n-butylphthalate	Organic	4.20E-02	9.00E-01	3.81E+00	2.70E-01	9.14E+00	Yes	2.88E-04	2.88E-04
Fluoranthene	Organic	3.08E-01	1.00E+00	1.43E+00	1.68E+00	5.73E+00	No	0.00E+00	0.00E+00
Fluorene	Organic	1.10E-01	1.00E+00	8.97E-01	5.45E-01	2.15E+00	Yes	4.07E-04	4.07E-04
N-Nitrosodiphenylamine	Organic	1.45E-02	1.00E+00	1.35E+00	7.85E-02	3.25E+00	Yes	6.60E-05	6.60E-05
Pentachlorophenol	Organic	1.27E-01	9.00E-01	3.26E+00	7.97E-01	1.25E+01	Yes	8.07E-04	8.07E-04
Endosulfan I	Organic	2.86E-03	9.00E-01	2.00E+01	2.22E-02	4.80E+01	Yes	4.50E-05	4.50E-05
Endosulfan II	Organic	2.86E-03	9.00E-01	2.00E+01	2.22E-02	4.80E+01	Yes	4.50E-05	4.50E-05
Endrin	Organic	3.26E-02	8.00E-01	1.43E+01	2.45E-01	3.43E+01	Yes	3.85E-04	3.85E-04
Endrin aldehyde	Organic	1.78E-02	8.00E-01	1.43E+01	1.34E-01	3.43E+01	Yes	2.10E-04	2.10E-04
Methoxychlor	Organic	4.28E-02	8.00E-01	9.07E+00	3.06E-01	2.18E+01	Yes	4.03E-04	4.03E-04
Boron	Inorganic	1.00E-03	1.00E+00	1.26E-01	1.40E-03	3.02E-01	Yes	2.00E-06	2.00E-06

CHEMICAL	Cancer Slope Factor		Reference Dose		Age Dependent Adjustment Factor				Surrogate
	Oral (mg/kg/day)$^{-1}$	Dermal (mg/kg/day)$^{-1}$	Oral (mg/kg/day)	Dermal (mg/kg/day)	Ages 0 - 2	Ages 2 - 6	Ages 6 - 16	Ages >16	
Aldrin	1.70E+01	1.70E+01	3.00E-05	3.00E-05	1	1	1	1	
Aluminum	NA	NA	1.00E+00	1.00E+00	1	1	1	1	
Antimony	NA	NA	4.00E-04	6.00E-05	1	1	1	1	
Aroclor-1016	7.00E-02	7.00E-02	7.00E-05	7.00E-05	1	1	1	1	
Aroclor-1242	2.00E+00	2.00E+00	NA	NA	1	1	1	1	
Aroclor-1248	2.00E+00	2.00E+00	NA	NA	1	1	1	1	
Aroclor-1260	2.00E+00	2.00E+00	NA	NA	1	1	1	1	
Dioxin-Like PCBs	1.30E+05	1.30E+05	7.00E-10	7.00E-10	1	1	1	1	
Non-Dioxin-Like PCBs	4.00E-01	4.00E-01	NA	NA	1	1	1	1	
Arsenic	1.50E+00	1.50E+00	3.00E-04	3.00E-04	1	1	1	1	
Atrazine	2.30E-01	2.30E-01	3.50E-02	3.50E-02	1	1	1	1	
Barium	NA	NA	2.00E-01	1.40E-02	1	1	1	1	
Benzo(a)anthracene	1.00E-01	1.00E-01	NA	NA	10	3	3	1	
Benzene	5.50E-02	5.50E-02	4.00E-03	4.00E-03	1	1	1	1	
Benzo(a)pyrene	1.00E+00	1.00E+00	3.00E-04	3.00E-04	10	3	3	1	
Benzo(b)fluoranthene	1.00E-01	1.00E-01	NA	NA	10	3	3	1	
Benzo(k)fluoranthene	1.00E-02	1.00E-02	NA	NA	10	3	3	1	
Beryllium	NA	NA	2.00E-03	1.40E-05	1	1	1	1	
Bis(2-chloro-1-methylethyl) ether	NA	NA	4.00E-02	4.00E-02	1	1	1	1	
Bis(2-ethylhexyl)phthalate	1.40E-02	1.40E-02	2.00E-02	2.00E-02	1	1	1	1	
Bromodichloromethane	6.20E-02	6.20E-02	2.00E-02	2.00E-02	1	1	1	1	
Cadmium	NA	NA	5.00E-04	2.50E-05	1	1	1	1	
Carbazole	NA	NA	NA	NA	1	1	1	1	
Carbon Tetrachloride	7.00E-02	7.00E-02	4.00E-03	4.00E-03	1	1	1	1	
alpha-Chlordane	3.50E-01	3.50E-01	5.00E-04	5.00E-04	1	1	1	1	Chlordane
gamma-Chlordane	3.50E-01	3.50E-01	5.00E-04	5.00E-04	1	1	1	1	Chlordane
Chlorobenzene	NA	NA	2.00E-02	2.00E-02	1	1	1	1	
Chromium (Trivalent)	NA	NA	1.50E+00	1.95E-02	1	1	1	1	
Chromium (Hexavalent)	5.00E-01	2.00E+01	3.00E-03	7.50E-05	10	3	3	1	
Chrysene	1.00E-03	1.00E-03	NA	NA	10	3	3	1	
Cobalt	NA	NA	3.00E-04	3.00E-04	1	1	1	1	
Copper	NA	NA	4.00E-02	4.00E-02	1	1	1	1	
Cyanide	NA	NA	6.00E-04	6.00E-04	1	1	1	1	
DDD	2.40E-01	2.40E-01	NA	NA	1	1	1	1	
DDE	3.40E-01	3.40E-01	NA	NA	1	1	1	1	
DDT	3.40E-01	3.40E-01	5.00E-04	5.00E-04	1	1	1	1	
Dibenzo(a,h)anthracene	1.00E+00	1.00E+00	NA	NA	10	3	3	1	
Dibenzofuran	NA	NA	1.00E-03	1.00E-03	1	1	1	1	
1,3-Dichlorobenzene	NA	NA	NA	NA	1	1	1	1	
1,4-Dichlorobenzene	5.40E-03	5.40E-03	7.00E-02	7.00E-02	1	1	1	1	
3,3'-Dichlorobenzidine	4.50E-01	4.50E-01	NA	NA	1	1	1	1	
cis-1,2-Dichloroethylene	NA	NA	2.00E-03	2.00E-03	1	1	1	1	
Dieldrin	1.60E+01	1.60E+01	5.00E-05	5.00E-05	1	1	1	1	
4,6-Dinitro-o-cresol	NA	NA	8.00E-05	8.00E-05	1	1	1	1	
2,4-Dinitrotoluene	3.10E-01	3.10E-01	2.00E-03	2.00E-03	1	1	1	1	
2,6-Dinitrotoluene	1.50E+00	1.50E+00	3.00E-04	3.00E-04	1	1	1	1	
1,4-Dioxane	1.00E-01	1.00E-01	3.00E-02	3.00E-02	1	1	1	1	
Endrin ketone	NA	NA	3.00E-04	3.00E-04	1	1	1	1	Endrin
Heptachlor	4.50E+00	4.50E+00	5.00E-04	5.00E-04	1	1	1	1	
Heptachlor Epoxide	9.10E+00	9.10E+00	1.30E-05	1.30E-05	1	1	1	1	
alpha-BHC	6.30E+00	6.30E+00	8.00E-03	8.00E-03	1	1	1	1	
beta-BHC	1.80E+00	1.80E+00	NA	NA	1	1	1	1	
delta-BHC	6.30E+00	6.30E+00	8.00E-03	8.00E-03	1	1	1	1	alpha-BHC
gamma-BHC (Lindane)	1.10E+00	1.10E+00	3.00E-04	3.00E-04	1	1	1	1	
Indeno(1,2,3-cd)pyrene	1.00E-01	1.00E-01	NA	NA	10	3	3	1	
Iron	NA	NA	7.00E-01	7.00E-01	1	1	1	1	
Lead	NA	NA	NA	NA	1	1	1	1	
Manganese	NA	NA	2.40E-02	9.60E-04	1	1	1	1	
Mercuric Chloride	NA	NA	3.00E-04	2.10E-05	1	1	1	1	
Mercury (elemental)	NA	NA	NA	NA	1	1	1	1	
Methyl tert-Butyl Ether (MTBE)	1.80E-03	1.80E-03	NA	NA	1	1	1	1	
2-Methylnaphthalene	NA	NA	4.00E-03	4.00E-03	1	1	1	1	
Naphthalene	NA	NA	2.00E-02	2.00E-02	1	1	1	1	
Nickel	NA	NA	2.00E-02	8.00E-04	1	1	1	1	
2-Nitroaniline	NA	NA	1.00E-02	1.00E-02	1	1	1	1	

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 4)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: COMBINED (CHILD AND ADULT) RECREATIONAL USERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Cancer Slope Factor		Reference Dose		Age Dependent Adjustment Factor				Surrogate
	Oral (mg/kg/day)$^{-1}$	Dermal (mg/kg/day)$^{-1}$	Oral (mg/kg/day)	Dermal (mg/kg/day)	Ages 0 - 2	Ages 2 - 6	Ages 6 - 16	Ages >16	
3-Nitroaniline	2.00E-02	2.00E-02	4.00E-03	4.00E-03	1	1	1	1	4-Nitroaniline
4-Nitroaniline	2.00E-02	2.00E-02	4.00E-03	4.00E-03	1	1	1	1	
Nitrobenzene	NA	NA	2.00E-03	2.00E-03	1	1	1	1	
N-Nitroso-di-N-propylamine	7.00E+00	7.00E+00	NA	NA	1	1	1	1	
Phenanthrene	NA	NA	3.00E-02	3.00E-02	1	1	1	1	Pyrene
Pyrene	NA	NA	3.00E-02	3.00E-02	1	1	1	1	
Selenium	NA	NA	5.00E-03	5.00E-03	1	1	1	1	
Silver	NA	NA	5.00E-03	2.00E-04	1	1	1	1	
2,3,7,8-TCDD Equivalents	1.30E+05	1.30E+05	7.00E-10	7.00E-10	1	1	1	1	
Tetrachloroethylene	2.10E-03	2.10E-03	6.00E-03	6.00E-03	1	1	1	1	
Thallium	NA	NA	1.00E-05	1.00E-05	1	1	1	1	
Trichloroethene (mutagenic)	9.30E-03	9.30E-03	5.00E-04	5.00E-04	10	3	3	1	
Trichloroethene (nonmutagenic)	3.67E-02	3.67E-02	5.00E-04	5.00E-04	1	1	1	1	
Vanadium	NA	NA	5.04E-03	1.31E-04	1	1	1	1	
Vinyl Chloride	7.20E-01	7.20E-01	3.00E-03	3.00E-03	1	1	1	1	
Zinc	NA	NA	3.00E-01	3.00E-01	1	1	1	1	
2-Methylphenol	NA	NA	5.00E-02	5.00E-02	1	1	1	1	
4-Methylphenol	NA	NA	1.00E-01	1.00E-01	1	1	1	1	
Acenaphthene	NA	NA	6.00E-02	6.00E-02	1	1	1	1	
Acenaphthylene	NA	NA	6.00E-02	6.00E-02	1	1	1	1	Acenaphthene
Anthracene	NA	NA	3.00E-01	3.00E-01	1	1	1	1	
Benzaldehyde	4.00E-03	4.00E-03	1.00E-01	1.00E-01	1	1	1	1	
Benzo(g,h,i)perylene	NA	NA	3.00E-02	3.00E-02	1	1	1	1	Pyrene
Caprolactam	NA	NA	5.00E-01	5.00E-01	1	1	1	1	
Di-n-butylphthalate	NA	NA	1.00E-01	1.00E-01	1	1	1	1	
Fluoranthene	NA	NA	4.00E-02	4.00E-02	1	1	1	1	
Fluorene	NA	NA	4.00E-02	4.00E-02	1	1	1	1	
N-Nitrosodiphenylamine	4.90E-03	4.90E-03	NA	NA	1	1	1	1	
Pentachlorophenol	4.00E-01	4.00E-01	5.00E-03	5.00E-03	1	1	1	1	
Endosulfan I	NA	NA	6.00E-03	6.00E-03	1	1	1	1	Endosulfan
Endosulfan II	NA	NA	6.00E-03	6.00E-03	1	1	1	1	Endosulfan
Endrin	NA	NA	3.00E-04	3.00E-04	1	1	1	1	
Endrin aldehyde	NA	NA	3.00E-04	3.00E-04	1	1	1	1	Endrin
Methoxychlor	NA	NA	5.00E-03	5.00E-03	1	1	1	1	
Boron	NA	NA	2.00E-01	2.00E-01	1	1	1	1	

CHEMICAL	Carcinogenic Intakes				Noncarcinogenic Intakes			
	Child		Adult		Child		Adult	
	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)
Aldrin	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Aluminum	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Antimony	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Aroclor-1016	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Aroclor-1242	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Aroclor-1248	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Aroclor-1260	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Dioxin-Like PCBs	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Non-Dioxin-Like PCBs	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Arsenic	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Atrazine	1.51E-05	3.81E-05	6.11E-06	3.89E-05	1.76E-04	4.44E-04	3.56E-05	2.27E-04
Barium	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Benzo(a)anthracene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Benzene	1.51E-05	5.33E-05	6.11E-06	5.45E-05	1.76E-04	6.22E-04	3.56E-05	3.18E-04
Benzo(a)pyrene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Benzo(b)fluoranthene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Benzo(k)fluoranthene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Beryllium	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Bis(2-chloro-1-methylethyl) ether	1.51E-05	4.16E-05	6.11E-06	4.26E-05	1.76E-04	4.85E-04	3.56E-05	2.48E-04
Bis(2-ethylhexyl)phthalate	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Bromodichloromethane	1.51E-05	2.09E-05	6.11E-06	2.14E-05	1.76E-04	2.44E-04	3.56E-05	1.25E-04
Cadmium	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Carbazole	1.51E-05	2.85E-04	6.11E-06	2.91E-04	1.76E-04	3.32E-03	3.56E-05	1.70E-03
Carbon Tetrachloride	1.51E-05	8.14E-05	6.11E-06	8.33E-05	1.76E-04	9.50E-04	3.56E-05	4.86E-04
alpha-Chlordane	1.51E-05	6.01E-04	6.11E-06	6.15E-04	1.76E-04	7.01E-03	3.56E-05	3.59E-03
gamma-Chlordane	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Chlorobenzene	1.51E-05	1.12E-04	6.11E-06	1.15E-04	1.76E-04	1.31E-03	3.56E-05	6.71E-04
Chromium (Trivalent)	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Chromium (Hexavalent)	8.04E-05	3.04E-05	1.63E-05	1.56E-05	1.76E-04	6.66E-05	3.56E-05	3.40E-05
Chrysene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Cobalt	1.51E-05	1.14E-06	6.11E-06	1.17E-06	1.76E-04	1.33E-05	3.56E-05	6.81E-06
Copper	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Cyanide	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
DDD	1.51E-05	2.86E-03	6.11E-06	2.92E-03	1.76E-04	3.33E-02	3.56E-05	1.71E-02
DDE	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
DDT	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Dibenzo(a,h)anthracene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Dibenzofuran	1.51E-05	5.21E-04	6.11E-06	5.33E-04	1.76E-04	6.08E-03	3.56E-05	3.11E-03
1,3-Dichlorobenzene	1.51E-05	2.47E-04	6.11E-06	2.53E-04	1.76E-04	2.89E-03	3.56E-05	1.48E-03
1,4-Dichlorobenzene	1.51E-05	2.16E-04	6.11E-06	2.21E-04	1.76E-04	2.52E-03	3.56E-05	1.29E-03
3,3'-Dichlorobenzidine	1.51E-05	1.18E-04	6.11E-06	1.21E-04	1.76E-04	1.38E-03	3.56E-05	7.06E-04
cis-1,2-Dichloroethylene	1.51E-05	4.21E-05	6.11E-06	4.31E-05	1.76E-04	4.91E-04	3.56E-05	2.51E-04
Dieldrin	1.51E-05	5.50E-04	6.11E-06	5.62E-04	1.76E-04	6.41E-03	3.56E-05	3.28E-03
4,6-Dinitro-o-cresol	1.51E-05	2.04E-05	6.11E-06	2.09E-05	1.76E-04	2.38E-04	3.56E-05	1.22E-04

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 5)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: COMBINED (CHILD AND ADULT) RECREATIONAL USERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Carcinogenic Intakes				Noncarcinogenic Intakes			
	Child		Adult		Child		Adult	
	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)
2,4-Dinitrotoluene	1.51E-05	1.80E-05	6.11E-06	1.84E-05	1.76E-04	2.10E-04	3.56E-05	1.08E-04
2,6-Dinitrotoluene	1.51E-05	2.16E-05	6.11E-06	2.21E-05	1.76E-04	2.53E-04	3.56E-05	1.29E-04
1,4-Dioxane	1.51E-05	1.26E-06	6.11E-06	1.29E-06	1.76E-04	1.47E-05	3.56E-05	7.50E-06
Endrin ketone	1.51E-05	3.96E-04	6.11E-06	4.05E-04	1.76E-04	4.62E-03	3.56E-05	2.36E-03
Heptachlor	1.51E-05	2.30E-03	6.11E-06	2.35E-03	1.76E-04	2.68E-02	3.56E-05	1.37E-02
Heptachlor Epoxide	1.51E-05	3.72E-04	6.11E-06	3.81E-04	1.76E-04	4.34E-03	3.56E-05	2.22E-03
alpha-BHC	1.51E-05	2.19E-04	6.11E-06	2.24E-04	1.76E-04	2.55E-03	3.56E-05	1.30E-03
beta-BHC	1.51E-05	2.19E-04	6.11E-06	2.24E-04	1.76E-04	2.55E-03	3.56E-05	1.30E-03
delta-BHC	1.51E-05	2.19E-04	6.11E-06	2.24E-04	1.76E-04	2.55E-03	3.56E-05	1.30E-03
gamma-BHC (Lindane)	1.51E-05	2.19E-04	6.11E-06	2.24E-04	1.76E-04	2.55E-03	3.56E-05	1.30E-03
Indeno(1,2,3-cd)pyrene	8.04E-05	0.00E+00	1.63E-05	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Iron	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Lead	1.51E-05	2.85E-07	6.11E-06	2.92E-07	1.76E-04	3.33E-06	3.56E-05	1.70E-06
Manganese	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Mercuric Chloride	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Mercury (elemental)	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Methyl tert-Butyl Ether (MTBE)	1.51E-05	7.96E-06	6.11E-06	8.14E-06	1.76E-04	9.29E-05	3.56E-05	4.75E-05
2-Methylnaphthalene	1.51E-05	4.22E-04	6.11E-06	4.32E-04	1.76E-04	4.93E-03	3.56E-05	2.52E-03
Naphthalene	1.51E-05	1.98E-04	6.11E-06	2.02E-04	1.76E-04	2.31E-03	3.56E-05	1.18E-03
Nickel	1.51E-05	5.70E-07	6.11E-06	5.84E-07	1.76E-04	6.66E-06	3.56E-05	3.40E-06
2-Nitroaniline	1.51E-05	2.06E-05	6.11E-06	2.10E-05	1.76E-04	2.40E-04	3.56E-05	1.23E-04
3-Nitroaniline	1.51E-05	9.89E-06	6.11E-06	1.01E-05	1.76E-04	1.15E-04	3.56E-05	5.90E-05
4-Nitroaniline	1.51E-05	1.02E-05	6.11E-06	1.05E-05	1.76E-04	1.19E-04	3.56E-05	6.10E-05
Nitrobenzene	1.51E-05	2.32E-05	6.11E-06	2.37E-05	1.76E-04	2.71E-04	3.56E-05	1.38E-04
N-Nitroso-di-N-propylamine	1.51E-05	1.04E-05	6.11E-06	1.06E-05	1.76E-04	1.21E-04	3.56E-05	6.18E-05
Phenanthrene	1.51E-05	8.21E-04	6.11E-06	8.40E-04	1.76E-04	9.58E-03	3.56E-05	4.90E-03
Pyrene	1.51E-05	1.34E-03	6.11E-06	1.37E-03	1.76E-04	1.56E-02	3.56E-05	7.99E-03
Selenium	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Silver	1.51E-05	1.71E-06	6.11E-06	1.75E-06	1.76E-04	2.00E-05	3.56E-05	1.02E-05
2,3,7,8-TCDD Equivalents	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Tetrachloroethene	1.51E-05	1.76E-04	6.11E-06	1.80E-04	1.76E-04	2.05E-03	3.56E-05	1.05E-03
Thallium	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Trichloroethene (mutagenic)	8.04E-05	2.74E-04	1.63E-05	1.40E-04	1.76E-04	5.99E-04	3.56E-05	3.07E-04
Trichloroethene (nonmutagenic)	1.51E-05	5.14E-05	6.11E-06	5.26E-05	1.76E-04	5.99E-04	3.56E-05	3.07E-04
Vanadium	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05
Vinyl Chloride	1.25E-03	2.41E-03	6.11E-06	2.98E-05	1.76E-04	3.39E-04	3.56E-05	1.74E-04
Zinc	1.51E-05	1.71E-06	6.11E-06	1.75E-06	1.76E-04	2.00E-05	3.56E-05	1.02E-05
2-Methylphenol	1.51E-05	3.07E-05	6.11E-06	3.15E-05	1.76E-04	3.59E-04	3.56E-05	1.84E-04
4-Methylphenol	1.51E-05	3.03E-05	6.11E-06	3.10E-05	1.76E-04	3.53E-04	3.56E-05	1.81E-04
Acenaphthene	1.51E-05	4.33E-04	6.11E-06	4.43E-04	1.76E-04	5.05E-03	3.56E-05	2.59E-03
Acenaphthylene	1.51E-05	4.52E-04	6.11E-06	4.63E-04	1.76E-04	5.28E-03	3.56E-05	2.70E-03
Anthracene	1.51E-05	8.10E-04	6.11E-06	8.29E-04	1.76E-04	9.45E-03	3.56E-05	4.83E-03
Benzaldehyde	1.51E-05	1.53E-05	6.11E-06	1.57E-05	1.76E-04	1.79E-04	3.56E-05	9.16E-05
Benzo(g,h,i)perylene	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Caprolactam	1.51E-05	4.14E-06	6.11E-06	4.23E-06	1.76E-04	4.83E-05	3.56E-05	2.47E-05
Di-n-butylphthalate	1.51E-05	4.11E-04	6.11E-06	4.21E-04	1.76E-04	4.80E-03	3.56E-05	2.45E-03
Fluoranthene	1.51E-05	0.00E+00	6.11E-06	0.00E+00	1.76E-04	0.00E+00	3.56E-05	0.00E+00
Fluorene	1.51E-05	5.81E-04	6.11E-06	5.94E-04	1.76E-04	6.77E-03	3.56E-05	3.47E-03
N-Nitrosodiphenylamine	1.51E-05	9.41E-05	6.11E-06	9.63E-05	1.76E-04	1.10E-03	3.56E-05	5.62E-04
Pentachlorophenol	1.51E-05	1.15E-03	6.11E-06	1.18E-03	1.76E-04	1.34E-02	3.56E-05	6.87E-03
Endosulfan I	1.51E-05	6.41E-05	6.11E-06	6.56E-05	1.76E-04	7.48E-04	3.56E-05	3.83E-04
Endosulfan II	1.51E-05	6.41E-05	6.11E-06	6.56E-05	1.76E-04	7.48E-04	3.56E-05	3.83E-04
Endrin	1.51E-05	5.50E-04	6.11E-06	5.62E-04	1.76E-04	6.41E-03	3.56E-05	3.28E-03
Endrin aldehyde	1.51E-05	3.00E-04	6.11E-06	3.07E-04	1.76E-04	3.50E-03	3.56E-05	1.79E-03
Methoxychlor	1.51E-05	5.75E-04	6.11E-06	5.88E-04	1.76E-04	6.71E-03	3.56E-05	3.43E-03
Boron	1.51E-05	2.85E-06	6.11E-06	2.92E-06	1.76E-04	3.33E-05	3.56E-05	1.70E-05

CHEMICAL	Pore Water RSL Concentration (ug/L)				
	Cancer			Noncancer	
	Child	Adult	Combined	Child	Adult
Aldrin	3.9	9.63	2.8	170	840
Aluminum	NA	NA	NA	4,800,000	19,000,000
Antimony	NA	NA	NA	1000	2,700
Aroclor-1016	948	2,340	670	400	2,000
Aroclor-1242	33	81.9	24	NA	NA
Aroclor-1248	33	81.9	24	NA	NA
Aroclor-1260	33	81.9	24	NA	NA
Dioxin-Like PCBs	0.0005	0.001	0.0004	0.004	0.02
Non-Dioxin-Like PCBs	166	409	120	NA	NA
Arsenic	37	73.9	25	1,400	5,700
Atrazine	82	96.5	44	56,000	130,000
Barium	NA	NA	NA	310,000	720,000
Benzo(a)anthracene	124	614.2	100	NA	NA
Benzene	266	300	140	5,000	11,000
Benzo(a)pyrene	12.4	61.42	10	1700	8400
Benzo(b)fluoranthene	124	614.2	100	NA	NA
Benzo(k)fluoranthene	1244	6142	1000	NA	NA
Beryllium	NA	NA	NA	410	810
Bis(2-chloro-1-methylethyl) ether	NA	NA	NA	60,000	140,000
Bis(2-ethylhexyl)phthalate	4,738	11,699	3,400	110,000	560,000
Bromodichloromethane	448	587	250	48,000	120,000
Cadmium	NA	NA	NA	590	1,300
Carbazole	NA	NA	NA	NA	NA

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 6)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: COMBINED (CHILD AND ADULT) RECREATIONAL USERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Pore Water RSL Concentration (ug/L)				
	Cancer			Noncancer	
	Child	Adult	Combined	Child	Adult
Carbon Tetrachloride	148	160	77	3,600	7,700
alpha-Chlordane	4.6	4.60	2.3	70	140
gamma-Chlordane	190	468	130	2,800	14,000
Chlorobenzene	NA	NA	NA	13,000	28,000
Chromium (Trivalent)	NA	NA	NA	550,000	1,100,000
Chromium (Hexavalent)	1.5	3.1	1.0	1,100	2,100
Chrysene	12,437	61,418	10,000	NA	NA
Cobalt	NA	NA	NA	1,600	7,100
Copper	NA	NA	NA	190,000	760,000
Cyanide	NA	NA	NA	2,900	11,000
DDD	1.5	1.42	0.72	NA	NA
DDE	195	482	140	NA	NA
DDT	195	482	140	2,800	14,000
Dibenzo(a,h)anthracene	12.4	61.42	10	NA	NA
Dibenzofuran	NA	NA	NA	160	320
1,3-Dichlorobenzene	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	803	817	400	26,000	53,000
3,3'-Dichlorobenzidine	17	17.5	8.5	NA	NA
cis-1,2-Dichloroethylene	NA	NA	NA	3,000	7,000
Dieldrin	0.11	0.110	0.055	7.6	15
4,6-Dinitro-o-cresol	NA	NA	NA	190	510
2,4-Dinitrotoluene	97	131	56	5,200	14,000
2,6-Dinitrotoluene	18	23.6	10	700	1,800
1,4-Dioxane	612	1,353	420	160,000	700,000
Endrin ketone	NA	NA	NA	63	120
Heptachlor	0.10	0.094	0.048	19	36
Heptachlor Epoxide	0.28	0.284	0.14	2.9	5.8
alpha-BHC	0.68	0.691	0.34	2,900	6,000
beta-BHC	2.4	2.42	1.2	NA	NA
delta-BHC	0.68	0.691	0.34	2,900	6,000
gamma-BHC (Lindane)	3.9	3.96	2	110	220
Indeno(1,2,3-cd)pyrene	124	614.2	100	NA	NA
Iron	NA	NA	NA	3,300,000	13,000,000
Lead	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	24,000	52,000
Mercuric Chloride	NA	NA	NA	460	1,100
Mercury (elemental)	NA	NA	NA	NA	NA
Methyl tert-Butyl Ether (MTBE)	24,117	38,985	15,000	NA	NA
2-Methylnaphthalene	NA	NA	NA	780	1,600
Naphthalene	NA	NA	NA	8,100	16,000
Nickel	NA	NA	NA	58,000	170,000
2-Nitroaniline	NA	NA	NA	24,000	63,000
3-Nitroaniline	2,003	3,081	1,200	14,000	42,000
4-Nitroaniline	1,977	3,020	1,200	14,000	41,000
Nitrobenzene	NA	NA	NA	4,500	11,000
N-Nitroso-di-N-propylamine	5.62	8.55	3.4	NA	NA
Phenanthrene	NA	NA	NA	3,100	6,100
Pyrene	NA	NA	NA	1,900	3,700
Selenium	NA	NA	NA	24,000	95,000
Silver	NA	NA	NA	7,400	17,000
2,3,7,8-TCDD Equivalents	0.0005	0.001	0.00036	0.004	0.02
Tetrachloroethylene	2,494	2,559	1,300	2,700	5,500
Thallium	NA	NA	NA	48	190
Trichloroethene (mutagenic)	303.38	687.2	210	640	1,500
Trichloroethene (nonmutagenic)	410.02	464.4	220	640	1,500
Trichloroethene	170	280	110	640	1,500
Vanadium	NA	NA	NA	3,500	7,300
Vinyl Chloride	0.38	38.7	0.38	5,800	14,000
Zinc	NA	NA	NA	1,500,000	6,500,000
2-Methylphenol	NA	NA	NA	94,000	230,000
4-Methylphenol	NA	NA	NA	190,000	460,000
Acenaphthene	NA	NA	NA	11,000	23,000
Acenaphthylene	NA	NA	NA	11,000	22,000
Anthracene	NA	NA	NA	31,000	62,000
Benzaldehyde	8218.41479	11465.0	4800	280,000	790,000
Benzo(g,h,i)perylene	NA	NA	NA	170,000	840,000
Caprolactam	NA	NA	NA	2,200,000	8,300,000
Di-n-butylphthalate	NA	NA	NA	20,000	40,000
Fluoranthene	NA	NA	NA	230,000	1,100,000
Fluorene	NA	NA	NA	5,800	11,000
N-Nitrosodiphenylamine	1,869	1,993	960	NA	NA
Pentachlorophenol	2	2	1.1	370	720
Endosulfan I	NA	NA	NA	6,500	14,000
Endosulfan II	NA	NA	NA	6,500	14,000
Endrin	NA	NA	NA	46	90
Endrin aldehyde	NA	NA	NA	82	160
Methoxychlor	NA	NA	NA	730	1,400
Boron	NA	NA	NA	960,000	3,800,000

TABLE 1

SUMMARY OF RECEPTOR RISKS AND HAZARDS - CHILD RECREATIONAL USERS (AGES 0 TO 6)
PORE WATER
LOWER DARBY CREEK AREA

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Aldrin		3.9	0.0E+00	Liver	170	0.0E+00
Aluminum		NA	0.0E+00	Neurological	4,800,000	0.0E+00
Antimony		NA	0.0E+00	Blood	1000	0.0E+00
Aroclor-1016		950	0.0E+00	Fetotoxicity	400	0.0E+00
Aroclor-1242		33	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1248		33	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1260		33	0.0E+00	Cancer	NA	0.0E+00
Dioxin-Like PCBs		0.0005	0.0E+00	Reproductive	0.004	0.0E+00
Non-Dioxin-Like PCBs		170	0.0E+00	Cancer	NA	0.0E+00
Arsenic		37	0.0E+00	Skin, Cardiovascular System	1,400	0.0E+00
Atrazine		82	0.0E+00	Body Weight	56,000	0.0E+00
Barium		NA	0.0E+00	Neurological	310,000	0.0E+00
Benzo(a)anthracene		120	0.0E+00	Cancer	NA	0.0E+00
Benzene		270	0.0E+00	Blood	5,000	0.0E+00
Benzo(a)pyrene		12	0.0E+00	Developmental, Immune, Reproductive	1700	0.0E+00
Benzo(b)fluoranthene		120	0.0E+00	Cancer	NA	0.0E+00
Benzo(k)fluoranthene		1200	0.0E+00	Cancer	NA	0.0E+00
Beryllium		NA	0.0E+00	Gastrointestinal System	410	0.0E+00
Bis(2-chloro-1-methylethyl) ether		NA	0.0E+00	Blood	60,000	0.0E+00
Bis(2-ethylhexyl)phthalate		4,700	0.0E+00	Liver	110,000	0.0E+00
Bromodichloromethane		450	0.0E+00	Kidney	48,000	0.0E+00
Cadmium		NA	0.0E+00	Kidney	590	0.0E+00
Carbazole		NA	0.0E+00	NA	NA	0.0E+00
Carbon Tetrachloride		150	0.0E+00	Liver	3,600	0.0E+00
alpha-Chlordane		4.6	0.0E+00	Liver	70	0.0E+00
gamma-Chlordane		190	0.0E+00	Liver	2,800	0.0E+00
Chlorobenzene		NA	0.0E+00	Liver	13,000	0.0E+00
Chromium (Trivalent)		NA	0.0E+00	None Reported	550,000	0.0E+00
Chromium (Hexavalent)		1.5	0.0E+00	None Reported	1,100	0.0E+00
Chrysene		12,000	0.0E+00	Cancer	NA	0.0E+00
Cobalt		NA	0.0E+00	Thyroid	1,600	0.0E+00
Copper		NA	0.0E+00	Gastrointestinal System	190,000	0.0E+00
Cyanide		NA	0.0E+00	Thyroid, Central Nervous System	2,900	0.0E+00
DDD		1.5	0.0E+00	Cancer	NA	0.0E+00
DDE		200	0.0E+00	Cancer	NA	0.0E+00
DDT		200	0.0E+00	Liver	2,800	0.0E+00
Dibenzo(a,h)anthracene		12	0.0E+00	Cancer	NA	0.0E+00
Dibenzofuran		NA	0.0E+00	Kidney	160	0.0E+00
1,3-Dichlorobenzene		NA	0.0E+00	Cancer	NA	0.0E+00
1,4-Dichlorobenzene		800	0.0E+00	Blood	26,000	0.0E+00
3,3'-Dichlorobenzidine		17	0.0E+00	Cancer	NA	0.0E+00
cis-1,2-Dichloroethylene		NA	0.0E+00	Kidney	3,000	0.0E+00
Dieldrin		0.11	0.0E+00	Liver	7.6	0.0E+00
4,6-Dinitro-o-cresol		NA	0.0E+00	Eyes	190	0.0E+00
2,4-Dinitrotoluene		97	0.0E+00	Neurotoxicity	5,200	0.0E+00
2,6-Dinitrotoluene		18	0.0E+00	Central Nervous System, Blood, Liver	700	0.0E+00
1,4-Dioxane		610	0.0E+00	Liver, Kidney	160,000	0.0E+00
Endrin ketone		NA	0.0E+00	Central Nervous System, Liver	63	0.0E+00
Heptachlor		0.096	0.0E+00	Liver	19	0.0E+00
Heptachlor Epoxide		0.28	0.0E+00	Liver	2.9	0.0E+00
alpha-BHC		0.68	0.0E+00	Liver	2,900	0.0E+00
beta-BHC		2.4	0.0E+00	Cancer	NA	0.0E+00
delta-BHC		0.68	0.0E+00	Liver	2,900	0.0E+00
gamma-BHC (Lindane)		3.9	0.0E+00	Liver, Kidney	110	0.0E+00
Indeno(1,2,3-cd)pyrene		120	0.0E+00	Cancer	NA	0.0E+00
Iron		NA	0.0E+00	Gastrointestinal System	3,300,000	0.0E+00
Lead		NA	0.0E+00	Neurological	NA	0.0E+00
Manganese		NA	0.0E+00	Central Nervous System	24,000	0.0E+00
Mercuric Chloride		NA	0.0E+00	Central Nervous System	460	0.0E+00

TABLE 1

SUMMARY OF RECEPTOR RISKS AND HAZARDS - CHILD RECREATIONAL USERS (AGES 0 TO 6)
PORE WATER
LOWER DARBY CREEK AREA
PAGE 2 OF 3

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Mercury (elemental)		NA	0.0E+00	Central Nervous System	NA	0.0E+00
Methyl tert-Butyl Ether (MTBE)		24,000	0.0E+00	Cancer	NA	0.0E+00
2-Methylnaphthalene		NA	0.0E+00	Respiratory	780	0.0E+00
Naphthalene		NA	0.0E+00	Body Weight	8,100	0.0E+00
Nickel		NA	0.0E+00	Body Weight	58,000	0.0E+00
2-Nitroaniline		NA	0.0E+00	Spleen	24,000	0.0E+00
3-Nitroaniline		2,000	0.0E+00	Spleen	14,000	0.0E+00
4-Nitroaniline		2,000	0.0E+00	Spleen	14,000	0.0E+00
Nitrobenzene		NA	0.0E+00	Blood	4,500	0.0E+00
N-Nitroso-di-N-propylamine		5.6	0.0E+00	Cancer	NA	0.0E+00
Phenanthrene		NA	0.0E+00	Kidney	3,100	0.0E+00
Pyrene		NA	0.0E+00	Kidney	1,900	0.0E+00
Selenium		NA	0.0E+00	Skin, Central Nervous System	24,000	0.0E+00
Silver		NA	0.0E+00	Skin	7,400	0.0E+00
2,3,7,8-TCDD Equivalents		0.00051	0.0E+00	Reproductive	0.004	0.0E+00
Tetrachloroethylene		2,500	0.0E+00	Neurotoxicity	2,700	0.0E+00
Thallium		NA	0.0E+00	Skin	48	0.0E+00
Trichloroethene		170	0.0E+00	Immune System, Developmental	640	0.0E+00
Vanadium		NA	0.0E+00	Kidney	3,500	0.0E+00
Vinyl Chloride		0.38	0.0E+00	Liver	5,800	0.0E+00
Zinc		NA	0.0E+00	Blood	1,500,000	0.0E+00
2-Methylphenol		NA	0.0E+00	Body Weight, Central Nervous System	94,000	0.0E+00
4-Methylphenol		NA	0.0E+00	Respiratory	190,000	0.0E+00
Acenaphthene		NA	0.0E+00	Liver	11,000	0.0E+00
Acenaphthylene		NA	0.0E+00	Liver	11,000	0.0E+00
Anthracene		NA	0.0E+00	None Reported	31,000	0.0E+00
Benzaldehyde		8200	0.0E+00	Gastrointestinal, Kidney	280,000	0.0E+00
Benzo(g,h,i)perylene		NA	0.0E+00	Kidney	170,000	0.0E+00
Caprolactam		NA	0.0E+00	Body Weight	2,200,000	0.0E+00
Di-n-butylphthalate		NA	0.0E+00	Developmental	20,000	0.0E+00
Fluoranthene		NA	0.0E+00	Liver, Kidney, Blood	230,000	0.0E+00
Fluorene		NA	0.0E+00	Blood	5,800	0.0E+00
N-Nitrosodiphenylamine		1900	0.0E+00	Cancer	NA	0.0E+00
Pentachlorophenol		2.1	0.0E+00	Liver	370	0.0E+00
Endosulfan I		NA	0.0E+00	Body Weight	6,500	0.0E+00
Endosulfan II		NA	0.0E+00	Body Weight	6,500	0.0E+00
Endrin		NA	0.0E+00	Liver	46	0.0E+00
Endrin aldehyde		NA	0.0E+00	Liver	82	0.0E+00
Methoxychlor		NA	0.0E+00	Reproductive	730	0.0E+00
Boron		NA	0.0E+00	Developmental	960,000	0.0E+00
		Total Carcinogenic Risk	**0E+00**		**Total HI**	**0**

Target Organ HIs

Total Blood HI =	0.0E+00
Total Body weight HI =	0.0E+00
Total Cardiovascular System HI =	0.0E+00
Total Central Nervous System HI =	0.0E+00
Total Developmental HI =	0.0E+00
Total Eyes HI =	0.0E+00
Total Fetotoxicity HI =	0.0E+00
Total Gastrointestinal System HI =	0.0E+00
Total Immune System HI =	0.0E+00
Total Kidney HI =	0.0E+00
Total Liver HI =	0.0E+00
Total Lymphoma HI =	0.0E+00
Total Neurological HI =	0.0E+00

TABLE 1

SUMMARY OF RECEPTOR RISKS AND HAZARDS - CHILD RECREATIONAL USERS (AGES 0 TO 6)
PORE WATER
LOWER DARBY CREEK AREA
PAGE 3 OF 3

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
					Total Neurotoxicity HI =	0.0E+00
					Total Reproductive HI =	0.0E+00
					Total Respiratory HI =	0.0E+00
					Total Skin HI =	0.0E+00
					Total Spleen HI =	0.0E+00
					Total Thyroid HI =	0.0E+00
					Total Urinary HI =	0.0E+00
					Total None Reported HI =	0.0E+00

TABLE 2

SUMMARY OF RECEPTOR RISKS AND HAZARDS - ADULT RECREATIONAL USERS (AGES 6 TO 18)
PORE WATER
LOWER DARBY CREEK AREA

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Aldrin		9.6	0.0E+00	Liver	840	0.0E+00
Aluminum		NA	0.0E+00	Neurological	19,000,000	0.0E+00
Antimony		NA	0.0E+00	Blood	2,700	0.0E+00
Aroclor-1016		2,300	0.0E+00	Fetotoxicity	2,000	0.0E+00
Aroclor-1242		82	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1248		82	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1260		82	0.0E+00	Cancer	NA	0.0E+00
Dioxin-Like PCBs		0.001	0.0E+00	Reproductive	0.02	0.0E+00
Non-Dioxin-Like PCBs		410	0.0E+00	Cancer	NA	0.0E+00
Arsenic		74	0.0E+00	Skin, Cardiovascular System	5,700	0.0E+00
Atrazine		97	0.0E+00	Body Weight	130,000	0.0E+00
Barium		NA	0.0E+00	Neurological	720,000	0.0E+00
Benzo(a)anthracene		610	0.0E+00	Cancer	NA	0.0E+00
Benzene		300	0.0E+00	Blood	11,000	0.0E+00
Benzo(a)pyrene		61	0.0E+00	Developmental, Immune, Reproductive	8400	0.0E+00
Benzo(b)fluoranthene		610	0.0E+00	Cancer	NA	0.0E+00
Benzo(k)fluoranthene		6100	0.0E+00	Cancer	NA	0.0E+00
Beryllium		NA	0.0E+00	Gastrointestinal System	810	0.0E+00
Bis(2-chloro-1-methylethyl) ether		NA	0.0E+00	Blood	140,000	0.0E+00
Bis(2-ethylhexyl)phthalate		12,000	0.0E+00	Liver	560,000	0.0E+00
Bromodichloromethane		590	0.0E+00	Kidney	120,000	0.0E+00
Cadmium		NA	0.0E+00	Kidney	1,300	0.0E+00
Carbazole		NA	0.0E+00	NA	NA	0.0E+00
Carbon Tetrachloride		160	0.0E+00	Liver	7,700	0.0E+00
alpha-Chlordane		4.6	0.0E+00	Liver	140	0.0E+00
gamma-Chlordane		470	0.0E+00	Liver	14,000	0.0E+00
Chlorobenzene		NA	0.0E+00	Liver	28,000	0.0E+00
Chromium (Trivalent)		NA	0.0E+00	Liver	1,100,000	0.0E+00
Chromium (Hexavalent)		3.1	0.0E+00	Liver	2,100	0.0E+00
Chrysene		61,000	0.0E+00	Cancer	NA	0.0E+00
Cobalt		NA	0.0E+00	Thyroid	7,100	0.0E+00
Copper		NA	0.0E+00	Gastrointestinal System	760,000	0.0E+00
Cyanide		NA	0.0E+00	Thyroid, Central Nervous System	11,000	0.0E+00
DDD		1.4	0.0E+00	Cancer	NA	0.0E+00
DDE		480	0.0E+00	Cancer	NA	0.0E+00
DDT		480	0.0E+00	Liver	14,000	0.0E+00
Dibenzo(a,h)anthracene		61	0.0E+00	Cancer	NA	0.0E+00
Dibenzofuran		NA	0.0E+00	Kidney	320	0.0E+00
1,3-Dichlorobenzene		NA	0.0E+00	Cancer	NA	0.0E+00
1,4-Dichlorobenzene		820	0.0E+00	Blood	53,000	0.0E+00
3,3'-Dichlorobenzidine		17	0.0E+00	Cancer	NA	0.0E+00
cis-1,2-Dichloroethylene		NA	0.0E+00	Kidney	7,000	0.0E+00
Dieldrin		0.11	0.0E+00	Liver	15	0.0E+00
4,6-Dinitro-o-cresol		NA	0.0E+00	Eyes	510	0.0E+00
2,4-Dinitrotoluene		130	0.0E+00	Neurotoxicity	14,000	0.0E+00
2,6-Dinitrotoluene		24	0.0E+00	Central Nervous System, Blood, Liver	1,800	0.0E+00
1,4-Dioxane		1,400	0.0E+00	Liver, Kidney	700,000	0.0E+00
Endrin ketone		NA	0.0E+00	Central Nervous System, Liver	120	0.0E+00
Heptachlor		0.094	0.0E+00	Liver	36	0.0E+00
Heptachlor Epoxide		0.28	0.0E+00	Liver	5.8	0.0E+00
alpha-BHC		0.69	0.0E+00	Liver	6,000	0.0E+00
beta-BHC		2.4	0.0E+00	Cancer	NA	0.0E+00
delta-BHC		0.69	0.0E+00	Liver	6,000	0.0E+00
gamma-BHC (Lindane)		4	0.0E+00	Liver, Kidney	220	0.0E+00
Indeno(1,2,3-cd)pyrene		610	0.0E+00	Cancer	NA	0.0E+00
Iron		NA	0.0E+00	Gastrointestinal System	13,000,000	0.0E+00
Lead		NA	0.0E+00	Neurological	NA	0.0E+00
Manganese		NA	0.0E+00	Central Nervous System	52,000	0.0E+00
Mercuric Chloride		NA	0.0E+00	Central Nervous System	1,100	0.0E+00

TABLE 2

SUMMARY OF RECEPTOR RISKS AND HAZARDS - ADULT RECREATIONAL USERS (AGES 6 TO 18)
PORE WATER
LOWER DARBY CREEK AREA
PAGE 2 OF 3

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Mercury (elemental)		NA	0.0E+00	Central Nervous System	NA	0.0E+00
Methyl tert-Butyl Ether (MTBE)		39,000	0.0E+00	Cancer	NA	0.0E+00
2-Methylnaphthalene		NA	0.0E+00	Respiratory	1,600	0.0E+00
Naphthalene		NA	0.0E+00	Body Weight	16,000	0.0E+00
Nickel		NA	0.0E+00	Body Weight	170,000	0.0E+00
2-Nitroaniline		NA	0.0E+00	Spleen	63,000	0.0E+00
3-Nitroaniline		3,100	0.0E+00	Spleen	42,000	0.0E+00
4-Nitroaniline		3,000	0.0E+00	Spleen	41,000	0.0E+00
Nitrobenzene		NA	0.0E+00	Blood	11,000	0.0E+00
N-Nitroso-di-N-propylamine		8.6	0.0E+00	Cancer	NA	0.0E+00
Phenanthrene		NA	0.0E+00	Kidney	6,100	0.0E+00
Pyrene		NA	0.0E+00	Kidney	3,700	0.0E+00
Selenium		NA	0.0E+00	Skin, Central Nervous System	95,000	0.0E+00
Silver		NA	0.0E+00	Skin	17,000	0.0E+00
2,3,7,8-TCDD Equivalents		0.0013	0.0E+00	Reproductive	0.02	0.0E+00
Tetrachloroethylene		2,600	0.0E+00	Neurotoxicity	5,500	0.0E+00
Thallium		NA	0.0E+00	Skin	190	0.0E+00
Trichloroethene		280	0.0E+00	Immune System, Developmental	1,500	0.0E+00
Vanadium		NA	0.0E+00	Kidney	7,300	0.0E+00
Vinyl Chloride		39	0.0E+00	Liver	14,000	0.0E+00
Zinc		NA	0.0E+00	Blood	6,500,000	0.0E+00
2-Methylphenol		NA	0.0E+00	Body Weight, Central Nervous System	230,000	0.0E+00
4-Methylphenol		NA	0.0E+00	Respiratory	460,000	0.0E+00
Acenaphthene		NA	0.0E+00	Liver	23,000	0.0E+00
Acenaphthylene		NA	0.0E+00	Liver	22,000	0.0E+00
Anthracene		NA	0.0E+00	None Reported	62,000	0.0E+00
Benzaldehyde		11000	0.0E+00	Gastrointestinal, Kidney	790,000	0.0E+00
Benzo(g,h,i)perylene		NA	0.0E+00	Kidney	840,000	0.0E+00
Caprolactam		NA	0.0E+00	Body Weight	8,300,000	0.0E+00
Di-n-butylphthalate		NA	0.0E+00	Developmental	40,000	0.0E+00
Fluoranthene		NA	0.0E+00	Liver, Kidney, Blood	1,100,000	0.0E+00
Fluorene		NA	0.0E+00	Blood	11,000	0.0E+00
N-Nitrosodiphenylamine		2000	0.0E+00	Cancer	NA	0.0E+00
Pentachlorophenol		2.1	0.0E+00	Liver	720	0.0E+00
Endosulfan I		NA	0.0E+00	Body Weight	14,000	0.0E+00
Endosulfan II		NA	0.0E+00	Body Weight	14,000	0.0E+00
Endrin		NA	0.0E+00	Liver	90	0.0E+00
Endrin aldehyde		NA	0.0E+00	Liver	160	0.0E+00
Methoxychlor		NA	0.0E+00	Reproductive	1,400	0.0E+00
Boron		NA	0.0E+00	Reproductive	3,800,000	0.0E+00
		Total Carcinogenic Risk	**0E+00**		**Total HI**	**0**

Target Organ HIs

Total Blood HI =	0.0E+00
Total Body weight HI =	0.0E+00
Total Cardiovascular System HI =	0.0E+00
Total Central Nervous System HI =	0.0E+00
Total Developmental HI =	0.0E+00
Total Eyes HI =	0.0E+00
Total Fetotoxicity HI =	0.0E+00
Total Gastrointestinal System HI =	0.0E+00
Total Immune System HI =	0.0E+00
Total Kidney HI =	0.0E+00
Total Liver HI =	0.0E+00
Total Lymphoma HI =	0.0E+00
Total Neurological HI =	0.0E+00

TABLE 2

SUMMARY OF RECEPTOR RISKS AND HAZARDS - ADULT RECREATIONAL USERS (AGES 6 TO 18)
PORE WATER
LOWER DARBY CREEK AREA
PAGE 3 OF 3

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
					Total Neurotoxicity HI =	0.0E+00
					Total Reproductive HI =	0.0E+00
					Total Respiratory HI =	0.0E+00
					Total Skin HI =	0.0E+00
					Total Spleen HI =	0.0E+00
					Total Thyroid HI =	0.0E+00
					Total Urinary HI =	0.0E+00
					Total None Reported HI =	0.0E+00

TABLE 3

SUMMARY OF RECEPTOR RISKS AND HAZARDS - COMBINED RECREATIONAL USERS (AGES 0 TO 18)
PORE WATER
LOWER DARBY CREEK AREA

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Aldrin		2.8	0.0E+00	Liver	170	0.0E+00
Aluminum		NA	0.0E+00	Neurological	4,800,000	0.0E+00
Antimony		NA	0.0E+00	Blood	1000	0.0E+00
Aroclor-1016		670	0.0E+00	Fetotoxicity	400	0.0E+00
Aroclor-1242		24	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1248		24	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1260		24	0.0E+00	Cancer	NA	0.0E+00
Dioxin-Like PCBs		0.0004	0.0E+00	Reproductive	0.004	0.0E+00
Non-Dioxin-Like PCBs		120	0.0E+00	Cancer	NA	0.0E+00
Arsenic		25	0.0E+00	Skin, Cardiovascular System	1,400	0.0E+00
Atrazine		44	0.0E+00	Body Weight	56,000	0.0E+00
Barium		NA	0.0E+00	Neurological	310,000	0.0E+00
Benzo(a)anthracene		100	0.0E+00	Cancer	NA	0.0E+00
Benzene		140	0.0E+00	Blood	5,000	0.0E+00
Benzo(a)pyrene		10	0.0E+00	Developmental, Immune, Reproductive	1700	0.0E+00
Benzo(b)fluoranthene		100	0.0E+00	Cancer	NA	0.0E+00
Benzo(k)fluoranthene		1000	0.0E+00	Cancer	NA	0.0E+00
Beryllium		NA	0.0E+00	Gastrointestinal System	410	0.0E+00
Bis(2-chloro-1-methylethyl) ether		NA	0.0E+00	Blood	60,000	0.0E+00
Bis(2-ethylhexyl)phthalate		3,400	0.0E+00	Liver	110,000	0.0E+00
Bromodichloromethane		250	0.0E+00	Kidney	48,000	0.0E+00
Cadmium		NA	0.0E+00	Kidney	590	0.0E+00
Carbazole		NA	0.0E+00	NA	NA	0.0E+00
Carbon Tetrachloride		77	0.0E+00	Liver	3,600	0.0E+00
alpha-Chlordane		2.3	0.0E+00	Liver	70	0.0E+00
gamma-Chlordane		130	0.0E+00	Liver	2,800	0.0E+00
Chlorobenzene		NA	0.0E+00	Liver	13,000	0.0E+00
Chromium (Trivalent)		NA	0.0E+00	Liver	550,000	0.0E+00
Chromium (Hexavalent)		1	0.0E+00	Liver	1,100	0.0E+00
Chrysene		10,000	0.0E+00	Cancer	NA	0.0E+00
Cobalt		NA	0.0E+00	Thyroid	1,600	0.0E+00
Copper		NA	0.0E+00	Gastrointestinal System	190,000	0.0E+00
Cyanide		NA	0.0E+00	Thyroid, Central Nervous System	2,900	0.0E+00
DDD		0.72	0.0E+00	Cancer	NA	0.0E+00
DDE		140	0.0E+00	Cancer	NA	0.0E+00
DDT		140	0.0E+00	Liver	2,800	0.0E+00
Dibenzo(a,h)anthracene		10	0.0E+00	Cancer	NA	0.0E+00
Dibenzofuran		NA	0.0E+00	Kidney	160	0.0E+00
1,3-Dichlorobenzene		NA	0.0E+00	Cancer	NA	0.0E+00
1,4-Dichlorobenzene		400	0.0E+00	Blood	26,000	0.0E+00
3,3'-Dichlorobenzidine		8.5	0.0E+00	Cancer	NA	0.0E+00
cis-1,2-Dichloroethylene		NA	0.0E+00	Kidney	3,000	0.0E+00
Dieldrin		0.055	0.0E+00	Liver	7.6	0.0E+00
4,6-Dinitro-o-cresol		NA	0.0E+00	Eyes	190	0.0E+00
2,4-Dinitrotoluene		56	0.0E+00	Neurotoxicity	5,200	0.0E+00
2,6-Dinitrotoluene		10	0.0E+00	Central Nervous System, Blood, Liver	700	0.0E+00
1,4-Dioxane		420	0.0E+00	Liver, Kidney	160,000	0.0E+00
Endrin ketone		NA	0.0E+00	Central Nervous System, Liver	63	0.0E+00
Heptachlor		0.048	0.0E+00	Liver	19	0.0E+00
Heptachlor Epoxide		0.14	0.0E+00	Liver	2.9	0.0E+00
alpha-BHC		0.34	0.0E+00	Liver	2,900	0.0E+00
beta-BHC		1.2	0.0E+00	Cancer	NA	0.0E+00
delta-BHC		0.34	0.0E+00	Liver	2,900	0.0E+00
gamma-BHC (Lindane)		2	0.0E+00	Liver, Kidney	110	0.0E+00
Indeno(1,2,3-cd)pyrene		100	0.0E+00	Cancer	NA	0.0E+00
Iron		NA	0.0E+00	Gastrointestinal System	3,300,000	0.0E+00
Lead		NA	0.0E+00	Neurological	NA	0.0E+00
Manganese		NA	0.0E+00	Central Nervous System	24,000	0.0E+00
Mercuric Chloride		NA	0.0E+00	Central Nervous System	460	0.0E+00

TABLE 3

SUMMARY OF RECEPTOR RISKS AND HAZARDS - COMBINED RECREATIONAL USERS (AGES 0 TO 18)
PORE WATER
LOWER DARBY CREEK AREA

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Mercury (elemental)		NA	0.0E+00	Central Nervous System	NA	0.0E+00
Methyl tert-Butyl Ether (MTBE)		15,000	0.0E+00	Cancer	NA	0.0E+00
2-Methylnaphthalene		NA	0.0E+00	Respiratory	780	0.0E+00
Naphthalene		NA	0.0E+00	Body Weight	8,100	0.0E+00
Nickel		NA	0.0E+00	Body Weight	58,000	0.0E+00
2-Nitroaniline		NA	0.0E+00	Spleen	24,000	0.0E+00
3-Nitroaniline		1,200	0.0E+00	Spleen	14,000	0.0E+00
4-Nitroaniline		1,200	0.0E+00	Spleen	14,000	0.0E+00
Nitrobenzene		NA	0.0E+00	Blood	4,500	0.0E+00
N-Nitroso-di-N-propylamine		3.4	0.0E+00	Cancer	NA	0.0E+00
Phenanthrene		NA	0.0E+00	Kidney	3,100	0.0E+00
Pyrene		NA	0.0E+00	Kidney	1,900	0.0E+00
Selenium		NA	0.0E+00	Skin, Central Nervous System	24,000	0.0E+00
Silver		NA	0.0E+00	Skin	7,400	0.0E+00
2,3,7,8-TCDD Equivalents		0.00036	0.0E+00	Reproductive	0.004	0.0E+00
Tetrachloroethylene		1,300	0.0E+00	Neurotoxicity	2,700	0.0E+00
Thallium		NA	0.0E+00	Skin	48	0.0E+00
Trichloroethene		110	0.0E+00	Immune System, Developmental	640	0.0E+00
Vanadium		NA	0.0E+00	Kidney	3,500	0.0E+00
Vinyl Chloride		0.38	0.0E+00	Liver	5,800	0.0E+00
Zinc		NA	0.0E+00	Blood	1,500,000	0.0E+00
2-Methylphenol		NA	0.0E+00	Body Weight, Central Nervous System	94,000	0.0E+00
4-Methylphenol		NA	0.0E+00	Respiratory	190,000	0.0E+00
Acenaphthene		NA	0.0E+00	Liver	11,000	0.0E+00
Acenaphthylene		NA	0.0E+00	Liver	11,000	0.0E+00
Anthracene		NA	0.0E+00	None Reported	31,000	0.0E+00
Benzaldehyde		4800	0.0E+00	Gastrointestinal, Kidney	280,000	0.0E+00
Benzo(g,h,i)perylene		NA	0.0E+00	Kidney	170,000	0.0E+00
Caprolactam		NA	0.0E+00	Body Weight	2,200,000	0.0E+00
Di-n-butylphthalate		NA	0.0E+00	Developmental	20,000	0.0E+00
Fluoranthene		NA	0.0E+00	Liver, Kidney, Blood	230,000	0.0E+00
Fluorene		NA	0.0E+00	Blood	5,800	0.0E+00
N-Nitrosodiphenylamine		960	0.0E+00	Cancer	NA	0.0E+00
Pentachlorophenol		1.1	0.0E+00	Liver	370	0.0E+00
Endosulfan I		NA	0.0E+00	Body Weight	6,500	0.0E+00
Endosulfan II		NA	0.0E+00	Body Weight	6,500	0.0E+00
Endrin		NA	0.0E+00	Liver	46	0.0E+00
Endrin aldehyde		NA	0.0E+00	Liver	82	0.0E+00
Methoxychlor		NA	0.0E+00	Reproductive	730	0.0E+00
Boron		NA	0.0E+00	Reproductive	960,000	0.0E+00
		Total Carcinogenic Risk	**0E+00**		**Total HI**	**0**

Target Organ HIs

Total Blood HI =	0.0E+00
Total Body weight HI =	0.0E+00
Total Cardiovascular System HI =	0.0E+00
Total Central Nervous System HI =	0.0E+00
Total Developmental HI =	0.0E+00
Total Eyes HI =	0.0E+00
Total Fetotoxicity HI =	0.0E+00
Total Gastrointestinal System HI =	0.0E+00
Total Immune System HI =	0.0E+00
Total Kidney HI =	0.0E+00
Total Liver HI =	0.0E+00
Total Lymphoma HI =	0.0E+00
Total Neurological HI =	0.0E+00

TABLE 3

SUMMARY OF RECEPTOR RISKS AND HAZARDS - COMBINED RECREATIONAL USERS (AGES 0 TO 18)
PORE WATER
LOWER DARBY CREEK AREA

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
				Total Neurotoxicity HI =		0.0E+00
				Total Reproductive HI =		0.0E+00
				Total Respiratory HI =		0.0E+00
				Total Skin HI =		0.0E+00
				Total Spleen HI =		0.0E+00
				Total Thyroid HI =		0.0E+00
				Total Urinary HI =		0.0E+00
				Total None Reported HI =		0.0E+00

Construction Workers

CALCULATION OF RISK-BASED SCREENING LEVELS

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

THIS SPREADSHEET CALCULATES RISK-BASED SCREENING LEVELS FOR EXPOSURES TO PORE WATER
THE INCIDENTAL INGESTION AND DERMAL CONTACT ROUTES OF EXPOSURE ARE CONSIDERED.

RELEVANT EQUATIONS:

Carcinogenic

$$RSL_{PW} = \frac{TCR}{Intake_{ing} \times CSF_{oral} + Intake_{derm} \times CSF_{derm}}$$

Noncarcinogenic

$$RSL_{PW} = \frac{THI}{\left(\frac{Intake_{ing}}{RfD_{oral}}\right) + \left(\frac{Intake_{derm}}{RfD_{derm}}\right)}$$

$$Intake_{ing} = \frac{CR \times ET \times EF \times ED}{BW \times AT}$$

$$Intake_{derm} = \frac{DA_{Event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

For Inorganics DAevent = Kp x CF x tevent

For Organics

$$\text{If } tevent \le t^*, \text{ then : } DAevent = 2 \times Kp \times FA \times CF \times \sqrt{\frac{6 \times tau \times tevent}{\pi}}$$

$$\text{If } tevent > t^*, \text{ then : } DAevent = Kp \times FA \times CF \times \left[\frac{tevent}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Where:	TCR = :	1.0E-06	Target Cancer Risk
	THI = :	1	Target Hazard Index
	IRW = :	0.01	Ingestion Rate (L/hour)
	ET = :	0.16	Exposure time (hours/day)
	SA = :	4,780	Skin surface available for contact (cm^2)
	DAevent = :		Chemical specific absorbed dose per event (mg/cm^2-event)
	EV = :	1	Event frequency (events/days)
	EF = :	26	Exposure frequency (days/year)
	ED = :	1	Exposure duration (years)
	BW = :	80	Body weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	ATn = :	365	Averaging time for noncarcinogenic exposures (days)
	CF = :	0.001	Conversion Factor (L/m^3)
	Kp =:		Chemical specific permeability coefficient (cm/hr)
	Cw = :		Concentration of chemical in water (mg/L)
	tevent = :	0.16	duration of event (hr/event)
	tau = :		Chemical specific lag time (hr)
	t* = :		Chemical specific time it takes to reach steady state (hr)
	B = :		Chemical specific dimensionless constant
	FA = :		Fraction absorbed (dimensionless)

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 2)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Organic or Inorganic	Estimated Kp (cm/hr)	FA	tau-event (hr)	B	t* (hr)	In EPD?	DAevent (L/cm^2 - event)
Aldrin	Organic	2.93E-01	1.00E+00	1.16E+01	2.15E+00	4.77E+01	No	0.00E+00
Aluminum	Inorganic	1.00E-03	1.00E+00	1.49E-01	2.00E-03	3.57E-01	Yes	1.60E-07
Antimony	Inorganic	1.00E-03	1.00E+00	5.25E-01	4.30E-03	1.26E+00	Yes	1.60E-07
Aroclor-1016	Organic	3.05E-01	0.00E+00	1.26E+02	2.75E+00	5.27E+02	No	0.00E+00
Aroclor-1242	Organic	5.45E-01	7.00E-01	4.54E+00	3.58E+00	1.94E+01	No	0.00E+00
Aroclor-1248	Organic	4.75E-01	0.00E+00	3.06E+02	4.54E+00	1.33E+03	No	0.00E+00
Aroclor-1260	Organic	9.86E-01	0.00E+00	1.72E+01	7.54E+00	7.71E+01	No	0.00E+00
Dioxin-Like PCBs	Organic	NA	NA	NA	NA	NA	No	0.00E+00
Non-Dioxin-Like PCBs	Organic	NA	NA	NA	NA	NA	No	0.00E+00
Arsenic	Inorganic	1.00E-03	1.00E+00	2.87E-01	3.40E-03	6.90E-01	Yes	1.60E-07
Atrazine	Organic	5.24E-03	1.00E+00	1.70E+00	2.96E-02	4.07E+00	Yes	7.55E-06
Barium	Inorganic	1.00E-03	1.00E+00	6.34E-01	4.54E-03	1.52E+00	Yes	1.60E-07
Benzo(a)anthracene	Organic	5.52E-01	1.00E+00	2.00E+00	3.21E+00	8.48E+00	No	0.00E+00
Benzene	Organic	1.49E-02	1.00E+00	2.88E-01	5.07E-02	6.91E-01	Yes	8.84E-06
Benzo(a)pyrene	Organic	7.13E-01	1.00E+00	2.72E+00	4.36E+00	1.18E+01	No	0.00E+00
Benzo(b)fluoranthene	Organic	4.17E-01	1.00E+00	2.72E+00	2.55E+00	1.13E+01	No	0.00E+00
Benzo(k)fluoranthene	Organic	6.91E-01	9.00E-01	2.72E+00	4.22E+00	1.18E+01	No	0.00E+00
Beryllium	Inorganic	1.00E-03	1.00E+00	1.21E-01	1.28E-03	2.91E-01	Yes	1.60E-07
Bis(2-chloro-1-methylethyl) ether	Organic	7.64E-03	1.00E+00	9.55E-01	3.84E-02	2.29E+00	Yes	8.25E-06
Bis(2-ethylhexyl)phthalate	Organic	1.13E+00	8.00E-01	1.62E+01	8.59E+00	7.29E+01	No	0.00E+00
Bromodichloromethane	Organic	4.02E-03	1.00E+00	8.70E-01	1.98E-02	2.09E+00	Yes	4.14E-06
Cadmium	Inorganic	1.00E-03	1.00E+00	4.48E-01	4.08E-03	1.08E+00	Yes	1.60E-07
Carbazole	Organic	5.36E-02	1.00E+00	9.08E-01	2.67E-01	2.18E+00	Yes	5.65E-05
Carbon Tetrachloride	Organic	1.63E-02	1.00E+00	7.64E-01	7.78E-02	1.83E+00	Yes	1.58E-05
alpha-Chlordane	Organic	3.38E-02	7.00E-01	2.07E+01	2.63E-01	4.98E+01	Yes	1.19E-04
gamma-Chlordane	Organic	3.38E-02	7.00E-01	2.07E+01	2.63E-01	4.98E+01	No	0.00E+00
Chlorobenzene	Organic	2.82E-02	1.00E+00	4.49E-01	1.15E-01	1.08E+00	Yes	2.09E-05
Chromium (Trivalent)	Inorganic	1.00E-03	1.00E+00	2.06E-01	2.77E-03	4.93E-01	Yes	1.60E-07
Chromium (Hexavalent)	Inorganic	2.00E-03	1.00E+00	2.06E-01	5.55E-03	4.93E-01	Yes	3.20E-07
Chrysene	Organic	5.96E-01	1.00E+00	2.00E+00	3.46E+00	8.53E+00	No	0.00E+00
Cobalt	Inorganic	4.00E-04	1.00E+00	2.25E-01	1.18E-03	5.40E-01	Yes	6.40E-08
Copper	Inorganic	1.00E-03	1.00E+00	2.39E-01	3.07E-03	5.73E-01	Yes	1.60E-07
Cyanide	Inorganic	1.00E-03	1.00E+00	1.47E-01	1.96E-03	3.53E-01	Yes	1.60E-07
DDD	Organic	2.51E-01	8.00E-01	6.52E+00	1.73E+00	2.62E+01	Yes	5.67E-04
DDE	Organic	5.45E-01	8.00E-01	6.35E+00	3.74E+00	2.73E+01	No	0.00E+00
DDT	Organic	6.28E-01	7.00E-01	1.02E+01	4.55E+00	4.43E+01	No	0.00E+00
Dibenzo(a,h)anthracene	Organic	9.53E-01	6.00E-01	3.81E+00	6.12E+00	1.69E+01	No	0.00E+00
Dibenzofuran	Organic	9.75E-02	1.00E+00	9.20E-01	4.86E-01	2.21E+00	Yes	1.03E-04
1,3-Dichlorobenzene	Organic	5.20E-02	1.00E+00	7.00E-01	2.42E-01	1.68E+00	Yes	4.81E-05
1,4-Dichlorobenzene	Organic	4.53E-02	1.00E+00	7.00E-01	2.11E-01	1.68E+00	Yes	4.19E-05
3,3'-Dichlorobenzidine	Organic	1.28E-02	1.00E+00	2.75E+00	7.83E-02	6.60E+00	Yes	2.35E-05
cis-1,2-Dichloroethylene	Organic	1.10E-02	1.00E+00	3.67E-01	4.17E-02	8.81E-01	Yes	7.37E-06
Dieldrin	Organic	3.26E-02	8.00E-01	1.43E+01	2.45E-01	3.43E+01	Yes	1.09E-04
4,6-Dinitro-o-cresol	Organic	3.15E-03	1.00E+00	1.35E+00	1.71E-02	3.25E+00	Yes	4.05E-06
2,4-Dinitrotoluene	Organic	3.08E-03	1.00E+00	1.10E+00	1.60E-02	2.64E+00	Yes	3.57E-06
2,6-Dinitrotoluene	Organic	3.70E-03	1.00E+00	1.10E+00	1.92E-02	2.64E+00	Yes	4.29E-06
1,4-Dioxane	Organic	3.32E-04	1.00E+00	3.28E-01	1.20E-03	7.86E-01	Yes	2.10E-07
Endrin ketone	Organic	2.35E-02	8.00E-01	1.43E+01	1.76E-01	3.43E+01	Yes	7.86E-05
Heptachlor	Organic	1.43E-01	8.00E-01	1.30E+01	1.06E+00	5.01E+01	Yes	4.55E-04
Heptachlor Epoxide	Organic	2.09E-02	8.00E-01	1.59E+01	1.59E-01	3.82E+01	Yes	7.38E-05
alpha-BHC	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	4.33E-05
beta-BHC	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	4.33E-05
delta-BHC	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	4.33E-05
gamma-BHC (Lindane)	Organic	2.06E-02	9.00E-01	4.47E+00	1.35E-01	1.07E+01	Yes	4.33E-05
Indeno(1,2,3-cd)pyrene	Organic	1.24E+00	6.00E-01	3.71E+00	7.93E+00	1.67E+01	No	0.00E+00
Iron	Inorganic	1.00E-03	1.00E+00	2.16E-01	2.87E-03	5.19E-01	Yes	1.60E-07
Lead	Inorganic	1.00E-04	1.00E+00	1.52E+00	5.54E-04	3.65E+00	Yes	1.60E-08
Manganese	Inorganic	1.00E-03	1.00E+00	2.14E-01	2.85E-03	5.13E-01	Yes	1.60E-07
Mercuric Chloride	Inorganic	1.00E-03	1.00E+00	3.49E+00	6.34E-03	8.36E+00	Yes	1.60E-07
Mercury (elemental)	Inorganic	1.00E-03	1.00E+00	1.40E+00	5.45E-03	3.35E+00	Yes	1.60E-07
Methyl tert-Butyl Ether (MTBE)	Organic	2.11E-03	1.00E+00	3.28E-01	7.62E-03	7.87E-01	Yes	1.34E-06
2-Methylnaphthalene	Organic	9.17E-02	1.00E+00	6.58E-01	4.21E-01	1.58E+00	Yes	8.22E-05
Naphthalene	Organic	4.66E-02	1.00E+00	5.49E-01	2.03E-01	1.32E+00	Yes	3.82E-05
Nickel	Inorganic	2.00E-04	1.00E+00	2.24E-01	5.89E-04	5.38E-01	Yes	3.20E-08
2-Nitroaniline	Organic	4.46E-03	1.00E+00	6.24E-01	2.02E-02	1.50E+00	Yes	3.90E-06
3-Nitroaniline	Organic	2.14E-03	1.00E+00	6.24E-01	9.67E-03	1.50E+00	Yes	1.87E-06
4-Nitroaniline	Organic	2.21E-03	1.00E+00	6.24E-01	9.99E-03	1.50E+00	Yes	1.93E-06
Nitrobenzene	Organic	5.41E-03	1.00E+00	5.14E-01	2.31E-02	1.23E+00	Yes	4.29E-06
N-Nitroso-di-N-propylamine	Organic	2.33E-03	1.00E+00	5.64E-01	1.02E-02	1.35E+00	Yes	1.93E-06
Phenanthrene	Organic	1.44E-01	1.00E+00	1.05E+00	7.39E-01	4.05E+00	Yes	1.63E-04
Pyrene	Organic	2.01E-01	1.00E+00	1.43E+00	1.10E+00	5.54E+00	Yes	2.65E-04
Selenium	Inorganic	1.00E-03	1.00E+00	2.91E-01	3.42E-03	6.99E-01	Yes	1.60E-07
Silver	Inorganic	6.00E-04	1.00E+00	4.23E-01	2.40E-03	1.01E+00	Yes	9.60E-08
2,3,7,8-TCDD Equivalents	Organic	8.08E-01	5.00E-01	6.68E+00	5.58E+00	2.95E+01	No	0.00E+00
Tetrachloroethylene	Organic	3.34E-02	1.00E+00	8.92E-01	1.65E-01	2.14E+00	Yes	3.49E-05
Thallium	Inorganic	1.00E-03	1.00E+00	1.49E+00	5.51E-03	3.57E+00	Yes	1.60E-07
Trichloroethylene	Organic	1.16E-02	1.00E+00	5.72E-01	5.11E-02	1.37E+00	Yes	9.70E-06

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 3)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Organic or Inorganic	Estimated Kp (cm/hr)	FA	tau-event (hr)	B	t* (hr)	In EPD?	DAevent (L/cm^2 - event)
Vanadium	Inorganic	1.00E-03	1.00E+00	2.03E-01	2.75E-03	4.87E-01	Yes	1.60E-07
Vinyl Chloride	Organic	8.38E-03	1.00E+00	2.35E-01	2.55E-02	5.65E-01	Yes	4.50E-06
Zinc	Inorganic	6.00E-04	1.00E+00	2.44E-01	1.87E-03	5.86E-01	Yes	9.60E-08
2-Methylphenol	Organic	7.66E-03	1.00E+00	4.24E-01	3.06E-02	1.02E+00	Yes	5.51E-06
4-Methylphenol	Organic	7.54E-03	1.00E+00	4.24E-01	3.02E-02	1.02E+00	Yes	5.43E-06
Acenaphthene	Organic	8.60E-02	1.00E+00	7.68E-01	4.11E-01	1.84E+00	Yes	8.33E-05
Acenaphthylene	Organic	9.11E-02	1.00E+00	7.48E-01	4.32E-01	1.80E+00	Yes	8.71E-05
Anthracene	Organic	1.42E-01	1.00E+00	1.05E+00	7.29E-01	4.05E+00	Yes	1.61E-04
Benzaldehyde	Organic	3.83E-03	1.00E+00	4.13E-01	1.52E-02	9.92E-01	Yes	2.72E-06
Benzo(g,h,i)perylene	Organic	1.12E+00	7.00E-01	3.71E+00	7.16E+00	1.66E+01	No	0.00E+00
Caprolactam	Organic	1.00E-03	1.00E+00	4.52E-01	4.09E-03	1.09E+00	Yes	7.44E-07
Di-n-butylphthalate	Organic	4.20E-02	9.00E-01	3.81E+00	2.70E-01	9.14E+00	Yes	8.15E-05
Fluoranthene	Organic	3.08E-01	1.00E+00	1.43E+00	1.68E+00	5.73E+00	No	0.00E+00
Fluorene	Organic	1.10E-01	1.00E+00	8.97E-01	5.45E-01	2.15E+00	Yes	1.15E-04
N-Nitrosodiphenylamine	Organic	1.45E-02	1.00E+00	1.35E+00	7.85E-02	3.25E+00	Yes	1.87E-05
Pentachlorophenol	Organic	1.27E-01	9.00E-01	3.26E+00	7.97E-01	1.25E+01	Yes	2.28E-04
Endosulfan I	Organic	2.86E-03	9.00E-01	2.00E+01	2.22E-02	4.80E+01	Yes	1.27E-05
Endosulfan II	Organic	2.86E-03	9.00E-01	2.00E+01	2.22E-02	4.80E+01	Yes	1.27E-05
Endrin	Organic	3.26E-02	8.00E-01	1.43E+01	2.45E-01	3.43E+01	Yes	1.09E-04
Endrin aldehyde	Organic	1.78E-02	8.00E-01	1.43E+01	1.34E-01	3.43E+01	Yes	5.95E-05
Methoxychlor	Organic	4.28E-02	8.00E-01	9.07E+00	3.06E-01	2.18E+01	Yes	1.14E-04
Boron	Inorganic	1.00E-03	1.00E+00	1.26E-01	1.40E-03	3.02E-01	Yes	1.60E-07

CHEMICAL	Cancer Slope Factor		Subchronic Reference Dose		Surrogate
	Oral $(mg/kg/day)^{-1}$	Dermal $(mg/kg/day)^{-1}$	Oral (mg/kg/day)	Dermal (mg/kg/day)	
Aldrin	1.70E+01	1.70E+01	4.00E-05	4.00E-05	
Aluminum	NA	NA	1.00E+00	1.00E+00	
Antimony	NA	NA	4.00E-04	6.00E-06	
Aroclor-1016	7.00E-02	7.00E-02	7.00E-05	7.00E-05	
Aroclor-1242	2.00E+00	2.00E+00	NA	NA	
Aroclor-1248	2.00E+00	2.00E+00	NA	NA	
Aroclor-1260	2.00E+00	2.00E+00	NA	NA	
Dioxin-Like PCBs	1.30E+05	1.30E+05	NA	NA	
Non-Dioxin-Like PCBs	4.00E-01	4.00E-01	NA	NA	
Arsenic	1.50E+00	1.50E+00	3.00E-04	3.00E-04	
Atrazine	2.30E-01	2.30E-01	3.00E-03	3.00E-03	
Barium	NA	NA	2.00E-01	1.40E-02	
Benzo(a)anthracene	1.00E-01	1.00E-01	NA	NA	
Benzene	5.50E-02	5.50E-02	1.00E-02	1.00E-02	
Benzo(a)pyrene	1.00E+00	1.00E+00	3.00E-04	3.00E-04	
Benzo(b)fluoranthene	1.00E-01	1.00E-01	NA	NA	
Benzo(k)fluoranthene	1.00E-02	1.00E-02	NA	NA	
Beryllium	NA	NA	5.00E-03	3.50E-05	
Bis(2-chloro-1-methylethyl) ether	NA	NA	1.00E-03	1.00E-03	
Bis(2-ethylhexyl)phthalate	1.40E-02	1.40E-02	1.00E-01	1.00E-01	
Bromodichloromethane	6.20E-02	6.20E-02	8.00E-03	8.00E-03	
Cadmium	NA	NA	5.00E-04	2.50E-05	
Carbazole	NA	NA	NA	NA	
Carbon Tetrachloride	7.00E-02	7.00E-02	7.00E-03	7.00E-03	
alpha-Chlordane	NA	NA	6.00E-04	6.00E-04	Chlordane
gamma-Chlordane	NA	NA	6.00E-04	6.00E-04	Chlordane
Chlorobenzene	NA	NA	7.00E-02	7.00E-02	
Chromium (Trivalent)	NA	NA	1.50E+00	1.95E-02	
Chromium (Hexavalent)	5.00E-01	2.00E+01	5.00E-03	1.25E-04	
Chrysene	1.00E-03	1.00E-03	NA	NA	
Cobalt	NA	NA	3.00E-03	3.00E-03	
Copper	NA	NA	1.00E-02	1.00E-02	
Cyanide	NA	NA	2.00E-02	2.00E-02	
DDD	2.40E-01	2.40E-01	NA	NA	
DDE	3.40E-01	3.40E-01	NA	NA	
DDT	3.40E-01	3.40E-01	5.00E-04	5.00E-04	
Dibenzo(a,h)anthracene	1.00E+00	1.00E+00	NA	NA	
Dibenzofuran	NA	NA	4.00E-03	4.00E-03	
1,3-Dichlorobenzene	NA	NA	2.00E-02	2.00E-02	
1,4-Dichlorobenzene	5.40E-03	5.40E-03	7.00E-02	7.00E-02	
3,3'-Dichlorobenzidine	4.50E-01	4.50E-01	NA	NA	
cis-1,2-Dichloroethylene	NA	NA	2.00E-02	2.00E-02	
Dieldrin	1.60E+01	1.60E+01	1.00E-04	1.00E-04	
4,6-Dinitro-o-cresol	NA	NA	8.00E-04	8.00E-04	
2,4-Dinitrotoluene	3.10E-01	3.10E-01	7.00E-03	7.00E-03	
2,6-Dinitrotoluene	1.50E+00	1.50E+00	4.00E-03	4.00E-03	
1,4-Dioxane	1.00E-01	1.00E-01	5.00E-01	5.00E-01	
Endrin ketone	NA	NA	2.00E-03	2.00E-03	Endrin
Heptachlor	4.50E+00	4.50E+00	1.00E-04	1.00E-04	
Heptachlor Epoxide	9.10E+00	9.10E+00	1.30E-05	1.30E-05	

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 4)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Cancer Slope Factor		Subchronic Reference Dose		Surrogate
	Oral (mg/kg/day)$^{-1}$	Dermal (mg/kg/day)$^{-1}$	Oral (mg/kg/day)	Dermal (mg/kg/day)	
alpha-BHC	6.30E+00	6.30E+00	8.00E-03	8.00E-03	
beta-BHC	1.80E+00	1.80E+00	6.00E-04	6.00E-04	
delta-BHC	NA	NA	8.00E-03	8.00E-03	alpha-BHC
gamma-BHC (Lindane)	1.10E+00	1.10E+00	1.00E-05	1.00E-05	
Indeno(1,2,3-cd)pyrene	1.00E-01	1.00E-01	NA	NA	
Iron	NA	NA	7.00E-01	7.00E-01	
Lead	NA	NA	NA	NA	
Manganese	NA	NA	2.40E-02	9.60E-04	
Mercuric Chloride	NA	NA	2.00E-03	1.40E-04	
Mercury (elemental)	NA	NA	NA	NA	
Methyl tert-Butyl Ether (MTBE)	1.80E-03	1.80E-03	3.00E-01	3.00E-01	
2-Methylnaphthalene	NA	NA	4.00E-03	4.00E-03	
Naphthalene	NA	NA	6.00E-01	6.00E-01	
Nickel	NA	NA	2.00E-02	8.00E-04	
2-Nitroaniline	NA	NA	1.00E-01	1.00E-01	
3-Nitroaniline	NA	NA	1.00E-03	1.00E-03	4-Nitroaniline
4-Nitroaniline	2.00E-02	2.00E-02	1.00E-02	1.00E-02	
Nitrobenzene	NA	NA	5.00E-03	5.00E-03	
N-Nitroso-di-N-propylamine	7.00E+00	7.00E+00	NA	NA	
Phenanthrene	NA	NA	3.00E-01	3.00E-01	Pyrene
Pyrene	NA	NA	3.00E-01	3.00E-01	
Selenium	NA	NA	5.00E-03	5.00E-03	
Silver	NA	NA	5.00E-03	2.00E-04	
2,3,7,8-TCDD Equivalents	1.30E+05	1.30E+05	2.00E-08	2.00E-08	
Tetrachloroethylene	2.10E-03	2.10E-03	1.00E-01	1.00E-01	
Thallium	NA	NA	4.00E-05	4.00E-05	
Trichloroethylene	4.60E-02	4.60E-02	5.00E-04	5.00E-04	
Vanadium	NA	NA	1.00E-02	2.60E-04	
Vinyl Chloride	7.20E-01	7.20E-01	3.00E-03	3.00E-03	
Zinc	NA	NA	3.00E-01	3.00E-01	
2-Methylphenol	NA	NA	2.00E-01	2.00E-01	
4-Methylphenol	NA	NA	2.00E-02	2.00E-02	
Acenaphthene	NA	NA	2.00E-01	2.00E-01	
Acenaphthylene	NA	NA	2.00E-01	2.00E-01	Acenaphthene
Anthracene	NA	NA	1.00E+00	1.00E+00	
Benzaldehyde	4.00E-03	4.00E-03	2.00E-01	2.00E-01	
Benzo(g,h,i)perylene	NA	NA	3.00E-01	3.00E-01	Pyrene
Caprolactam	NA	NA	5.00E-01	5.00E-01	
Di-n-butylphthalate	NA	NA	1.00E+00	1.00E+00	
Fluoranthene	NA	NA	1.00E-01	1.00E-01	
Fluorene	NA	NA	4.00E-01	4.00E-01	
N-Nitrosodiphenylamine	4.90E-03	4.90E-03	NA	NA	
Pentachlorophenol	4.00E-01	4.00E-01	1.00E-03	1.00E-03	
Endosulfan I	NA	NA	5.00E-03	5.00E-03	Endosulfan
Endosulfan II	NA	NA	NA	NA	
Endrin	NA	NA	2.00E-03	2.00E-03	
Endrin aldehyde	NA	NA	2.00E-03	2.00E-03	Endrin
Methoxychlor	NA	NA	5.00E-03	5.00E-03	
Boron	NA	NA	2.00E-01	2.00E-01	

CHEMICAL	Carcinogenic Intakes		Noncarcinogenic Intakes	
	Ingestion (L/kg/day)	Dermal (L/kg/day)	Ingestion (L/kg/day)	Dermal (L/kg/day)
Aldrin	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Aluminum	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Antimony	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Aroclor-1016	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Aroclor-1242	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Aroclor-1248	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Aroclor-1260	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Dioxin-Like PCBs	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Non-Dioxin-Like PCBs	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Arsenic	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Atrazine	2.04E-08	4.59E-07	1.42E-06	3.21E-05
Barium	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Benzo(a)anthracene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Benzene	2.04E-08	5.37E-07	1.42E-06	3.76E-05
Benzo(a)pyrene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Benzo(b)fluoranthene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Benzo(k)fluoranthene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Beryllium	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Bis(2-chloro-1-methylethyl) ether	2.04E-08	5.02E-07	1.42E-06	3.51E-05
Bis(2-ethylhexyl)phthalate	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Bromodichloromethane	2.04E-08	2.52E-07	1.42E-06	1.76E-05
Cadmium	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Carbazole	2.04E-08	3.43E-06	1.42E-06	2.40E-04

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 5)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

Carbon Tetrachloride	2.04E-08	9.58E-07	1.42E-06	6.71E-05
alpha-Chlordane	2.04E-08	7.25E-06	1.42E-06	5.07E-04
gamma-Chlordane	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Chlorobenzene	2.04E-08	1.27E-06	1.42E-06	8.89E-05
Chromium (Trivalent)	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Chromium (Hexavalent)	2.04E-08	1.95E-08	1.42E-06	1.36E-06
Chrysene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Cobalt	2.04E-08	3.89E-09	1.42E-06	2.72E-07
Copper	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Cyanide	2.04E-08	9.73E-09	1.42E-06	6.81E-07
DDD	2.04E-08	3.45E-05	1.42E-06	2.41E-03
DDE	2.04E-08	0.00E+00	1.42E-06	0.00E+00
DDT	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Dibenzo(a,h)anthracene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Dibenzofuran	2.04E-08	6.29E-06	1.42E-06	4.40E-04
1,3-Dichlorobenzene	2.04E-08	2.92E-06	1.42E-06	2.05E-04
1,4-Dichlorobenzene	2.04E-08	2.55E-06	1.42E-06	1.78E-04
3,3'-Dichlorobenzidine	2.04E-08	1.43E-06	1.42E-06	9.99E-05
cis-1,2-Dichloroethylene	2.04E-08	4.48E-07	1.42E-06	3.14E-05
Dieldrin	2.04E-08	6.63E-06	1.42E-06	4.64E-04
4,6-Dinitro-o-cresol	2.04E-08	2.46E-07	1.42E-06	1.72E-05
2,4-Dinitrotoluene	2.04E-08	2.17E-07	1.42E-06	1.52E-05
2,6-Dinitrotoluene	2.04E-08	2.61E-07	1.42E-06	1.83E-05
1,4-Dioxane	2.04E-08	1.28E-08	1.42E-06	8.94E-07
Endrin ketone	2.04E-08	4.78E-06	1.42E-06	3.34E-04
Heptachlor	2.04E-08	2.77E-05	1.42E-06	1.94E-03
Heptachlor Epoxide	2.04E-08	4.49E-06	1.42E-06	3.14E-04
alpha-BHC	2.04E-08	2.64E-06	1.42E-06	1.84E-04
beta-BHC	2.04E-08	2.64E-06	1.42E-06	1.84E-04
delta-BHC	2.04E-08	2.64E-06	1.42E-06	1.84E-04
gamma-BHC (Lindane)	2.04E-08	2.64E-06	1.42E-06	1.84E-04
Indeno(1,2,3-cd)pyrene	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Iron	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Lead	2.04E-08	9.73E-10	1.42E-06	6.81E-08
Manganese	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Mercuric Chloride	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Mercury (elemental)	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Methyl tert-Butyl Ether (MTBE)	2.04E-08	8.12E-08	1.42E-06	5.68E-06
2-Methylnaphthalene	2.04E-08	5.00E-06	1.42E-06	3.50E-04
Naphthalene	2.04E-08	2.32E-06	1.42E-06	1.62E-04
Nickel	2.04E-08	1.95E-09	1.42E-06	1.36E-07
2-Nitroaniline	2.04E-08	2.37E-07	1.42E-06	1.66E-05
3-Nitroaniline	2.04E-08	1.14E-07	1.42E-06	7.96E-06
4-Nitroaniline	2.04E-08	1.17E-07	1.42E-06	8.22E-06
Nitrobenzene	2.04E-08	2.61E-07	1.42E-06	1.83E-05
N-Nitroso-di-N-propylamine	2.04E-08	1.18E-07	1.42E-06	8.23E-06
Phenanthrene	2.04E-08	9.91E-06	1.42E-06	6.93E-04
Pyrene	2.04E-08	1.61E-05	1.42E-06	1.13E-03
Selenium	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Silver	2.04E-08	5.84E-09	1.42E-06	4.09E-07
2,3,7,8-TCDD Equivalents	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Tetrachloroethylene	2.04E-08	2.12E-06	1.42E-06	1.48E-04
Thallium	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Trichloroethylene	2.04E-08	5.90E-07	1.42E-06	4.13E-05
Vanadium	2.04E-08	9.73E-09	1.42E-06	6.81E-07
Vinyl Chloride	2.04E-08	2.73E-07	1.42E-06	1.91E-05
Zinc	2.04E-08	5.84E-09	1.42E-06	4.09E-07
2-Methylphenol	2.04E-08	3.30E-07	1.42E-06	2.31E-05
4-Methylphenol	2.04E-08	5.07E-06	1.42E-06	3.55E-04
Acenaphthene	2.04E-08	5.30E-06	1.42E-06	3.71E-04
Acenaphthylene	2.04E-08	9.77E-06	1.42E-06	6.84E-04
Anthracene	2.04E-08	1.66E-07	1.42E-06	1.16E-05
Benzaldehyde	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Benzo(g,h,i)perylene	2.04E-08	4.52E-08	1.42E-06	3.17E-06
Caprolactam	2.04E-08	4.96E-06	1.42E-06	3.47E-04
Di-n-butylphthalate	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Fluoranthene	2.04E-08	7.00E-06	1.42E-06	4.90E-04
Fluorene	2.04E-08	1.13E-06	1.42E-06	7.94E-05
N-Nitrosodiphenylamine	2.04E-08	1.39E-05	1.42E-06	9.71E-04
Pentachlorophenol	2.04E-08	7.73E-07	1.42E-06	5.41E-05
Endosulfan I	2.04E-08	7.73E-07	1.42E-06	5.41E-05
Endosulfan II	2.04E-08	6.63E-06	1.42E-06	4.64E-04
Endrin	2.04E-08	3.62E-06	1.42E-06	2.53E-04
Endrin aldehyde	2.04E-08	6.93E-06	1.42E-06	4.85E-04
Methoxychlor	2.04E-08	0.00E+00	1.42E-06	0.00E+00
Boron	2.04E-08	0.00E+00	1.42E-06	0.00E+00

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 6)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Pore Water RSL Concentration		Risk-Based[(1)]
	Carcinogenic (ug/L)	Noncarcinogenic (ug/L)	Screening Level (ug/L)
Aldrin	2900	28,000	2900
Aluminum	NA	470,000,000	470,000,000
Antimony	NA	8,500	8,500
Aroclor-1016	700,000	49,000	49,000
Aroclor-1242	25,000	NA	25,000
Aroclor-1248	25,000	NA	25,000
Aroclor-1260	25,000	NA	25,000
Dioxin-Like PCBs	0.38	NA	0.38
Non-Dioxin-Like PCBs	120,000	NA	120,000
Arsenic	22,000	140,000	22,000
Atrazine	9,100	89,000	9,100
Barium	NA	18,000,000	18,000,000
Benzo(a)anthracene	490,000	NA	490,000
Benzene	33,000	260,000	33,000
Benzo(a)pyrene	49,000	210000	49,000
Benzo(b)fluoranthene	490,000	NA	490,000
Benzo(k)fluoranthene	4,900,000	NA	4,900,000
Beryllium	NA	51,000	51,000
Bis(2-chloro-1-methylethyl) ether	NA	27,000	27,000
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	3,500,000
Bromodichloromethane	59,000	420,000	59,000
Cadmium	NA	33,000	33,000
Carbazole	NA	NA	NA
Carbon Tetrachloride	15,000	100,000	15,000
alpha-Chlordane	NA	1200	1200
gamma-Chlordane	NA	420,000	420,000
Chlorobenzene	NA	770,000	770,000
Chromium (Trivalent)	NA	28,000,000	28,000,000
Chromium (Hexavalent)	2,500	89,000	2,500
Chrysene	49,000,000	NA	49,000,000
Cobalt	NA	1,800,000	1,800,000
Copper	NA	4,700,000	4,700,000
Cyanide	NA	9,500,000	9,500,000
DDD	120	NA	120
DDE	140,000	NA	140,000
DDT	140,000	350,000	140,000
Dibenzo(a,h)anthracene	49,000	NA	49,000
Dibenzofuran	NA	9,100	9,100
1,3-Dichlorobenzene	NA	97,000	97,000
1,4-Dichlorobenzene	72,000	390,000	72,000
3,3'-Dichlorobenzidine	1500	NA	1500
cis-1,2-Dichloroethylene	NA	610,000	610,000
Dieldrin	9.4	210	9.4
4,6-Dinitro-o-cresol	NA	43,000	43,000
2,4-Dinitrotoluene	14,000	420,000	14,000
2,6-Dinitrotoluene	2400	200,000	2400
1,4-Dioxane	300,000	220,000,000	300,000
Endrin ketone	NA	6,000	6,000
Heptachlor	8	52	8
Heptachlor Epoxide	24	41	24
alpha-BHC	60	43,000	60
beta-BHC	210	3,200	210
delta-BHC	NA	43,000	43000
gamma-BHC (Lindane)	340	54	54
Indeno(1,2,3-cd)pyrene	490,000	NA	490,000
Iron	NA	330,000,000	330,000,000
Lead	NA	NA	NA
Manganese	NA	1,300,000	1,300,000
Mercuric Chloride	NA	180,000	180,000
Mercury (elemental)	NA	NA	NA
Methyl tert-Butyl Ether (MTBE)	5,500,000	42000000	5,500,000
2-Methylnaphthalene	NA	11,000	11,000
Naphthalene	NA	3,700,000	3,700,000
Nickel	NA	4,100,000	4,100,000
2-Nitroaniline	NA	5,600,000	5,600,000
3-Nitroaniline	NA	110,000	110,000
4-Nitroaniline	360,000	1,000,000	360,000
Nitrobenzene	NA	250,000	250,000
N-Nitroso-di-N-propylamine	1000	NA	1000
Phenanthrene	NA	430,000	430,000
Pyrene	NA	270,000	270,000
Selenium	NA	2,400,000	2,400,000
Silver	NA	430,000	430,000
2,3,7,8-TCDD Equivalents	0.38	14	0.38
Tetrachloroethylene	220,000	670,000	220,000
Thallium	NA	19,000	19,000
Trichloroethylene	36,000	12,000	12,000

RISK ASSESSMENT SPREADSHEET - CLEANUP LEVELS FOR EXPOSURES TO PORE WATER (PAGE 7)

SITE NAME: LOWER DARBY CREEK AREA
EXPOSURE SCENARIO: CONSTRUCTION WORKERS
MEDIA: PORE WATER
DATE: JUNE 29, 2016

CHEMICAL	Pore Water RSL Concentration		Risk-Based[(1)] Screening Level (ug/L)
	Carcinogenic (ug/L)	Noncarcinogenic (ug/L)	
Vanadium	NA	360,000	360,000
Vinyl Chloride	4,700	150,000	4,700
Zinc	NA	160,000,000	160,000,000
2-Methylphenol	NA	8,200,000	8,200,000
4-Methylphenol	NA	56,000	56,000
Acenaphthene	NA	540,000	540,000
Acenaphthylene	NA	290,000	290,000
Anthracene	NA	77,000,000	77,000,000
Benzaldehyde	12000000	140,000,000	12,000,000
Benzo(g,h,i)perylene	NA	65,000,000	65,000,000
Caprolactam	NA	1,400,000	1,400,000
Di-n-butylphthalate	NA	700,000,000	700,000,000
Fluoranthene	NA	200,000	200,000
Fluorene	NA	4,900,000	4,900,000
N-Nitrosodiphenylamine	15,000	NA	15,000
Pentachlorophenol	3,100	18,000	3,100
Endosulfan I	NA	90,000	90,000
Endosulfan II	NA	NA	NA
Endrin	NA	7,900	7,900
Endrin aldehyde	NA	4,100	4,100
Methoxychlor	NA	3,500,000	3,500,000
Boron	NA	140,000,000	140,000,000

1 - Screening level is lower of carcinogenic and noncarcinogenic value.

TABLE 4

SUMMARY OF RECEPTOR RISKS AND HAZARDS - CONSTRUCTION WORKERS
PORE WATER
LOWER DARBY CREEK AREA
PAGE 1 OF 1

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Aldrin		2900	0.0E+00	Liver	28,000	0.0E+00
Aluminum		NA	0.0E+00	Neuorological	470,000,000	0.0E+00
Antimony		NA	0.0E+00	Blood	8,500	0.0E+00
Aroclor-1016		700,000	0.0E+00	Fetotoxicity	49,000	0.0E+00
Aroclor-1242		25,000	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1248		25,000	0.0E+00	Cancer	NA	0.0E+00
Aroclor-1260		25,000	0.0E+00	Cancer	NA	0.0E+00
Dioxin-Like PCBs		0.38	0.0E+00	Lymphoma	NA	0.0E+00
Non-Dioxin-Like PCBs		120,000	0.0E+00	Cancer	NA	0.0E+00
Arsenic		22,000	0.0E+00	Skin, Cardiovascular System	140,000	0.0E+00
Atrazine		9,100	0.0E+00	Body weight	89,000	0.0E+00
Barium		NA	0.0E+00	Neuorological	18,000,000	0.0E+00
Benzo(a)anthracene		490,000	0.0E+00	Cancer	NA	0.0E+00
Benzene		33,000	0.0E+00	Blood	260,000	0.0E+00
Benzo(a)pyrene		49,000	0.0E+00	Developmental, Immune, Reproductive	210000	0.0E+00
Benzo(b)fluoranthene		490,000	0.0E+00	Cancer	NA	0.0E+00
Benzo(k)fluoranthene		4,900,000	0.0E+00	Cancer	NA	0.0E+00
Beryllium		NA	0.0E+00	GS	51,000	0.0E+00
Bis(2-chloro-1-methylethyl) ether		NA	0.0E+00	Blood	27,000	0.0E+00
Bis(2-ethylhexyl)phthalate		3,500,000	0.0E+00	Reproductive	70,000,000	0.0E+00
Bromodichloromethane		59,000	0.0E+00	Kidney	420,000	0.0E+00
Cadmium		NA	0.0E+00	Urinary	33,000	0.0E+00
Carbazole		NA	0.0E+00	Cancer	NA	0.0E+00
Carbon Tetrachloride		15,000	0.0E+00	Liver	100,000	0.0E+00
alpha-Chlordane		NA	0.0E+00	Liver	1200	0.0E+00
gamma-Chlordane		NA	0.0E+00	Liver	420,000	0.0E+00
Chlorobenzene		NA	0.0E+00	Liver, Kidney	770,000	0.0E+00
Chromium (Trivalent)		NA	0.0E+00	None Reported	28,000,000	0.0E+00
Chromium (Hexavalent)		2500	0.0E+00	None Reported	89,000	0.0E+00
Chrysene		49,000,000	0.0E+00	Cancer	NA	0.0E+00
Cobalt		NA	0.0E+00	Thyroid	1,800,000	0.0E+00
Copper		NA	0.0E+00	Gastrointestinal System	4,700,000	0.0E+00
Cyanide		NA	0.0E+00	Thyroid, Central Nervous System, Body Weight	9,500,000	0.0E+00
DDD		120	0.0E+00	Cancer	NA	0.0E+00
DDE		140,000	0.0E+00	Cancer	NA	0.0E+00
DDT		140,000	0.0E+00	Liver	350,000	0.0E+00
Dibenzo(a,h)anthracene		49,000	0.0E+00	Cancer	NA	0.0E+00
Dibenzofuran		NA	0.0E+00	Kidney	9100	0.0E+00
1,3-Dichlorobenzene		NA	0.0E+00	Cancer	97000	0.0E+00
1,4-Dichlorobenzene		72,000	0.0E+00	Blood	390,000	0.0E+00
3,3'-Dichlorobenzidine		1500	0.0E+00	Cancer	NA	0.0E+00
cis-1,2-Dichloroethylene		NA	0.0E+00	Kidney	610,000	0.0E+00
Dieldrin		9	0.0E+00	Liver	210	0.0E+00
4,6-Dinitro-o-cresol		NA	0.0E+00	Eyes	43,000	0.0E+00
2,4-Dinitrotoluene		14,000	0.0E+00	Neurotoxicity	420,000	0.0E+00
2,6-Dinitrotoluene		2400	0.0E+00	Central Nervous System, Blood, Liver	200,000	0.0E+00
1,4-Dioxane		300,000	0.0E+00	Liver, Kidney	220,000,000	0.0E+00
Endrin ketone		NA	0.0E+00	Central Nervous System, Liver	6000	0.0E+00
Heptachlor		8	0.0E+00	Reproductive	52	0.0E+00
Heptachlor Epoxide		24	0.0E+00	Liver	41	0.0E+00
alpha-BHC		60	0.0E+00	Liver	43,000	0.0E+00
beta-BHC		210	0.0E+00	Cancer	3200	0.0E+00
delta-BHC		NA	0.0E+00	Liver	43,000	0.0E+00
gamma-BHC (Lindane)		340	0.0E+00	Immune System	54	0.0E+00
Indeno(1,2,3-cd)pyrene		490,000	0.0E+00	Cancer	NA	0.0E+00
Iron		NA	0.0E+00	Gastrointestinal System	330,000,000	0.0E+00
Lead		NA	0.0E+00	Neuorological	NA	0.0E+00
Manganese		NA	0.0E+00	Central Nervous System	1,300,000	0.0E+00
Mercuric Chloride		NA	0.0E+00	Central Nervous System	180,000	0.0E+00

TABLE 4

SUMMARY OF RECEPTOR RISKS AND HAZARDS - CONSTRUCTION WORKERS
PORE WATER
LOWER DARBY CREEK AREA
PAGE 2 OF 2

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
Mercury (elemental)		NA	0.0E+00	Central Nervous System	NA	0.0E+00
Methyl tert-Butyl Ether (MTBE)		5,500,000	0.0E+00	Cancer	42000000	0.0E+00
2-Methylnaphthalene		NA	0.0E+00	Respiratory	11,000	0.0E+00
Naphthalene		NA	0.0E+00	Body Weight	3,700,000	0.0E+00
Nickel		NA	0.0E+00	Body Weight	4,100,000	0.0E+00
2-Nitroaniline		NA	0.0E+00	Spleen	5,600,000	0.0E+00
3-Nitroaniline		NA	0.0E+00	Spleen	110,000	0.0E+00
4-Nitroaniline		360,000	0.0E+00	Spleen	1,000,000	0.0E+00
Nitrobenzene		NA	0.0E+00	Blood	250,000	0.0E+00
N-Nitroso-di-N-propylamine		1000	0.0E+00	Cancer	NA	0.0E+00
Phenanthrene		NA	0.0E+00	Kidney	430,000	0.0E+00
Pyrene		NA	0.0E+00	Kidney	270,000	0.0E+00
Selenium		NA	0.0E+00	Skin, Central Nervous System	2,400,000	0.0E+00
Silver		NA	0.0E+00	Skin	430,000	0.0E+00
2,3,7,8-TCDD Equivalents		0.38	0.0E+00	Lymphoma	14	0.0E+00
Tetrachloroethylene		220,000	0.0E+00	Neurotoxicity	670,000	0.0E+00
Thallium		NA	0.0E+00	Skin	19000	0.0E+00
Trichloroethylene		36,000	0.0E+00	Immune System, Developmental	12,000	0.0E+00
Vanadium		NA	0.0E+00	Kidney	360,000	0.0E+00
Vinyl Chloride		4,700	0.0E+00	Liver	150,000	0.0E+00
Zinc		NA	0.0E+00	Blood	160,000,000	0.0E+00
2-Methylphenol		NA	0.0E+00	Whole Body	8,200,000	0.0E+00
4-Methylphenol		NA	0.0E+00	Liver	56,000	0.0E+00
Acenaphthene		NA	0.0E+00	Liver	540,000	0.0E+00
Acenaphthylene		NA	0.0E+00	None Reported	290,000	0.0E+00
Anthracene		NA	0.0E+00	Whole Body	77,000,000	0.0E+00
Benzaldehyde		12000000	0.0E+00	Kidney	140,000,000	0.0E+00
Benzo(g,h,i)perylene		NA	0.0E+00	Kidney	65,000,000	0.0E+00
Caprolactam		NA	0.0E+00	Developmental	1,400,000	0.0E+00
Di-n-butylphthalate		NA	0.0E+00	Whole Body	700,000,000	0.0E+00
Fluoranthene		NA	0.0E+00	Kidney	200,000	0.0E+00
Fluorene		NA	0.0E+00	Blood	4,900,000	0.0E+00
N-Nitrosodiphenylamine		15,000	0.0E+00	Liver	NA	0.0E+00
Pentachlorophenol		3,100	0.0E+00	Reproductive	18,000	0.0E+00
Endosulfan I		NA	0.0E+00	Body Weight	90,000	0.0E+00
Endosulfan II		NA	0.0E+00	Liver	NA	0.0E+00
Endrin		NA	0.0E+00	Central Nervous System	7,900	0.0E+00
Endrin aldehyde		NA	0.0E+00	Central Nervous System	4,100	0.0E+00
Methoxychlor		NA	0.0E+00	Central Nervous System	3,500,000	0.0E+00
Boron		NA	0.0E+00	Developmental	140,000,000	0.0E+00
		Total Carcinogenic Risk	**0E+00**		**Total HI**	**0**

Target Organ HIs

Total Blood HI =	0.0E+00
Total Body weight HI =	0.0E+00
Total Cardiovascular System HI =	0.0E+00
Total Central Nervous System HI =	0.0E+00
Total Developmental HI =	0.0E+00
Total Eyes HI =	0.0E+00
Total Fetotoxicity HI =	0.0E+00
Total Gastrointestinal System HI =	0.0E+00
Total Immune System HI =	0.0E+00
Total Kidney HI =	0.0E+00
Total Liver HI =	0.0E+00
Total Lymphoma HI =	0.0E+00
Total Neuorological HI =	0.0E+00

TABLE 4

SUMMARY OF RECEPTOR RISKS AND HAZARDS - CONSTRUCTION WORKERS
PORE WATER
LOWER DARBY CREEK AREA
PAGE 3 OF 3

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Pore Water Concentration ug/L	RSL ug/L	Estimated ILCR	Primary Target Organs	RSL ug/L	Estimated HQ
					Total Neurotoxicity HI =	0.0E+00
					Total Reproductive HI =	0.0E+00
					Total Respiratory HI =	0.0E+00
					Total Skin HI =	0.0E+00
					Total Spleen HI =	0.0E+00
					Total Thyroid HI =	0.0E+00
					Total Urinary HI =	0.0E+00
					Total Whole Body HI =	0.0E+00
					Total None Reported HI =	0.0E+00

Pore Water Risks

May 2013

Risks for Lifetime Recreational Users Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-LD103 LDCA-PW-LD103-20130502 20130502				PW-LD106 LDCA-PW-LD106-20130502 20130502				PW-LD108 LDCA-PW-LD108-20130502 20130502				PW-LD110 LDCA-PW-LD110-20130502 20130502				PW-LD114 LDCA-PW-LD114-20130503 20130503			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																							
1,4-Dioxane	420	160,000	Liver, Kidney	4.9 J		1.2E-08	3.1E-05	14 J		3.3E-08	8.8E-05	12 J		2.9E-08	7.5E-05	63 J		1.5E-07	3.9E-04	150 J		3.6E-07	9.4E-04
2-Methylnaphthalene	NA	780	Respiratory	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
4-Methylphenol	NA	190,000	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Acenaphthene	NA	11,000	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Anthracene	NA	31,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5.1 J		5.1E-08	NA	5 UJ		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4.3 J		4.3E-07	2.5E-03	5 UJ		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4.5 J		4.5E-08	NA	5 UJ		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.3 J		NA	1.9E-05	5 UJ		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.9 J		3.9E-09	NA	5 UJ		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 UJ		NA	NA	2.6 J		7.6E-10	2.4E-05	5 UJ		NA	NA	6.9 J		2.0E-09	6.3E-05	2.6 J		7.6E-10	2.4E-05
Caprolactam	NA	2,200,000	Developmental	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Carbazole	NA	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Chrysene	10,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	6.3 J		6.3E-10	NA	5 UJ		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Fluoranthene	NA	230,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	12 J		NA	5.2E-05	5 UJ		NA	NA
Fluorene	NA	5,800	Blood	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.2 J		3.2E-08	NA	5 UJ		NA	NA
Naphthalene	NA	8,100	Body Weight	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Nitrobenzene	NA	4,500	Blood	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4.4 J		4.6E-09	NA
Pentachlorophenol	1.10	370	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	3,100	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	7.1 J		NA	2.3E-03	5 UJ		NA	NA
Pyrene	NA	1,900	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	9.4 J		NA	4.9E-03	5 UJ		NA	NA
Pesticides (ug/L)																							
4,4'-DDD	0.720	NA	Cancer	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.057 J		7.9E-08	NA	0.01 UJ		NA	NA
4,4'-DDE	140	NA	Cancer	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.037 J		2.6E-10	NA	0.01 UJ		NA	NA
4,4'-DDT	140	2,800	Liver	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.12 J		8.6E-10	4.3E-05	0.01 UJ		NA	NA
Aldrin	2.80	170	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
alpha-BHC	0.340	2,900	Liver	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
alpha-Chlordane	2.30	70	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.029 J		1.3E-08	4.1E-04	0.005 UJ		NA	NA
beta-BHC	1.20	NA	Cancer	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
delta-BHC	0.340	2,900	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Dieldrin	0.055	8	Liver	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.0082 J		1.5E-07	1.1E-03	0.002 UJ		NA	NA
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 J		NA	1.5E-06	0.01 UJ		NA	NA
Endosulfan Sulfate	NA	6,500	Cardiovascular System, Urinary	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin	NA	46	Central Nervous System	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.036 J		NA	4.4E-04	0.01 UJ		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.017 J		NA	2.7E-04	0.01 UJ		NA	NA
gamma-BHC (Lindane)	2.00	110	Immune System	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Heptachlor	0.048	19	Reproductive	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
Heptachlor Epoxide	0.140	3	Liver	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA
Methoxychlor	NA	730	Developmental	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA
Metals (ug/L)																							
Aluminum	NA	4,800,000	Neurological	445		NA	9.3E-05	20 U		NA	NA	1080		NA	2.3E-04	215		NA	4.5E-05	1310		NA	2.7E-04
Arsenic	25.0	1,400	Skin, Cardiovascular System	2.5 J		1.0E-07	1.8E-03	6.1 J		2.4E-07	4.4E-03	12.3 J		4.9E-07	8.8E-03	14.9 J		6.0E-07	1.1E-02	6.7 J		2.7E-07	4.8E-03
Barium	NA	310,000	Neurological	809		NA	2.6E-03	825		NA	2.7E-03	1390		NA	4.5E-03	535		NA	1.7E-03	496		NA	1.6E-03
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Cadmium	NA	590	Urinary	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Calcium	NA	NA	Essential Nutrient	167000		NA	NA	128000		NA	NA	95800		NA	NA	142000		NA	NA	76300		NA	NA
Chromium	1.00	1,100	None Reported	4.8		4.8E-06	4.4E-03	4.2		4.2E-06	3.8E-03	11.4		**1.1E-05**	1.0E-02	18.8		**1.9E-05**	1.7E-02	32.4		**3.2E-05**	2.9E-02
Cobalt	NA	1,600	Thyroid	2.2 J		NA	1.4E-03	3.2 J		NA	2.0E-03	3.9 J		NA	2.4E-03	7.5 J		NA	4.7E-03	10.9 J		NA	6.8E-03
Copper	NA	190,000	Gastrointestinal System	14.1 J		NA	7.4E-05	2 UJ		NA	NA	40 J		NA	2.1E-04	6.5 J		NA	3.4E-05	14.6 J		NA	7.7E-05
Iron	NA	3,300,000	Gastrointestinal System	37100 J		NA	1.1E-02	25900 J		NA	7.8E-03	46700 J		NA	1.4E-02	32200 J		NA	9.8E-03	15200 J		NA	4.6E-03
Lead	NA	NA	Neurological	39.5		NA	NA	2.1		NA	NA	176		NA	NA	21.8		NA	NA	73.4		NA	NA
Magnesium	NA	NA	Essential Nutrient	68700		NA	NA	86500		NA	NA	76400		NA	NA	76300		NA	NA	74500		NA	NA
Manganese	NA	24,000	Central Nervous System	725		NA	3.0E-02	144		NA	6.0E-03	362		NA	1.5E-02	404		NA	1.7E-02	274		NA	1.1E-02
Nickel	NA	58,000	Body Weight	5.2 J		NA	9.0E-05	7.7 J		NA	1.3E-04	7.2 J		NA	1.2E-04	8.9 J		NA	1.5E-04	17.5 J		NA	3.0E-04
Potassium	NA	NA	Essential Nutrient	36300 J		NA	NA	57800 J		NA	NA	57800 J		NA	NA	90900 J		NA	NA	127000 J		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	2 J		NA	8.3E-05	2.1 J		NA	8.8E-05	2 J		NA	8.3E-05	5.3		NA	2.2E-04	8.1		NA	3.4E-04
Sodium	NA	NA	Essential Nutrient	114000		NA	NA	127000		NA	NA	113000		NA	NA	517000		NA	NA	834000		NA	NA
Vanadium	NA	3,500	Kidney	7.9 J		NA	2.3E-03	2.6 UJ		NA	NA	10.6 J		NA	3.0E-03	22.8 J		NA	6.5E-03	29.3 J		NA	8.4E-03
Zinc	NA	1,500,000	Blood	44.4		NA	3.0E-05	67.6		NA	4.5E-05	100		NA	6.7E-05	19		NA	1.3E-05	120		NA	8.0E-05
PCBs (pg/L)																							
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Risk/Hazard Index						4.9E-06	5.4E-02			4.5E-06	2.7E-02			**1.2E-05**	5.9E-02			**2.0E-05**	8.0E-02			**3.3E-05**	6.9E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-LD116 LDCA-PW-LD116-20130503 20130503				PW-LD118 LDCA-PW-LD118-20130503 20130503				PW-LD123 LDCA-PW-LD123-20130503 20130503				PW-LD126 LDCA-PW-LD126-20130502 20130502				PW-LD129 LDCA-PW-LD129-20130502 20130502			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																							
1,4-Dioxane	420	160,000	Liver, Kidney	11 J		2.6E-08	6.9E-05	130 J		3.1E-07	8.1E-04	69 J		1.6E-07	4.3E-04	110 J		2.6E-07	6.9E-04	170 J		4.0E-07	1.1E-03
2-Methylnaphthalene	NA	780	Respiratory	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
4-Methylphenol	NA	190,000	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	9.3 J		NA	4.9E-05
Acenaphthene	NA	11,000	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Anthracene	NA	31,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5.8 J		1.2E-09	2.1E-05	7.6 J		1.6E-09	2.7E-05
Benzo(a)anthracene	100	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4.1 J		4.1E-08	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4 J		4.0E-07	2.4E-03
Benzo(b)fluoranthene	100	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5.1 J		5.1E-08	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.7 J		NA	2.2E-05
Benzo(k)fluoranthene	1,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.7 J		3.7E-09	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	10 J		2.9E-09	9.1E-05	5 UJ		NA	NA	5 UJ		NA	NA	2.8 J		8.2E-10	2.5E-05	6.3 J		1.9E-09	5.7E-05
Caprolactam	NA	2,200,000	Developmental	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Carbazole	NA	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Chrysene	10,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	6.3 J		6.3E-10	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Fluoranthene	NA	230,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.3 J		NA	1.4E-05	12 J		NA	5.2E-05
Fluorene	NA	5,800	Blood	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.2 J		3.2E-08	NA
Naphthalene	NA	8,100	Body Weight	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Nitrobenzene	NA	4,500	Blood	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Pentachlorophenol	1.10	370	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	3,100	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	6.5 J		NA	2.1E-03
Pyrene	NA	1,900	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	2.6 J		NA	1.4E-03	8.8 J		NA	4.6E-03
Pesticides (ug/L)																							
4,4'-DDD	0.720	NA	Cancer	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
4,4'-DDE	140	NA	Cancer	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.0019 J		1.4E-11	NA	0.013 J		9.3E-11	NA	0.01 UJ		NA	NA
4,4'-DDT	140	2,800	Liver	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.016 J		1.1E-10	5.7E-06	0.01 UJ		NA	NA
Aldrin	2.80	170	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
alpha-BHC	0.340	2,900	Liver	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
alpha-Chlordane	2.30	70	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.063 J		2.7E-08	9.0E-04	0.0052 J		2.3E-09	7.4E-05
beta-BHC	1.20	NA	Cancer	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
delta-BHC	0.340	2,900	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Dieldrin	0.055	8	Liver	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endosulfan Sulfate	NA	6,500	Cardiovascular System, Urinary	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin	NA	46	Central Nervous System	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.0025 J		NA	3.0E-05	0.01 UJ		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
gamma-BHC (Lindane)	2.00	110	Immune System	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.021 J		1.1E-08	1.9E-04	0.005 UJ		NA	NA	0.005 UJ		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.031 J		2.4E-10	1.1E-05	0.005 UJ		NA	NA
Heptachlor	0.048	19	Reproductive	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
Heptachlor Epoxide	0.140	3	Liver	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.0045 J		3.2E-08	1.6E-03	0.002 UJ		NA	NA
Methoxychlor	NA	730	Developmental	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA
Metals (ug/L)																							
Aluminum	NA	4,800,000	Neurological	84.8		NA	1.8E-05	213		NA	4.4E-05	20 U		NA	NA	5350		NA	1.1E-03	872		NA	1.8E-04
Arsenic	25.0	1,400	Skin, Cardiovascular System	4.7 J		1.9E-07	3.4E-03	4.1 J		1.6E-07	2.9E-03	4.2 J		1.7E-07	3.0E-03	7.3 J		2.9E-07	5.2E-03	5.4 J		2.2E-07	3.9E-03
Barium	NA	310,000	Neurological	311		NA	1.0E-03	336		NA	1.1E-03	953		NA	3.1E-03	1290		NA	4.2E-03	818		NA	2.6E-03
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1.3		NA	3.2E-03	1 U		NA	NA
Cadmium	NA	590	Urinary	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	5		NA	8.5E-03	1 U		NA	NA
Calcium	NA	NA	Essential Nutrient	106000		NA	NA	104000		NA	NA	101000		NA	NA	159000		NA	NA	108000		NA	NA
Chromium	1.00	1,100	None Reported	21.8		**2.2E-05**	2.0E-02	18.9		**1.9E-05**	1.7E-02	11.9		**1.2E-05**	1.1E-02	17.2		**1.7E-05**	1.6E-02	7.3		7.3E-06	6.6E-03
Cobalt	NA	1,600	Thyroid	10.8 J		NA	6.8E-03	8.5 J		NA	5.3E-03	8.4 J		NA	5.3E-03	14.9 J		NA	9.3E-03	5.3 J		NA	3.3E-03
Copper	NA	190,000	Gastrointestinal System	2.1 J		NA	1.1E-05	3.8 J		NA	2.0E-05	2 UJ		NA	NA	371 J		NA	2.0E-03	37 J		NA	1.9E-04
Iron	NA	3,300,000	Gastrointestinal System	14600 J		NA	4.4E-03	12500 J		NA	3.8E-03	16400 J		NA	5.0E-03	31600 J		NA	9.6E-03	17000 J		NA	5.2E-03
Lead	NA	NA	Neurological	6		NA	NA	9.1		NA	NA	1 U		NA	NA	676		NA	NA	80.4		NA	NA
Magnesium	NA	NA	Essential Nutrient	70200		NA	NA	71500		NA	NA	122000		NA	NA	130000		NA	NA	98200		NA	NA
Manganese	NA	24,000	Central Nervous System	270		NA	1.1E-02	295		NA	1.2E-02	71.3		NA	3.0E-03	1190		NA	5.0E-02	271		NA	1.1E-02
Nickel	NA	58,000	Body Weight	13.2 J		NA	2.3E-04	9.9 J		NA	1.7E-04	6.6 J		NA	1.1E-04	26.6 J		NA	4.6E-04	8 J		NA	1.4E-04
Potassium	NA	NA	Essential Nutrient	111000 J		NA	NA	97500 J		NA	NA	108000 J		NA	NA	65700 J		NA	NA	68100 J		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	6.5		NA	2.7E-04	5.5		NA	2.3E-04	5.8		NA	2.4E-04	4.3 J		NA	1.8E-04	5.4		NA	2.3E-04
Sodium	NA	NA	Essential Nutrient	632000		NA	NA	574000		NA	NA	494000		NA	NA	313000		NA	NA	298000		NA	NA
Vanadium	NA	3,500	Kidney	18.9 J		NA	5.4E-03	8.7 J		NA	2.5E-03	3.4 J		NA	9.7E-04	39.2 J		NA	1.1E-02	8.9 J		NA	2.5E-03
Zinc	NA	1,500,000	Blood	12.3		NA	8.2E-06	9.5		NA	6.3E-06	2 J		NA	1.3E-06	1080		NA	7.2E-04	137		NA	9.1E-05
PCBs (pg/L)																							
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	9.43		1.8E-08	2.4E-03	0.20		4.0E-10	5.1E-05
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	557,328		4.6E-09	NA	58,059		4.8E-10	NA
Total Risk/Hazard Index						**2.2E-05**	5.3E-02			**1.9E-05**	4.6E-02			**1.2E-05**	3.2E-02			**1.8E-05**	1.3E-01			8.5E-06	4.7E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-LD132								PW-LD136							
				LDCA-PW-LD132-20130502 20130502				LDCA-PW-LD132-20130502-D 20130502				LDCA-PW-LD136-20130502 20130502				LDCA-PW-LD136-20130502-D 20130502			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																			
1,4-Dioxane	420	160,000	Liver, Kidney	25 J		6.0E-08	1.6E-04	NA		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA
2-Methylnaphthalene	NA	780	Respiratory	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 UJ		NA	NA	NA		NA	NA	17 J		NA	1.8E-04	8 J		NA	8.5E-05
4-Methylphenol	NA	190,000	Liver	5 UJ		NA	NA	NA		NA	NA	71 J		NA	3.7E-04	2.9 J		NA	1.5E-05
Acenaphthene	NA	11,000	Liver	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Anthracene	NA	31,000	Whole Body	5 UJ		NA	NA	NA		NA	NA	2.8 J		NA	9.0E-05	5 UJ		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 UJ		NA	NA	NA		NA	NA	24 J		5.0E-09	8.6E-05	5.5 J		1.1E-09	2.0E-05
Benzo(a)anthracene	100	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	12 J		1.2E-07	NA	5 UJ		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 UJ		NA	NA	NA		NA	NA	11 J		1.1E-06	6.5E-03	5 UJ		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	14 J		1.4E-07	NA	5 UJ		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 UJ		NA	NA	NA		NA	NA	9.8 J		NA	5.8E-05	5 UJ		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	11 J		1.1E-08	NA	5 UJ		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	13 J		3.8E-09	1.2E-04	NA		NA	NA	11 J		3.2E-09	1.0E-04	5.4 J		1.6E-09	4.9E-05
Caprolactam	NA	2,200,000	Developmental	5 UJ		NA	NA	NA		NA	NA	3.7 J		NA	1.7E-06	3.5 J		NA	1.6E-06
Carbazole	NA	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	4.4 J		NA	NA	5 UJ		NA	NA
Chrysene	10,000	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	16 J		1.6E-09	NA	2.8 J		2.8E-10	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	4.1 J		4.1E-07	NA	5 UJ		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 UJ		NA	NA	NA		NA	NA	2.5 J		NA	1.3E-04	5 UJ		NA	NA
Fluoranthene	NA	230,000	Kidney	5 UJ		NA	NA	NA		NA	NA	29 J		NA	1.3E-04	5.3 J		NA	2.3E-05
Fluorene	NA	5,800	Blood	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 UJ		NA	NA	NA		NA	NA	9.3 J		9.3E-08	NA	5 UJ		NA	NA
Naphthalene	NA	8,100	Body Weight	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Nitrobenzene	NA	4,500	Blood	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 UJ		NA	NA	NA		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Pentachlorophenol	1.10	370	Reproductive	10 UJ		NA	NA	NA		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	3,100	Kidney	5 UJ		NA	NA	NA		NA	NA	17 J		NA	5.5E-03	2.5 J		NA	8.1E-04
Pyrene	NA	1,900	Kidney	5 UJ		NA	NA	NA		NA	NA	22 J		NA	1.2E-02	3.8 J		NA	2.0E-03
Pesticides (ug/L)																			
4,4'-DDD	0.720	NA	Cancer	0.01 UJ		NA	NA	NA		NA	NA	0.054 J		7.5E-08	NA	0.052 J		7.2E-08	NA
4,4'-DDE	140	NA	Cancer	0.01 UJ		NA	NA	NA		NA	NA	0.031 J		2.2E-10	NA	0.05 J		3.6E-10	NA
4,4'-DDT	140	2,800	Liver	0.01 UJ		NA	NA	NA		NA	NA	0.039 J		2.8E-10	1.4E-05	0.064 J		4.6E-10	2.3E-05
Aldrin	2.80	170	Liver	0.005 UJ		NA	NA	NA		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
alpha-BHC	0.340	2,900	Liver	0.001 UJ		NA	NA	NA		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
alpha-Chlordane	2.30	70	Liver	0.005 UJ		NA	NA	NA		NA	NA	0.39 J		1.7E-07	5.6E-03	0.4 J		1.7E-07	5.7E-03
beta-BHC	1.20	NA	Cancer	0.001 UJ		NA	NA	NA		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
delta-BHC	0.340	2,900	Liver	0.005 UJ		NA	NA	NA		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Dieldrin	0.055	8	Liver	0.002 UJ		NA	NA	NA		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 UJ		NA	NA	NA		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.01 UJ		NA	NA	NA		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endosulfan Sulfate	NA	6,500	Cardiovascular System, Urinary	0.01 UJ		NA	NA	NA		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin	NA	46	Central Nervous System	0.01 UJ		NA	NA	NA		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.01 UJ		NA	NA	NA		NA	NA	0.031 J		NA	3.8E-04	0.011 J		NA	1.3E-04
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 UJ		NA	NA	NA		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
gamma-BHC (Lindane)	2.00	110	Immune System	0.005 UJ		NA	NA	NA		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 UJ		NA	NA	NA		NA	NA	0.2 J		1.5E-09	7.1E-05	0.16 J		1.2E-09	5.7E-05
Heptachlor	0.048	19	Reproductive	0.001 UJ		NA	NA	NA		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
Heptachlor Epoxide	0.140	3	Liver	0.002 UJ		NA	NA	NA		NA	NA	0.022 J		1.6E-07	7.6E-03	0.002 UJ		NA	NA
Methoxychlor	NA	730	Developmental	0.05 UJ		NA	NA	NA		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA
Metals (ug/L)																			
Aluminum	NA	4,800,000	Neuorological	57.2		NA	1.2E-05	6290		NA	1.3E-03	6680		NA	1.4E-03	NA		NA	NA
Arsenic	25.0	1,400	Skin, Cardiovascular System	3.1 J		1.2E-07	2.2E-03	7.5 J		3.0E-07	5.4E-03	7.5 J		3.0E-07	5.4E-03	NA		NA	NA
Barium	NA	310,000	Neuorological	1320		NA	4.3E-03	462		NA	1.5E-03	500		NA	1.6E-03	NA		NA	NA
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1.3		NA	3.2E-03	1.4		NA	3.4E-03	NA		NA	NA
Cadmium	NA	590	Urinary	1 U		NA	NA	2.4		NA	4.1E-03	2.5		NA	4.2E-03	NA		NA	NA
Calcium	NA	NA	Essential Nutrient	176000		NA	NA	66500		NA	NA	74500		NA	NA	NA		NA	NA
Chromium	1.00	1,100	None Reported	2.6		2.6E-06	2.4E-03	15.4		**1.5E-05**	1.4E-02	14.2		**1.4E-05**	1.3E-02	NA		NA	NA
Cobalt	NA	1,600	Thyroid	1.1 J		NA	6.9E-04	13.8 J		NA	8.6E-03	16.6 J		NA	1.0E-02	NA		NA	NA
Copper	NA	190,000	Gastrointestinal System	2 UJ		NA	NA	110 J		NA	5.8E-04	82.4 J		NA	4.3E-04	NA		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	34300 J		NA	1.0E-02	33100 J		NA	1.0E-02	38200 J		NA	1.2E-02	NA		NA	NA
Lead	NA	NA	Neuorological	15.2		NA	NA	279		NA	NA	263		NA	NA	NA		NA	NA
Magnesium	NA	NA	Essential Nutrient	72800		NA	NA	23000		NA	NA	26600		NA	NA	NA		NA	NA
Manganese	NA	24,000	Central Nervous System	380		NA	1.6E-02	4370		NA	1.8E-01	4890		NA	2.0E-01	NA		NA	NA
Nickel	NA	58,000	Body Weight	2.1 J		NA	3.6E-05	20.6 J		NA	3.6E-04	24.2 J		NA	4.2E-04	NA		NA	NA
Potassium	NA	NA	Essential Nutrient	28200 J		NA	NA	5600 J		NA	NA	5900 J		NA	NA	NA		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	NA		NA	NA
Sodium	NA	NA	Essential Nutrient	103000		NA	NA	33300		NA	NA	34100		NA	NA	NA		NA	NA
Vanadium	NA	3,500	Kidney	2.6 UJ		NA	NA	36.2 J		NA	1.0E-02	44.1 J		NA	1.3E-02	NA		NA	NA
Zinc	NA	1,500,000	Blood	11.5		NA	7.7E-06	555		NA	3.7E-04	613		NA	4.1E-04	NA		NA	NA
PCBs (pg/L)																			
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	46.0		9.0E-08	1.2E-02	1.50		2.9E-09	3.7E-04	1.29		2.5E-09	3.2E-04	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	1,185,302		9.9E-09	NA	237,494		2.0E-09	NA	40,162		3.3E-10	NA	NA		NA	NA
Total Risk/Hazard Index						2.9E-06	4.8E-02			**1.6E-05**	2.4E-01			**1.7E-05**	3.1E-01			2.5E-07	8.9E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Construction Workers Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-LD103 LDCA-PW-LD103-20130502 20130502				PW-LD106 LDCA-PW-LD106-20130502 20130502				PW-LD108 LDCA-PW-LD108-20130502 20130502				PW-LD110 LDCA-PW-LD110-20130502 20130502			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																			
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	4.9 J		1.6E-11	2.2E-08	14 J		4.7E-11	6.4E-08	12 J		4.0E-11	5.5E-08	63 J		2.1E-10	2.9E-07
2-Methylnaphthalene	NA	11,000	Respiratory	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
4-Methylphenol	NA	56,000	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Acenaphthene	NA	540,000	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Anthracene	NA	77,000,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5.1 J		1.0E-11	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4.3 J		8.8E-11	2.0E-05
Benzo(b)fluoranthene	490,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	4.5 J		9.2E-12	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.3 J		NA	5.1E-08
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.9 J		8.0E-13	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 UJ		NA	NA	2.6 J		7.4E-13	3.7E-08	5 UJ		NA	NA	6.9 J		2.0E-12	9.9E-08
Caprolactam	NA	1,400,000	Developmental	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Carbazole	NA	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Chrysene	49,000,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	6.3 J		1.3E-13	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Fluoranthene	NA	200,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	12 J		NA	6.0E-05
Fluorene	NA	4,900,000	Blood	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Indeno(1,2,3-cd)pyrene	490,000	NA	Cancer	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	3.2 J		6.5E-12	NA
Naphthalene	NA	3,700,000	Body Weight	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Nitrobenzene	NA	250,000	Blood	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	430,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	7.1 J		NA	1.7E-05
Pyrene	NA	270,000	Kidney	5 UJ		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	9.4 J		NA	3.5E-05
Pesticides (ug/L)																			
4,4'-DDD	120	NA	Cancer	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.057 J		4.8E-10	NA
4,4'-DDE	140,000	NA	Cancer	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.037 J		2.6E-13	NA
4,4'-DDT	140,000	350,000	Liver	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.12 J		8.6E-13	3.4E-07
Aldrin	2,900	28,000	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
alpha-BHC	60	43,000	Liver	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.029 J		NA	2.4E-05
beta-BHC	210	3,200	Cancer	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
delta-BHC	NA	43,000	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Dieldrin	9.4	210	Liver	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.0082 J		8.7E-10	3.9E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 J		NA	1.1E-07
Endosulfan Sulfate	NA	90,000	Cardiovascular System, Urinary	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin	NA	7,900	Central Nervous System	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.036 J		NA	8.8E-06
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.01 UJ		NA	NA	0.017 J		NA	2.8E-06
gamma-BHC (Lindane)	340	54	Immune System	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA	0.005 UJ		NA	NA
Heptachlor	8	52	Reproductive	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA	0.001 UJ		NA	NA
Heptachlor Epoxide	24	41	Liver	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA	0.002 UJ		NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA	0.05 UJ		NA	NA
Metals (ug/L)																			
Aluminum	NA	470,000,000	Neuorological	445		NA	9.5E-07	20 U		NA	NA	1080		NA	2.3E-06	215		NA	4.6E-07
Arsenic	22,000	140,000	Skin, Cardiovascular System	2.5 J		1.1E-10	1.8E-05	6.1 J		2.8E-10	4.4E-05	12.3 J		5.6E-10	8.8E-05	14.9 J		6.8E-10	1.1E-04
Barium	NA	18,000,000	Neuorological	809		NA	4.5E-05	825		NA	4.6E-05	1390		NA	7.7E-05	535		NA	3.0E-05
Beryllium	NA	51,000	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Cadmium	NA	33,000	Urinary	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Calcium	NA	NA	Essential Nutrient	167000		NA	NA	128000		NA	NA	95800		NA	NA	142000		NA	NA
Chromium	2,500	89,000	None Reported	4.8		1.9E-09	5.4E-05	4.2		1.7E-09	4.7E-05	11.4		4.6E-09	1.3E-04	18.8		7.5E-09	2.1E-04
Cobalt	NA	1,800,000	Thyroid	2.2 J		NA	1.2E-06	3.2 J		NA	1.8E-06	3.9 J		NA	2.2E-06	7.5 J		NA	4.2E-06
Copper	NA	4,700,000	Gastrointestinal System	14.1 J		NA	3.0E-06	2 UJ		NA	NA	40 J		NA	8.5E-06	6.5 J		NA	1.4E-06
Iron	NA	330,000,000	Gastrointestinal System	37100 J		NA	1.1E-04	25900 J		NA	7.8E-05	46700 J		NA	1.4E-04	32200 J		NA	9.8E-05
Lead	NA	NA	Neuorological	39.5		NA	NA	2.1		NA	NA	176		NA	NA	21.8		NA	NA
Magnesium	NA	NA	Essential Nutrient	68700		NA	NA	86500		NA	NA	76400		NA	NA	76300		NA	NA
Manganese	NA	1,300,000	Central Nervous System	725		NA	5.6E-04	144		NA	1.1E-04	362		NA	2.8E-04	404		NA	3.1E-04
Nickel	NA	4,100,000	Body Weight	5.2 J		NA	1.3E-06	7.7 J		NA	1.9E-06	7.2 J		NA	1.8E-06	8.9 J		NA	2.2E-06
Potassium	NA	NA	Essential Nutrient	36300 J		NA	NA	57800 J		NA	NA	57800 J		NA	NA	90900 J		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	2 J		NA	8.3E-07	2.1 J		NA	8.8E-07	2 J		NA	8.3E-07	5.3		NA	2.2E-06
Sodium	NA	NA	Essential Nutrient	114000		NA	NA	127000		NA	NA	113000		NA	NA	517000		NA	NA
Vanadium	NA	360,000	Kidney	7.9 J		NA	2.2E-05	2.6 UJ		NA	NA	10.6 J		NA	2.9E-05	22.8 J		NA	6.3E-05
Zinc	NA	160,000,000	Blood	44.4		NA	2.8E-07	67.6		NA	4.2E-07	100		NA	6.3E-07	19		NA	1.2E-07
PCBs (pg/L)																			
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma																
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer																
Total Risk/Hazard Index						2.0E-09	8.2E-04			2.0E-09	3.3E-04			5.2E-09	7.6E-04			9.9E-09	1.0E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Risks for Construction Workers Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-LD114 LDCA-PW-LD114-20130503 20130503				PW-LD116 LDCA-PW-LD116-20130503 20130503				PW-LD118 LDCA-PW-LD118-20130503 20130503				PW-LD123 LDCA-PW-LD123-20130503 20130503			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																			
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	150	J	5.0E-10	6.8E-07	11	J	3.7E-11	5.0E-08	130	J	4.3E-10	5.9E-07	69	J	2.3E-10	3.1E-07
2-Methylnaphthalene	NA	11,000	Respiratory	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
4-Methylphenol	NA	56,000	Liver	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Acenaphthene	NA	540,000	Liver	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Acenaphthylene	NA	290,000	None Reported	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Anthracene	NA	77,000,000	Whole Body	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	2.6	J	7.4E-13	3.7E-08	10	J	2.9E-12	1.4E-07	5	UJ	NA	NA	5	UJ	NA	NA
Caprolactam	NA	1,400,000	Developmental	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Carbazole	NA	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Chrysene	49,000,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Fluoranthene	NA	200,000	Kidney	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Fluorene	NA	4,900,000	Blood	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Indeno(1,2,3-cd)pyrene	490,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Naphthalene	NA	3,700,000	Body Weight	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Nitrobenzene	NA	250,000	Blood	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	4.4	J	2.9E-10	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10	UJ	NA	NA	10	UJ	NA	NA	10	UJ	NA	NA	10	UJ	NA	NA
Phenanthrene	NA	430,000	Kidney	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Pyrene	NA	270,000	Kidney	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA
Pesticides (ug/L)																			
4,4'-DDD	120	NA	Cancer	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
4,4'-DDE	140,000	NA	Cancer	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.0019	J	1.4E-14	NA
4,4'-DDT	140,000	350,000	Liver	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Aldrin	2,900	28,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA
alpha-BHC	60	43,000	Liver	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA
alpha-Chlordane	NA	1,200	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA
beta-BHC	210	3,200	Cancer	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA
delta-BHC	NA	43,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA
Dieldrin	9.4	210	Liver	0.002	UJ	NA	NA	0.002	UJ	NA	NA	0.002	UJ	NA	NA	0.002	UJ	NA	NA
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endosulfan Sulfate	NA	90,000	Cardiovascular System, Urinary	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endrin	NA	7,900	Central Nervous System	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.021	J	6.2E-11	3.9E-04
gamma-Chlordane	NA	420,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA
Heptachlor	8	52	Reproductive	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA
Heptachlor Epoxide	24	41	Liver	0.002	UJ	NA	NA	0.002	UJ	NA	NA	0.002	UJ	NA	NA	0.002	UJ	NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05	UJ	NA	NA	0.05	UJ	NA	NA	0.05	UJ	NA	NA	0.05	UJ	NA	NA
Metals (ug/L)																			
Aluminum	NA	470,000,000	Neuorological	1310		NA	2.8E-06	84.8		NA	1.8E-07	213		NA	4.5E-07	20	U	NA	NA
Arsenic	22,000	140,000	Skin, Cardiovascular System	6.7	J	3.0E-10	4.8E-05	4.7	J	2.1E-10	3.4E-05	4.1	J	1.9E-10	2.9E-05	4.2	J	1.9E-10	3.0E-05
Barium	NA	18,000,000	Neuorological	496		NA	2.8E-05	311		NA	1.7E-05	336		NA	1.9E-05	953		NA	5.3E-05
Beryllium	NA	51,000	Gastrointestinal System	1	U	NA	NA	1	U	NA	NA	1	U	NA	NA	1	U	NA	NA
Cadmium	NA	33,000	Urinary	1	U	NA	NA	1	U	NA	NA	1	U	NA	NA	1	U	NA	NA
Calcium	NA	NA	Essential Nutrient	76300		NA	NA	106000		NA	NA	104000		NA	NA	101000		NA	NA
Chromium	2,500	89,000	None Reported	32.4		1.3E-08	3.6E-04	21.8		8.7E-09	2.4E-04	18.9		7.6E-09	2.1E-04	11.9		4.8E-09	1.3E-04
Cobalt	NA	1,800,000	Thyroid	10.9	J	NA	6.1E-06	10.8	J	NA	6.0E-06	8.5	J	NA	4.7E-06	8.4	J	NA	4.7E-06
Copper	NA	4,700,000	Gastrointestinal System	14.6	J	NA	3.1E-06	2.1	J	NA	4.5E-07	3.8	J	NA	8.1E-07	2	UJ	NA	NA
Iron	NA	330,000,000	Gastrointestinal System	15200	J	NA	4.6E-05	14600	J	NA	4.4E-05	12500	J	NA	3.8E-05	16400	J	NA	5.0E-05
Lead	NA	NA	Neuorological	73.4		NA	NA	6		NA	NA	9.1		NA	NA	1	U	NA	NA
Magnesium	NA	NA	Essential Nutrient	74500		NA	NA	70200		NA	NA	71500		NA	NA	122000		NA	NA
Manganese	NA	1,300,000	Central Nervous System	274		NA	2.1E-04	270		NA	2.1E-04	295		NA	2.3E-04	71.3		NA	5.5E-05
Nickel	NA	4,100,000	Body Weight	17.5	J	NA	4.3E-06	13.2	J	NA	3.2E-06	9.9	J	NA	2.4E-06	6.6	J	NA	1.6E-06
Potassium	NA	NA	Essential Nutrient	127000	J	NA	NA	111000	J	NA	NA	97500	J	NA	NA	108000	J	NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	8.1		NA	3.4E-06	6.5		NA	2.7E-06	5.5		NA	2.3E-06	5.8		NA	2.4E-06
Sodium	NA	NA	Essential Nutrient	834000		NA	NA	632000		NA	NA	574000		NA	NA	494000		NA	NA
Vanadium	NA	360,000	Kidney	29.3	J	NA	8.1E-05	18.9	J	NA	5.3E-05	8.7	J	NA	2.4E-05	3.4	J	NA	9.4E-06
Zinc	NA	160,000,000	Blood	120		NA	7.5E-07	12.3		NA	7.7E-08	9.5		NA	5.9E-08	2	J	NA	1.3E-08
PCBs (pg/L)																			
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma																
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer																
Total Risk/Hazard Index						1.4E-08	8.0E-04			9.0E-09	6.1E-04			8.2E-09	5.6E-04			5.2E-09	7.3E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Risks for Construction Workers Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-LD126 LDCA-PW-LD126-20130502 20130502				PW-LD129 LDCA-PW-LD129-20130502 20130502				PW-LD132 LDCA-PW-LD132-20130502 20130502				LDCA-PW-LD132-20130502-D 20130502			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																			
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	110	J	3.7E-10	5.0E-07	170	J	5.7E-10	7.7E-07	25	J	8.3E-11	1.1E-07	NA		NA	NA
2-Methylnaphthalene	NA	11,000	Respiratory	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
4-Methylphenol	NA	56,000	Liver	5	UJ	NA	NA	9.3	J	NA	1.7E-04	5	UJ	NA	NA	NA		NA	NA
Acenaphthene	NA	540,000	Liver	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Acenaphthylene	NA	290,000	None Reported	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Anthracene	NA	77,000,000	Whole Body	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5.8	J	4.8E-13	4.1E-08	7.6	J	6.3E-13	5.4E-08	5	UJ	NA	NA	NA		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5	UJ	NA	NA	4.1	J	8.4E-12	NA	5	UJ	NA	NA	NA		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5	UJ	NA	NA	4	J	8.2E-11	1.9E-05	5	UJ	NA	NA	NA		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5	UJ	NA	NA	5.1	J	1.0E-11	NA	5	UJ	NA	NA	NA		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5	UJ	NA	NA	3.7	J	NA	5.7E-08	5	UJ	NA	NA	NA		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5	UJ	NA	NA	3.7	J	7.6E-13	NA	5	UJ	NA	NA	NA		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	2.8	J	8.0E-13	4.0E-08	6.3	J	1.8E-12	9.0E-08	13	J	3.7E-12	1.9E-07	NA		NA	NA
Caprolactam	NA	1,400,000	Developmental	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Carbazole	NA	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Chrysene	49,000,000	NA	Cancer	5	UJ	NA	NA	6.3	J	1.3E-13	NA	5	UJ	NA	NA	NA		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Fluoranthene	NA	200,000	Kidney	3.3	J	NA	1.7E-05	12	J	NA	6.0E-05	5	UJ	NA	NA	NA		NA	NA
Fluorene	NA	4,900,000	Blood	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Indeno(1,2,3-cd)pyrene	490,000	NA	Cancer	5	UJ	NA	NA	3.2	J	6.5E-12	NA	5	UJ	NA	NA	NA		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Nitrobenzene	NA	250,000	Blood	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5	UJ	NA	NA	5	UJ	NA	NA	5	UJ	NA	NA	NA		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10	UJ	NA	NA	10	UJ	NA	NA	10	UJ	NA	NA	NA		NA	NA
Phenanthrene	NA	430,000	Kidney	5	UJ	NA	NA	6.5	J	NA	1.5E-05	5	UJ	NA	NA	NA		NA	NA
Pyrene	NA	270,000	Kidney	2.6	J	NA	9.6E-06	8.8	J	NA	3.3E-05	5	UJ	NA	NA	NA		NA	NA
Pesticides (ug/L)																			
4,4'-DDD	120	NA	Cancer	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.013	J	9.3E-14	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.016	J	1.1E-13	4.6E-08	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
Aldrin	2,900	28,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	NA		NA	NA
alpha-BHC	60	43,000	Liver	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA	NA		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.063	J	NA	5.3E-05	0.0052	J	NA	4.3E-06	0.005	UJ	NA	NA	NA		NA	NA
beta-BHC	210	3,200	Cancer	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA	NA		NA	NA
delta-BHC	NA	43,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	NA		NA	NA
Dieldrin	9.4	210	Liver	0.002	UJ	NA	NA	0.002	UJ	NA	NA	0.002	UJ	NA	NA	NA		NA	NA
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	NA		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
Endosulfan Sulfate	NA	90,000	Cardiovascular System, Urinary	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
Endrin	NA	7,900	Central Nervous System	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.0025	J	NA	6.1E-07	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01	UJ	NA	NA	0.01	UJ	NA	NA	0.01	UJ	NA	NA	NA		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005	UJ	NA	NA	0.005	UJ	NA	NA	0.005	UJ	NA	NA	NA		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.031	J	NA	7.4E-08	0.005	UJ	NA	NA	0.005	UJ	NA	NA	NA		NA	NA
Heptachlor	8	52	Reproductive	0.001	UJ	NA	NA	0.001	UJ	NA	NA	0.001	UJ	NA	NA	NA		NA	NA
Heptachlor Epoxide	24	41	Liver	0.0045	J	1.9E-10	1.1E-04	0.002	UJ	NA	NA	0.002	UJ	NA	NA	NA		NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05	UJ	NA	NA	0.05	UJ	NA	NA	0.05	UJ	NA	NA	NA		NA	NA
Metals (ug/L)																			
Aluminum	NA	470,000,000	Neuorological	5350		NA	1.1E-05	872		NA	1.9E-06	57.2		NA	1.2E-07	6290		NA	1.3E-05
Arsenic	22,000	140,000	Skin, Cardiovascular System	7.3	J	3.3E-10	5.2E-05	5.4	J	2.5E-10	3.9E-05	3.1	J	1.4E-10	2.2E-05	7.5	J	3.4E-10	5.4E-05
Barium	NA	18,000,000	Neuorological	1290		NA	7.2E-05	818		NA	4.5E-05	1320		NA	7.3E-05	462		NA	2.6E-05
Beryllium	NA	51,000	Gastrointestinal System	1.3		NA	2.5E-05	1	U	NA	NA	1	U	NA	NA	1.3		NA	2.5E-05
Cadmium	NA	33,000	Urinary	5		NA	1.5E-04	1	U	NA	NA	1	U	NA	NA	2.4		NA	7.3E-05
Calcium	NA	NA	Essential Nutrient	159000		NA	NA	108000		NA	NA	176000		NA	NA	66500		NA	NA
Chromium	2,500	89,000	None Reported	17.2		6.9E-09	1.9E-04	7.3		2.9E-09	8.2E-05	2.6		1.0E-09	2.9E-05	15.4		6.2E-09	1.7E-04
Cobalt	NA	1,800,000	Thyroid	14.9	J	NA	8.3E-06	5.3	J	NA	2.9E-06	1.1	J	NA	6.1E-07	13.8	J	NA	7.7E-06
Copper	NA	4,700,000	Gastrointestinal System	371	J	NA	7.9E-05	37	J	NA	7.9E-06	2	UJ	NA	NA	110	J	NA	2.3E-05
Iron	NA	330,000,000	Gastrointestinal System	31600	J	NA	9.6E-05	17000	J	NA	5.2E-05	34300	J	NA	1.0E-04	33100	J	NA	1.0E-04
Lead	NA	NA	Neuorological	676		NA	NA	80.4		NA	NA	15.2		NA	NA	279		NA	NA
Magnesium	NA	NA	Essential Nutrient	130000		NA	NA	98200		NA	NA	72800		NA	NA	23000		NA	NA
Manganese	NA	1,300,000	Central Nervous System	1190		NA	9.2E-04	271		NA	2.1E-04	380		NA	2.9E-04	4370		NA	3.4E-03
Nickel	NA	4,100,000	Body Weight	26.6	J	NA	6.5E-06	8	J	NA	2.0E-06	2.1	J	NA	5.1E-07	20.6	J	NA	5.0E-06
Potassium	NA	NA	Essential Nutrient	65700	J	NA	NA	68100	J	NA	NA	28200	J	NA	NA	5600	J	NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	4.3	J	NA	1.8E-06	5.4		NA	2.3E-06	5	U	NA	NA	5	U	NA	NA
Sodium	NA	NA	Essential Nutrient	313000		NA	NA	298000		NA	NA	103000		NA	NA	33300		NA	NA
Vanadium	NA	360,000	Kidney	39.2	J	NA	1.1E-04	8.9	J	NA	2.5E-05	2.6	UJ	NA	NA	36.2	J	NA	1.0E-04
Zinc	NA	160,000,000	Blood	1080		NA	6.8E-06	137		NA	8.6E-07	11.5		NA	7.2E-08	555		NA	3.5E-06
PCBs (pg/L)																			
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma	9.43		2.5E-11	NA	0.20		5.4E-13	NA	46.0		1.2E-10	NA	1.50		3.9E-12	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer	557,328		4.6E-12	NA	58,059		4.8E-13	NA	1,185,302		9.9E-12	NA	237,494		2.0E-12	NA
Total Risk/Hazard Index						7.8E-09	1.9E-03			3.8E-09	7.7E-04			1.4E-09	5.2E-04			6.5E-09	4.0E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Risks for Construction Workers Exposed to Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-LD136							
				LDCA-PW-LD136-20130502 20130502				LDCA-PW-LD136-20130502-D 20130502			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	2	UJ	NA	NA	2	UJ	NA	NA
2-Methylnaphthalene	NA	11,000	Respiratory	5	UJ	NA	NA	5	UJ	NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	17	J	NA	2.1E-06	8	J	NA	9.8E-07
4-Methylphenol	NA	56,000	Liver	71	J	NA	1.3E-03	2.9	J	NA	5.2E-05
Acenaphthene	NA	540,000	Liver	5	UJ	NA	NA	5	UJ	NA	NA
Acenaphthylene	NA	290,000	None Reported	5	UJ	NA	NA	5	UJ	NA	NA
Anthracene	NA	77,000,000	Whole Body	2.8	J	NA	3.6E-08	5	UJ	NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	24	J	2.0E-12	1.7E-07	5.5	J	4.6E-13	3.9E-08
Benzo(a)anthracene	490,000	NA	Cancer	12	J	2.4E-11	NA	5	UJ	NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	11	J	2.2E-10	5.2E-05	5	UJ	NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	14	J	2.9E-11	NA	5	UJ	NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	9.8	J	NA	1.5E-07	5	UJ	NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	11	J	2.2E-12	NA	5	UJ	NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	11	J	3.1E-12	1.6E-07	5.4	J	1.5E-12	7.7E-08
Caprolactam	NA	1,400,000	Developmental	3.7	J	NA	2.6E-06	3.5	J	NA	2.5E-06
Carbazole	NA	NA	Cancer	4.4	J	NA	NA	5	UJ	NA	NA
Chrysene	49,000,000	NA	Cancer	16	J	3.3E-13	NA	2.8	J	5.7E-14	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	4.1	J	8.4E-11	NA	5	UJ	NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	2.5	J	NA	3.6E-09	5	UJ	NA	NA
Fluoranthene	NA	200,000	Kidney	29	J	NA	1.5E-04	5.3	J	NA	2.7E-05
Fluorene	NA	4,900,000	Blood	5	UJ	NA	NA	5	UJ	NA	NA
Indeno(1,2,3-cd)pyrene	490,000	NA	Cancer	9.3	J	1.9E-11	NA	5	UJ	NA	NA
Naphthalene	NA	3,700,000	Body Weight	5	UJ	NA	NA	5	UJ	NA	NA
Nitrobenzene	NA	250,000	Blood	5	UJ	NA	NA	5	UJ	NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5	UJ	NA	NA	5	UJ	NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10	UJ	NA	NA	10	UJ	NA	NA
Phenanthrene	NA	430,000	Kidney	17	J	NA	4.0E-05	2.5	J	NA	5.8E-06
Pyrene	NA	270,000	Kidney	22	J	NA	8.1E-05	3.8	J	NA	1.4E-05
Pesticides (ug/L)											
4,4'-DDD	120	NA	Cancer	0.054	J	4.5E-10	NA	0.052	J	4.3E-10	NA
4,4'-DDE	140,000	NA	Cancer	0.031	J	2.2E-13	NA	0.05	J	3.6E-13	NA
4,4'-DDT	140,000	350,000	Liver	0.039	J	2.8E-13	1.1E-07	0.064	J	4.6E-13	1.8E-07
Aldrin	2,900	28,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA
alpha-BHC	60	43,000	Liver	0.001	UJ	NA	NA	0.001	UJ	NA	NA
alpha-Chlordane	NA	1,200	Liver	0.39	J	NA	3.3E-04	0.4	J	NA	3.3E-04
beta-BHC	210	3,200	Cancer	0.001	UJ	NA	NA	0.001	UJ	NA	NA
delta-BHC	NA	43,000	Liver	0.005	UJ	NA	NA	0.005	UJ	NA	NA
Dieldrin	9.4	210	Liver	0.002	UJ	NA	NA	0.002	UJ	NA	NA
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005	UJ	NA	NA	0.005	UJ	NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endosulfan Sulfate	NA	90,000	Cardiovascular System, Urinary	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endrin	NA	7,900	Central Nervous System	0.01	UJ	NA	NA	0.01	UJ	NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.031	J	NA	7.6E-06	0.011	J	NA	2.7E-06
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01	UJ	NA	NA	0.01	UJ	NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005	UJ	NA	NA	0.005	UJ	NA	NA
gamma-Chlordane	NA	420,000	Liver	0.2	J	NA	4.8E-07	0.16	J	NA	3.8E-07
Heptachlor	8	52	Reproductive	0.001	UJ	NA	NA	0.001	UJ	NA	NA
Heptachlor Epoxide	24	41	Liver	0.022	J	9.2E-10	5.4E-04	0.002	UJ	NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05	UJ	NA	NA	0.05	UJ	NA	NA
Metals (ug/L)											
Aluminum	NA	470,000,000	Neuorological	6680		NA	1.4E-05	NA		NA	NA
Arsenic	22,000	140,000	Skin, Cardiovascular System	7.5	J	3.4E-10	5.4E-05	NA		NA	NA
Barium	NA	18,000,000	Neuorological	500		NA	2.8E-05	NA		NA	NA
Beryllium	NA	51,000	Gastrointestinal System	1.4		NA	2.7E-05	NA		NA	NA
Cadmium	NA	33,000	Urinary	2.5		NA	7.6E-05	NA		NA	NA
Calcium	NA	NA	Essential Nutrient	74500		NA	NA	NA		NA	NA
Chromium	2,500	89,000	None Reported	14.2		5.7E-09	1.6E-04	NA		NA	NA
Cobalt	NA	1,800,000	Thyroid	16.6	J	NA	9.2E-06	NA		NA	NA
Copper	NA	4,700,000	Gastrointestinal System	82.4	J	NA	1.8E-05	NA		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	38200	J	NA	1.2E-04	NA		NA	NA
Lead	NA	NA	Neuorological	263		NA	NA	NA		NA	NA
Magnesium	NA	NA	Essential Nutrient	26600		NA	NA	NA		NA	NA
Manganese	NA	1,300,000	Central Nervous System	4890		NA	3.8E-03	NA		NA	NA
Nickel	NA	4,100,000	Body Weight	24.2	J	NA	5.9E-06	NA		NA	NA
Potassium	NA	NA	Essential Nutrient	5900	J	NA	NA	NA		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	5	U	NA	NA	NA		NA	NA
Sodium	NA	NA	Essential Nutrient	34100		NA	NA	NA		NA	NA
Vanadium	NA	360,000	Kidney	44.1	J	NA	1.2E-04	NA		NA	NA
Zinc	NA	160,000,000	Blood	613		NA	3.8E-06	NA		NA	NA
PCBs (pg/L)											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma	1.29		3.4E-12	NA				
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer	40,162		3.3E-13	NA				
Total Risk/Hazard Index						7.8E-09	6.9E-03			4.4E-10	4.4E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

September 2013

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-0301									PW-0302						PW-0303		
				LDCA-PW-0301-00-20130909 20130909				LDCA-PW-0301-02-20130909 20130909				LDCA-PW-0301-02-20130909-D 20130909				LDCA-PW-0302-00-20130909 20130909				LDCA-PW-0302-02-20130909 20130909				LDCA-PW-0303-00-20130909 20130909		
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																										
1,4-Dioxane	420	160,000	Liver, Kidney	0.59 J		1.4E-09	3.7E-06	8.9		2.1E-08	5.6E-05	9.6		2.3E-08	6.0E-05	2.5 U		NA	NA	7.8		1.9E-08	4.9E-05	2.5 U		NA	NA
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	3,100	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																										
2-Methylnaphthalene	NA	780	Respiratory	0.017 J		NA	2.2E-05	0.01 J		NA	1.3E-05	0.012 J		NA	1.5E-05	0.012 J		NA	1.5E-05	0.035 J		NA	4.5E-05	0.0056 J		NA	7.2E-06
Acenaphthene	NA	11,000	Liver	0.033 J		NA	3.0E-06	0.094 J		NA	8.5E-06	0.1		NA	9.1E-06	0.028 J		NA	2.5E-06	0.11		NA	1.0E-05	0.01 J		NA	9.1E-07
Acenaphthylene	NA	11,000	None Reported	0.012 J		NA	1.1E-06	0.021 J		NA	1.9E-06	0.024 J		NA	2.2E-06	0.1 U		NA	NA	0.018 J		NA	1.6E-06	0.1 U		NA	NA
Anthracene	NA	31,000	Whole Body	0.077 J		NA	2.5E-06	0.098		NA	3.2E-06	0.11		NA	3.5E-06	0.011 J		NA	3.5E-07	0.15		NA	4.8E-06	0.1 U		NA	NA
Benzo(a)anthracene	14	NA	Cancer	0.1 U		NA	NA	0.038 J		2.7E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.09 J		6.4E-09	NA	0.018 J		1.3E-09	NA
Benzo(a)pyrene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.035 J		2.5E-08	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.054 J		3.9E-09	NA	0.028 J		2.0E-09	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.018 J		NA	1.1E-07	0.013 J		NA	7.6E-08
Benzo(k)fluoranthene	140	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.021 J		1.5E-10	NA	0.011 J		7.9E-11	NA
Chrysene	1,400	NA	Cancer	0.1 U		NA	NA	0.043 J		3.1E-11	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.076 J		5.4E-11	NA	0.019 J		1.4E-11	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	230,000	Kidney	0.037 J		NA	1.6E-07	0.052 J		NA	2.3E-07	0.04 J		NA	1.7E-07	0.03 J		NA	1.3E-07	0.16		NA	7.0E-07	0.047 J		NA	2.0E-07
Fluorene	NA	5,800	Blood	0.035 J		NA	6.0E-06	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.071 J		NA	1.2E-05	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.019 J		1.4E-09	NA	0.011 J		7.9E-10	NA
Naphthalene	NA	8,100	Body Weight	0.046 J		NA	5.7E-06	0.015 J		NA	1.9E-06	0.016 J		NA	2.0E-06	0.044 J		NA	5.4E-06	0.094 J		NA	1.2E-05	0.022 J		NA	2.7E-06
Pentachlorophenol	1	370	Reproductive	0.11 J		1.0E-07	3.0E-04	0.2 R		NA	NA	0.2 R		NA	NA	0.041 J		3.7E-08	1.1E-04	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	0.045 J		NA	1.5E-05	0.073 J		NA	2.4E-05	0.098		NA	3.2E-05	0.032 J		NA	1.0E-05	0.23		NA	7.4E-05	0.018 J		NA	5.8E-06
Pyrene	NA	1,900	Kidney	0.032 J		NA	1.7E-05	0.098		NA	5.2E-05	0.092 J		NA	4.8E-05	0.053 J		NA	2.8E-05	0.21		NA	1.1E-04	0.043 J		NA	2.3E-05
Pesticides (ug/L)																										
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.011		7.9E-11	3.9E-06	0.0026 J		1.9E-11	9.3E-07	0.0089 J		6.4E-11	3.2E-06
Aldrin	3	170	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
alpha-Chlordane	2	70	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0019 J		8.3E-10	2.7E-05	0.005 U		NA	NA	0.005 U		NA	NA
beta-BHC	1	NA	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	0	2,900	Liver	0.001 J		2.9E-09	3.4E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	0	8	Liver	0.0099		1.8E-07	1.3E-03	0.0057 J		1.0E-07	7.5E-04	0.0052 J		9.5E-08	6.8E-04	0.012		2.2E-07	1.6E-03	0.0094		1.7E-07	1.2E-03	0.0096		1.7E-07	1.3E-03
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.001 J		NA	1.5E-07	0.001 J		NA	1.5E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.0045 J		NA	6.9E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.0037 J		NA	5.7E-07	0.01 U		NA	NA	0.0024 J		NA	3.7E-07
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.0013 J		NA	1.6E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0015 J		1.2E-11	5.4E-07	0.0016 J		1.2E-11	5.7E-07	0.005 U		NA	NA
Heptachlor	0	19	Reproductive	0.001 J		2.1E-08	5.3E-05	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	0	3	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.0022 J		1.6E-08	7.6E-04	0.002 U		NA	NA	0.002 U		NA	NA
Methoxychlor	NA	730	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																										
TEQ	360	4,000	Lymphoma	10 U		NA	NA	10 U		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																										
Aluminum	NA	4,800,000	Neurological	40		NA	8.3E-06	101		NA	2.1E-05	20 U		NA	NA	20 U		NA	NA	20 U		NA	NA	20 U		NA	NA
Arsenic	25	1,400	Skin, Cardiovascular System	14.7 J+		5.9E-07	1.1E-02	8.1 J+		3.2E-07	5.8E-03	8.4 J+		3.4E-07	6.0E-03	3.3 J+		1.3E-07	2.4E-03	11.4 J+		4.6E-07	8.1E-03	1.2 J+		4.8E-08	8.6E-04
Barium	NA	310,000	Neurological	469		NA	1.5E-03	466		NA	1.5E-03	453		NA	1.5E-03	112		NA	3.6E-04	480		NA	1.5E-03	95.7		NA	3.1E-04
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	475		NA	4.9E-04	952		NA	9.9E-04	948		NA	9.9E-04	41.6		NA	4.3E-05	946		NA	9.9E-04	43.5		NA	4.5E-05
Calcium	NA	NA	Essential Nutrient	106000		NA	NA	127000		NA	NA	122000		NA	NA	39200		NA	NA	97500		NA	NA	37400		NA	NA
Chromium	1	1,100	None Reported	0.84 J		8.4E-07	7.6E-04	2.7		2.7E-06	2.5E-03	1.9 J		1.9E-06	1.7E-03	0.19 J		1.9E-07	1.7E-04	0.91 J		9.1E-07	8.3E-04	0.2 J		2.0E-07	1.8E-04
Cobalt	NA	1,600	Thyroid	3.1		NA	1.9E-03	2.3		NA	1.4E-03	2.1		NA	1.3E-03	1.8		NA	1.1E-03	1.6		NA	1.0E-03	1 U		NA	NA
Copper	NA	190,000	Gastrointestinal System	2 UJ		NA	NA	2.7		NA	1.4E-05	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	81500		NA	2.5E-02	76000		NA	2.3E-02	72300		NA	2.2E-02	2500		NA	7.6E-04	78700		NA	2.4E-02	1230		NA	3.7E-04
Lead	NA	NA	Neurological	4		NA	NA	9.3		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Magnesium	NA	NA	Essential Nutrient	45800		NA	NA	64100		NA	NA	60400		NA	NA	16100		NA	NA	61400		NA	NA	16700		NA	NA
Manganese	NA	24,000	Central Nervous System	3200		NA	1.3E-01	2360		NA	9.8E-02	2360		NA	9.8E-02	1100		NA	4.6E-02	1960		NA	8.2E-02	280		NA	1.2E-02
Mercury	NA	460	Central Nervous System	0.13 J		NA	2.8E-04	0.12 J		NA	2.6E-04	0.099 J		NA	2.2E-04	0.13 J		NA	2.8E-04	0.2 U		NA	NA	0.13 J		NA	2.8E-04
Nickel	NA	58,000	Body Weight	2.5 J		NA	4.3E-05	2.4 J		NA	4.1E-05	1.6 J		NA	2.8E-05	1.9 J		NA	3.3E-05	1.6 J		NA	2.8E-05	0.98 J		NA	1.7E-05
Potassium	NA	NA	Essential Nutrient	11400		NA	NA	16500		NA	NA	16100		NA	NA	5210		NA	NA	14300		NA	NA	4560		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	60800 J		NA	NA	131000 J		NA	NA	126000 J		NA	NA	39000 J		NA	NA	107000 J		NA	NA	40000 J		NA	NA
Vanadium	NA	3,500	Kidney	2.6 U		NA	NA	2.6 UJ		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA
Zinc	NA	1,500,000	Blood	7.6		NA	5.1E-06	11		NA	7.3E-06	12		NA	8.0E-06	9.6		NA	6.4E-06	3.2		NA	2.1E-06	7.3		NA	4.9E-06
PCBs (pg/L)																										
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	0.0015		2.9E-12	3.7E-07	0.0019		3.6E-12	4.6E-07	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	3126		2.6E-11	NA	6844		5.7E-11	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Risk/Hazard Index						1.7E-06	1.8E-01			3.2E-06	1.3E-01			2.4E-06	1.3E-01			5.9E-07	5.4E-02			1.6E-06	1.2E-01			4.3E-07	1.5E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-0303 LDCA-PW-0303-02-20130909 20130909				PW-1001 LDCA-PW-1001-00-20130911 20130911				LDCA-PW-1001-02-20130911 20130911				LDCA-PW-1001-02-20130911-D 20130911				LDCA-PW-1001-04-20130911 20130911				LDCA-PW-1002-00-20130911 20130911			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	420	160,000	Liver, Kidney	4.5		1.1E-08	2.8E-05	0.54 J		1.3E-09	3.4E-06	11		2.6E-08	6.9E-05	5.2 J		1.2E-08	3.3E-05	51		1.2E-07	3.2E-04	2.5 U		NA	NA
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA	10 U		NA	NA
Phenanthrene	NA	3,100	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	780	Respiratory	0.018 J		NA	2.3E-05	0.017 J		NA	2.2E-05	0.024 J		NA	3.1E-05	0.014 J		NA	1.8E-05	0.074 J		NA	9.5E-05	0.01 J		NA	1.3E-05
Acenaphthene	NA	11,000	Liver	0.11		NA	1.0E-05	0.031 J		NA	2.8E-06	0.1		NA	9.1E-06	0.088 J		NA	8.0E-06	0.21 J		NA	1.9E-05	0.029 J		NA	2.6E-06
Acenaphthylene	NA	11,000	None Reported	0.011 J		NA	1.0E-06	0.1 U		NA	NA	0.04 J		NA	3.6E-06	0.028 J		NA	2.5E-06	0.063 J		NA	5.7E-06	0.1 U		NA	NA
Anthracene	NA	31,000	Whole Body	0.091 J		NA	2.9E-06	0.018 J		NA	5.8E-07	0.079 J		NA	2.5E-06	0.07 J		NA	2.3E-06	0.33		NA	1.1E-05	0.021 J		NA	6.8E-07
Benzo(a)anthracene	14	NA	Cancer	0.086 J		6.1E-09	NA	0.1 U		NA	NA	0.046 J		3.3E-09	NA	0.1 U		NA	NA	0.069 J		4.9E-09	NA	0.0068 J		4.9E-10	NA
Benzo(a)pyrene	1	NA	Cancer	0.052 J		3.7E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.073 J		5.2E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.032 J		NA	1.9E-07	0.1 U		NA	NA	0.0065 J		NA	3.8E-08	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA
Benzo(k)fluoranthene	140	NA	Cancer	0.024 J		1.7E-10	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Chrysene	1,400	NA	Cancer	0.067 J		4.8E-11	NA	0.1 U		NA	NA	0.032 J		2.3E-11	NA	0.1 U		NA	NA	0.023 J		1.6E-11	NA	0.0065 J		4.6E-12	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.0072 J		5.1E-09	NA	0.1 U		NA	NA	0.0095 J		6.8E-09	NA	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	230,000	Kidney	0.17		NA	7.4E-07	0.027 J		NA	1.2E-07	0.047 J		NA	2.0E-07	0.044 J		NA	1.9E-07	0.12		NA	5.2E-07	0.047 J		NA	2.0E-07
Fluorene	NA	5,800	Blood	0.043 J		NA	7.4E-06	0.024 J		NA	4.1E-06	0.049 J		NA	8.4E-06	0.041 J		NA	7.1E-06	0.23 J		NA	4.0E-05	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.031 J		2.2E-09	NA	0.1 U		NA	NA	0.0079 J		5.6E-10	NA	0.1 U		NA	NA	0.017 J		1.2E-09	NA	0.1 U		NA	NA
Naphthalene	NA	8,100	Body Weight	0.065 J		NA	8.0E-06	0.033 J		NA	4.2E-06	0.1 U		NA	NA	0.017 J		NA	2.1E-06	0.1 U		NA	NA	0.1 U		NA	NA
Pentachlorophenol	1	370	Reproductive	0.2 R		NA	NA	0.064 J		5.8E-08	1.7E-04	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	0.18		NA	5.8E-05	0.033 J		NA	1.1E-05	0.11		NA	3.5E-05	0.1		NA	3.2E-05	0.47		NA	1.5E-04	0.026 J		NA	8.4E-06
Pyrene	NA	1,900	Kidney	0.21		NA	1.1E-04	0.045 J		NA	2.4E-05	0.071 J		NA	3.7E-05	0.034 J		NA	1.8E-05	0.23		NA	1.2E-04	0.061 J		NA	3.2E-05
Pesticides (ug/L)																											
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0034 J		2.4E-11	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.0022 J		1.6E-11	7.9E-07	0.0092 J		6.6E-11	3.3E-06	0.01 U		NA	NA	0.01 U		NA	NA	0.002 J		1.4E-11	7.1E-07	0.013 J		9.3E-11	4.6E-06
Aldrin	3	170	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0013 J		4.6E-10	7.6E-06	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0016 J		4.7E-09	5.5E-07	0.001 U		NA	NA
alpha-Chlordane	2	70	Liver	0.005 U		NA	NA	0.0023 J		1.0E-09	3.3E-05	0.0022 J		9.6E-10	3.1E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.0023 J		1.0E-09	3.3E-05
beta-BHC	1	NA	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.0039 J		3.3E-09	NA	0.001 U		NA	NA	0.0023 J		1.9E-09	NA	0.001 U		NA	NA
delta-BHC	0	2,900	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 J		1.5E-08	1.7E-06	0.0053		1.6E-08	1.8E-06	0.0066 J		1.9E-08	2.3E-06	0.005 U		NA	NA
Dieldrin	0	8	Liver	0.0047 J		8.5E-08	6.2E-04	0.013		2.4E-07	1.7E-03	0.0074 J		1.3E-07	9.7E-04	0.0079 J		1.4E-07	1.0E-03	0.0042 J		7.6E-08	5.5E-04	0.016		2.9E-07	2.1E-03
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0017 J		NA	2.6E-07	0.005 U		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.0031 J		NA	4.8E-07	0.0024 J		NA	3.7E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.0026 J		NA	4.0E-07	0.0036 J		NA	5.5E-07
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.0024 J		NA	2.9E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0031 J		NA	3.8E-05	0.01 U		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0015 J		7.5E-10	1.4E-05	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 U		NA	NA	0.0013 J		1.0E-11	4.6E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0013 J		1.0E-11	4.6E-07
Heptachlor	0	19	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	0	3	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.0021		1.5E-08	7.2E-04
Methoxychlor	NA	730	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	360	4,000	Lymphoma	NA		NA	NA	10 U		NA	NA	NA		NA	NA	NA		NA	NA	0.072		2.0E-10	1.8E-05	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	4,800,000	Neurological	1420		NA	3.0E-04	10.2 J		NA	2.1E-06	1.4 J		NA	2.9E-07	1.6 J		NA	3.3E-07	34.6		NA	7.2E-06	20 U		NA	NA
Arsenic	25	1,400	Skin, Cardiovascular System	6.8 J+		2.7E-07	4.9E-03	10 J+		4.0E-07	7.1E-03	1.1 J+		4.4E-08	7.9E-04	1.2 J+		4.8E-08	8.6E-04	6.2 J+		2.5E-07	4.4E-03	4.2 J+		1.7E-07	3.0E-03
Barium	NA	310,000	Neurological	472		NA	1.5E-03	401 J		NA	1.3E-03	143 J		NA	4.6E-04	143 J		NA	4.6E-04	438		NA	1.4E-03	217		NA	7.0E-04
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	642		NA	6.7E-04	285		NA	3.0E-04	2040		NA	2.1E-03	1720		NA	1.8E-03	5830		NA	6.1E-03	62.6		NA	6.5E-05
Calcium	NA	NA	Essential Nutrient	94700		NA	NA	95400		NA	NA	126000		NA	NA	106000		NA	NA	143000		NA	NA	38300		NA	NA
Chromium	1	1,100	None Reported	20.6		**2.1E-05**	1.9E-02	0.83 J		8.3E-07	7.5E-04	1.4 J		1.4E-06	1.3E-03	1.5 J		1.5E-06	1.4E-03	10		**1.0E-05**	9.1E-03	0.17 J		1.7E-07	1.5E-04
Cobalt	NA	1,600	Thyroid	3		NA	1.9E-03	7.6		NA	4.8E-03	1.8		NA	1.1E-03	1.7		NA	1.1E-03	7.9		NA	4.9E-03	2.1		NA	1.3E-03
Copper	NA	190,000	Gastrointestinal System	10.8		NA	5.7E-05	0.29 J-		NA	1.5E-06	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	45900		NA	1.4E-02	23800		NA	7.2E-03	8860		NA	2.7E-03	10000		NA	3.0E-03	41400		NA	1.3E-02	3530		NA	1.1E-03
Lead	NA	NA	Neurological	183		NA	NA	0.8 J		NA	NA	1 UJ		NA	NA	0.23 J		NA	NA	1.8		NA	NA	1 U		NA	NA
Magnesium	NA	NA	Essential Nutrient	56400		NA	NA	35600		NA	NA	69500		NA	NA	60000		NA	NA	124000		NA	NA	15600		NA	NA
Manganese	NA	24,000	Central Nervous System	2440		NA	1.0E-01	4430		NA	1.8E-01	2410		NA	1.0E-01	2060		NA	8.6E-02	744		NA	3.1E-02	1340		NA	5.6E-02
Mercury	NA	460	Central Nervous System	0.11 J		NA	2.4E-04	0.035 J		NA	7.6E-05	0.2 U		NA	NA	0.037 J		NA	8.0E-05	0.054 J		NA	1.2E-04	0.058 J		NA	1.3E-04
Nickel	NA	58,000	Body Weight	11.5 J		NA	2.0E-04	5.4		NA	9.3E-05	2.1		NA	3.6E-05	1.8		NA	3.1E-05	5.4 J		NA	9.3E-05	2 J		NA	3.4E-05
Potassium	NA	NA	Essential Nutrient	8960		NA	NA	9910		NA	NA	21200		NA	NA	21500		NA	NA	74600		NA	NA	5680		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	5 U		NA	NA	1.2 J		NA	5.0E-05	2.9 J		NA	1.2E-04	2.8 J		NA	1.2E-04	7.9 J		NA	3.3E-04	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	93400 J		NA	NA	51200		NA	NA	136000		NA	NA	117000		NA	NA	358000 J		NA	NA	39800 J		NA	NA
Vanadium	NA	3,500	Kidney	12.5		NA	3.6E-03	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	5.5 J		NA	1.6E-03	2.6 U		NA	NA
Zinc	NA	1,500,000	Blood	133		NA	8.9E-05	21.3 J		NA	1.4E-05	2.8 J		NA	1.9E-06	1.7 J		NA	1.1E-06	4.5		NA	3.0E-06	13.9		NA	9.3E-06
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	0.0023		4.5E-12	5.8E-07	NA		NA	NA	NA		NA	NA	0.130		2.5E-10	3.3E-05	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	4626		3.9E-11	NA	NA		NA	NA	NA		NA	NA	27397		2.3E-10	NA	NA		NA	NA
Total Risk/Hazard Index						**2.1E-05**	1.5E-01			1.5E-06	2.1E-01			1.6E-06	1.1E-01			1.7E-06	9.6E-02			**1.0E-05**	7.3E-02			6.5E-07	6.5E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-1002 LDCA-PW-1002-02-20130911 20130911				PW-1002 LDCA-PW-1002-04-20130911 20130911				PW-1003 LDCA-PW-1003-00-20130910 20130910				PW-1003 LDCA-PW-1003-02-20130910 20130910				PW-1601 LDCA-PW-1601-00-20130911 20130911				PW-1601 LDCA-PW-1601-02-20130911 20130911			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	420	160,000	Liver, Kidney	2.1 J		5.0E-09	1.3E-05	37		8.8E-08	2.3E-04	2.5 U		NA	NA	2.5 U		NA	NA	2.5 U		NA	NA	20		4.8E-08	1.3E-04
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	3,100	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	780	Respiratory	0.0091 J		NA	1.2E-05	0.047 J		NA	6.0E-05	0.1 U		NA	NA	0.013 J		NA	1.7E-05	0.0068 J		NA	8.7E-06	0.079 J		NA	1.0E-04
Acenaphthene	NA	11,000	Liver	0.066 J		NA	6.0E-06	0.23		NA	2.1E-05	0.1 U		NA	NA	0.062 J		NA	5.6E-06	0.056 J		NA	5.1E-06	0.14		NA	1.3E-05
Acenaphthylene	NA	11,000	None Reported	0.013 J		NA	1.2E-06	0.075 J		NA	6.8E-06	0.1 U		NA	NA	0.0075 J		NA	6.8E-07	0.0078 J		NA	7.1E-07	0.059 J		NA	5.4E-06
Anthracene	NA	31,000	Whole Body	0.06 J		NA	1.9E-06	0.55		NA	1.8E-05	0.1 U		NA	NA	0.036 J		NA	1.2E-06	0.019 J		NA	6.1E-07	0.16		NA	5.2E-06
Benzo(a)anthracene	14	NA	Cancer	0.016 J		1.1E-09	NA	0.055 J		3.9E-09	NA	0.1 U		NA	NA	0.04 J		2.9E-09	NA	0.015 J		1.1E-09	NA	0.052 J		3.7E-09	NA
Benzo(a)pyrene	1	NA	Cancer	0.1 U		NA	NA	0.015 J		1.1E-08	NA	0.1 U		NA	NA	0.031 J		2.2E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.0097 J		6.9E-10	NA	0.026 J		1.9E-09	NA	0.1 U		NA	NA	0.054 J		3.9E-09	NA	0.015 J		1.1E-09	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.1 U		NA	NA	0.0065 J		NA	3.8E-08	0.1 U		NA	NA	0.023 J		NA	1.4E-07	0.0075 J		NA	4.4E-08	0.1 U		NA	NA
Benzo(k)fluoranthene	140	NA	Cancer	0.1 U		NA	NA	0.012 J		8.6E-11	NA	0.1 U		NA	NA	0.021 J		1.5E-10	NA	0.0063 J		4.5E-11	NA	0.1 U		NA	NA
Chrysene	1,400	NA	Cancer	0.011 J		7.9E-12	NA	0.018 J		1.3E-11	NA	0.1 U		NA	NA	0.034 J		2.4E-11	NA	0.015 J		1.1E-11	NA	0.025 J		1.8E-11	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	230,000	Kidney	0.053 J		NA	2.3E-07	0.089 J		NA	3.9E-07	0.021 J		NA	9.1E-08	0.12		NA	5.2E-07	0.047 J		NA	2.0E-07	0.078 J		NA	3.4E-07
Fluorene	NA	5,800	Blood	0.1 U		NA	NA	0.19		NA	3.3E-05	0.1 U		NA	NA	0.06 J		NA	1.0E-05	0.1 U		NA	NA	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.1 U		NA	NA	0.0071 J		5.1E-10	NA	0.1 U		NA	NA	0.022 J		1.6E-09	NA	0.0068 J		4.9E-10	NA	0.1 U		NA	NA
Naphthalene	NA	8,100	Body Weight	0.1 U		NA	NA	0.1 U		NA	NA	0.022 J		NA	2.7E-06	0.058 J		NA	7.2E-06	0.1 U		NA	NA	0.1 U		NA	NA
Pentachlorophenol	1	370	Reproductive	0.2 R		NA	NA	0.056 J		5.1E-08	1.5E-04	0.2 R		NA	NA	0.13 J		1.2E-07	3.5E-04	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	0.045 J		NA	1.5E-05	0.25		NA	8.1E-05	0.019 J		NA	6.1E-06	0.073 J		NA	2.4E-05	0.023 J		NA	7.4E-06	0.053 J		NA	1.7E-05
Pyrene	NA	1,900	Kidney	0.044 J		NA	2.3E-05	0.11		NA	5.8E-05	0.051 J		NA	2.7E-05	0.12		NA	6.3E-05	0.084 J		NA	4.4E-05	0.095 J		NA	5.0E-05
Pesticides (ug/L)																											
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0028 J		3.9E-09	NA
4,4'-DDE	140	NA	Cancer	0.01 U		NA	NA	0.0012 J		8.6E-12	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01		7.1E-11	3.6E-06	0.011		7.9E-11	3.9E-06	0.015 J		1.1E-10	5.4E-06	0.0053 J		3.8E-11	1.9E-06
Aldrin	3	170	Liver	0.005 U		NA	NA	0.0021 J		7.5E-10	1.2E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0015		4.4E-09	5.2E-07
alpha-Chlordane	2	70	Liver	0.0019 J		8.3E-10	2.7E-05	0.005 U		NA	NA	0.0021 J		9.1E-10	3.0E-05	0.002 J		8.7E-10	2.9E-05	0.0035 J		1.5E-09	5.0E-05	0.005 U		NA	NA
beta-BHC	1	NA	Cancer	0.001 U		NA	NA	0.0035 J		2.9E-09	NA	0.0027		2.3E-09	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0031 J		2.6E-09	NA
delta-BHC	0	2,900	Liver	0.005 U		NA	NA	0.0042 J		1.2E-08	1.4E-06	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	0	8	Liver	0.0097		1.8E-07	1.3E-03	0.0058 J		1.1E-07	7.6E-04	0.014		2.5E-07	1.8E-03	0.011		2.0E-07	1.4E-03	0.02		3.6E-07	2.6E-03	0.0034 J		6.2E-08	4.5E-04
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 U		NA	NA	0.0021 J		NA	3.2E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.0013 J		NA	2.0E-07	0.005 U		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.01 U		NA	NA	0.01 U		NA	NA	0.0048 J		NA	7.4E-07	0.01 U		NA	NA	0.0047 J		NA	7.2E-07	0.0019 J		NA	2.9E-07
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.0021 J		NA	4.6E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.0019 J		NA	2.3E-05	0.0022 J		NA	2.7E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0017 J		NA	2.7E-05	0.01 U		NA	NA
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.0015 J		7.5E-10	1.4E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 U		NA	NA	0.0018 J		1.4E-11	6.4E-07	0.0012 J		9.2E-12	4.3E-07	0.0014 J		1.1E-11	5.0E-07	0.0025 J		1.9E-11	8.9E-07	0.0041 J		3.2E-11	1.5E-06
Heptachlor	0	19	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0011 J		2.3E-08	5.8E-05	0.0036		7.5E-08	1.9E-04
Heptachlor Epoxide	0	3	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.0021 J		1.5E-08	7.2E-04	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA
Methoxychlor	NA	730	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.0061 J		NA	8.4E-06
Dioxins/Furans (pg/L)																											
TEQ	360	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	10 U		NA	NA	0.144		4.0E-10	3.6E-05
Metals (ug/L)																											
Aluminum	NA	4,800,000	Neurological	29.1		NA	6.1E-06	20 U		NA	NA	11.2 J		NA	2.3E-06	20.4		NA	4.3E-06	18.4 J		NA	3.8E-06	26.9		NA	5.6E-06
Arsenic	25	1,400	Skin, Cardiovascular System	7.5 J+		3.0E-07	5.4E-03	3.3 J+		1.3E-07	2.4E-03	0.55 J+		2.2E-08	3.9E-04	4.1 J+		1.6E-07	2.9E-03	1.6 J+		6.4E-08	1.1E-03	3.5 J+		1.4E-07	2.5E-03
Barium	NA	310,000	Neurological	258		NA	8.3E-04	230		NA	7.4E-04	97.8 J		NA	3.2E-04	102 J		NA	3.3E-04	96.8 J		NA	3.1E-04	96.2 J		NA	3.1E-04
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	559		NA	5.8E-04	5670		NA	5.9E-03	29.2		NA	3.0E-05	24.2		NA	2.5E-05	48.1		NA	5.0E-05	805		NA	8.4E-04
Calcium	NA	NA	Essential Nutrient	65600		NA	NA	150000		NA	NA	38600		NA	NA	37800		NA	NA	36800		NA	NA	36200		NA	NA
Chromium	1	1,100	None Reported	0.84 J		8.4E-07	7.6E-04	7.7		7.7E-06	7.0E-03	2 U		NA	NA	0.28 J		2.8E-07	2.5E-04	0.26 J		2.6E-07	2.4E-04	7.2		7.2E-06	6.5E-03
Cobalt	NA	1,600	Thyroid	1 U		NA	NA	7		NA	4.4E-03	0.5 J		NA	3.1E-04	0.72 J		NA	4.5E-04	0.54 J		NA	3.4E-04	2.1		NA	1.3E-03
Copper	NA	190,000	Gastrointestinal System	2 UJ		NA	NA	2 UJ		NA	NA	0.93 J		NA	4.9E-06	0.094 J		NA	4.9E-07	0.92 J		NA	4.8E-06	0.11 J-		NA	5.8E-07
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	31500		NA	9.5E-03	8420		NA	2.6E-03	34 J		NA	1.0E-05	5890		NA	1.8E-03	1080		NA	3.3E-04	2030		NA	6.2E-04
Lead	NA	NA	Neurological	2.4		NA	NA	1 U		NA	NA	0.41 J		NA	NA	0.58 J		NA	NA	1.9		NA	NA	1.4		NA	NA
Magnesium	NA	NA	Essential Nutrient	25600		NA	NA	119000		NA	NA	15500		NA	NA	14300		NA	NA	14500		NA	NA	19900		NA	NA
Manganese	NA	24,000	Central Nervous System	1690		NA	7.0E-02	647		NA	2.7E-02	357		NA	1.5E-02	958		NA	4.0E-02	433		NA	1.8E-02	213		NA	8.9E-03
Mercury	NA	460	Central Nervous System	0.13 J		NA	2.8E-04	0.064 J		NA	1.4E-04	0.043 J		NA	9.3E-05	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
Nickel	NA	58,000	Body Weight	0.75 J		NA	1.3E-05	4.7 J		NA	8.1E-05	1.1		NA	1.9E-05	0.95 J		NA	1.6E-05	1.2		NA	2.1E-05	3		NA	5.2E-05
Potassium	NA	NA	Essential Nutrient	10900		NA	NA	80900		NA	NA	4570		NA	NA	4360		NA	NA	4740		NA	NA	23200		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	5 U		NA	NA	6.8 J		NA	2.8E-04	0.55 J		NA	2.3E-05	0.48 J		NA	2.0E-05	0.64 J		NA	2.7E-05	2.6 J		NA	1.1E-04
Sodium	NA	NA	Essential Nutrient	53100 J		NA	NA	306000 J		NA	NA	37300		NA	NA	29300		NA	NA	34700		NA	NA	144000		NA	NA
Vanadium	NA	3,500	Kidney	2.6 UJ		NA	NA	2.6 UJ		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	5.2 U		NA	NA	6.5 J		NA	1.9E-03
Zinc	NA	1,500,000	Blood	4.3		NA	2.9E-06	1.6 J		NA	1.1E-06	7 J		NA	4.7E-06	3.9 J		NA	2.6E-06	7.6 J		NA	5.1E-06	2 J		NA	1.3E-06
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	0.0029		5.7E-12	7.3E-07	0.072		1.4E-10	1.8E-05
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	5289		4.4E-11	NA	18840		1.6E-10	NA
Total Risk/Hazard Index						1.3E-06	8.9E-02			8.1E-06	5.2E-02			2.9E-07	1.9E-02			7.9E-07	4.8E-02			7.1E-07	2.3E-02			7.5E-06	2.4E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-1602 LDCA-PW-1602-00-20130911 20130911				PW-1602 LDCA-PW-1602-02-20130911 20130911				PW-1602 LDCA-PW-1602-04-20130911 20130911				LDCA-PW-1603-00-20130912 20130912				LDCA-PW-1603-00-20130912-D 20130912				PW-1603 LDCA-PW-1603-02-20130912 20130912			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	420	160,000	Liver, Kidney	2.5 U		NA	NA	2.5 U		NA	NA	170		4.0E-07	1.1E-03	2.5 U		NA	NA	2.5 U		NA	NA	32		7.6E-08	2.0E-04
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	5 U		NA	NA	5 U		NA	NA	2.5 J		NA	8.1E-05	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	1.5 J		NA	1.9E-04	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA	10 U		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	3,100	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	780	Respiratory	0.1 U		NA	NA	0.0085 J		NA	1.1E-05	0.24		NA	3.1E-04	0.1 U		NA	NA	0.1 U		NA	NA	0.055 J		NA	7.1E-05
Acenaphthene	NA	11,000	Liver	0.1 U		NA	NA	0.059 J		NA	5.4E-06	0.12 J		NA	1.1E-05	0.022 J		NA	2.0E-06	0.0089 J		NA	8.1E-07	0.26		NA	2.4E-05
Acenaphthylene	NA	11,000	None Reported	0.1 U		NA	NA	0.0063 J		NA	5.7E-07	0.084 J		NA	7.6E-06	0.1 U		NA	NA	0.1 U		NA	NA	0.035 J		NA	3.2E-06
Anthracene	NA	31,000	Whole Body	0.013 J		NA	NA	0.026 J		NA	8.4E-07	0.79		NA	2.5E-05	0.1 U		NA	NA	0.1 U		NA	NA	0.36		NA	1.2E-05
Benzo(a)anthracene	14	NA	Cancer	0.1 U		NA	NA	0.026 J		1.9E-09	NA	0.28		2.0E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.084 J		6.0E-09	NA
Benzo(a)pyrene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.052 J		3.7E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.1 U		NA	NA	0.02 J		1.4E-09	NA	0.084 J		6.0E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.1 U		NA	NA	0.0066 J		NA	3.9E-08	0.012 J		NA	7.1E-08	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Benzo(k)fluoranthene	140	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.038 J		2.7E-10	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Chrysene	1,400	NA	Cancer	0.1 U		NA	NA	0.019 J		1.4E-11	NA	0.059 J		4.2E-11	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.029 J		2.1E-11	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Fluoranthene	NA	230,000	Kidney	0.011 J		NA	4.8E-08	0.086 J		NA	3.7E-07	0.22		NA	9.6E-07	0.027 J		NA	1.2E-07	0.028 J		NA	1.2E-07	0.12		NA	5.2E-07
Fluorene	NA	5,800	Blood	0.1 U		NA	NA	0.1 U		NA	NA	0.12 J		NA	2.1E-05	0.1 U		NA	NA	0.1 U		NA	NA	0.072 J		NA	1.2E-05
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.1 U		NA	NA	0.0071 J		5.1E-10	NA	0.015 J		1.1E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Naphthalene	NA	8,100	Body Weight	0.1 U		NA	NA	0.1 U		NA	NA	0.88		NA	1.1E-04	0.1 U		NA	NA	0.1 U		NA	NA	0.12		NA	1.5E-05
Pentachlorophenol	1	370	Reproductive	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	0.0073 J		NA	2.4E-06	0.039 J		NA	1.3E-05	0.18		NA	5.8E-05	0.0081 J		NA	2.6E-06	0.1 U		NA	NA	0.022 J		NA	7.1E-06
Pyrene	NA	1,900	Kidney	0.1 U		NA	NA	0.11		NA	5.8E-05	0.45		NA	2.4E-04	0.056 J		NA	2.9E-05	0.029 J		NA	1.5E-05	0.14		NA	7.4E-05
Pesticides (ug/L)																											
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.0013 J		9.3E-12	NA	0.0011 J		7.9E-12	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.0097 J		6.9E-11	3.5E-06	0.003 J		2.1E-11	1.1E-06	0.0041 J		2.9E-11	1.5E-06	0.0067 J		4.8E-11	2.4E-06	0.0021 J		1.5E-11	7.5E-07	0.0073 J		5.2E-11	2.6E-06
Aldrin	3	170	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.0019 J		5.6E-09	6.6E-07	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
alpha-Chlordane	2	70	Liver	0.0024 J		1.0E-09	3.4E-05	0.0022 J		9.6E-10	3.1E-05	0.0027 J		1.2E-09	3.9E-05	0.005 U		NA	NA	0.0022 J		9.6E-10	3.1E-05	0.005 U		NA	NA
beta-BHC	1	NA	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.0026 J		2.2E-09	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	0	2,900	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	0	8	Liver	0.017		3.1E-07	2.2E-03	0.0073		1.3E-07	9.6E-04	0.002 U		NA	NA	0.011		2.0E-07	1.4E-03	0.012		2.2E-07	1.6E-03	0.0052		9.5E-08	6.8E-04
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 U		NA	NA	0.005 U		NA	NA	0.0025 J		NA	3.8E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.0027 J		NA	4.2E-07	0.0034 J		NA	5.2E-07	0.01 U		NA	NA	0.0022 J		NA	3.4E-07	0.0022 J		NA	3.4E-07	0.01 U		NA	NA
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.0014 J		NA	3.0E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.0049 J		NA	6.0E-05	0.0018 J		NA	2.2E-05	0.0012 J		NA	1.5E-05	0.0014 J		NA	1.7E-05
Endrin Ketone	NA	63	Central Nervous System, Liver	0.0028 J		NA	4.4E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.0017 J		NA	2.7E-05	0.0021 J		NA	3.3E-05	0.01 U		NA	NA
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.0015 J		7.5E-10	1.4E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 U		NA	NA	0.0019 J		1.5E-11	6.8E-07	0.0023 J		1.8E-11	8.2E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Heptachlor	0	19	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.0039		8.1E-08	2.1E-04	0.001 U		NA	NA	0.001 U		NA	NA	0.0015		3.1E-08	7.9E-05
Heptachlor Epoxide	0	3	Liver	0.0026 J		1.9E-08	9.0E-04	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.0018 J		1.3E-08	6.2E-04	0.002 U		NA	NA
Methoxychlor	NA	730	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.0055 J		NA	7.5E-06	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	360	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	4,800,000	Neurological	20 UJ		NA	NA	20 U		NA	NA	91.4		NA	1.9E-05	12.7 J		NA	2.6E-06	15.2 J		NA	3.2E-06	16 J		NA	3.3E-06
Arsenic	25	1,400	Skin, Cardiovascular System	0.72 J+		2.9E-08	5.1E-04	1.9 J+		7.6E-08	1.4E-03	6.9 J+		2.8E-07	4.9E-03	1.4 J+		5.6E-08	1.0E-03	1.4 J+		5.6E-08	1.0E-03	6.8 J+		2.7E-07	4.9E-03
Barium	NA	310,000	Neurological	86 J		NA	2.8E-04	100		NA	3.2E-04	447		NA	1.4E-03	106 J		NA	3.4E-04	117 J		NA	3.8E-04	301 J		NA	9.7E-04
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	31.2		NA	3.3E-05	38.5		NA	4.0E-05	1160		NA	1.2E-03	36.6		NA	3.8E-05	34.9		NA	3.6E-05	218		NA	2.3E-04
Calcium	NA	NA	Essential Nutrient	38600 J		NA	NA	40100		NA	NA	24200		NA	NA	36100		NA	NA	38400		NA	NA	80800		NA	NA
Chromium	1	1,100	None Reported	0.13 J		1.3E-07	1.2E-04	0.51 J		5.1E-07	4.6E-04	18.2		**1.8E-05**	1.7E-02	0.19 J		1.9E-07	1.7E-04	0.16 J		1.6E-07	1.5E-04	4.1		4.1E-06	3.7E-03
Cobalt	NA	1,600	Thyroid	1 U		NA	NA	1 U		NA	NA	21.9		NA	1.4E-02	0.2 J		NA	1.3E-04	0.2 J		NA	1.3E-04	3.6		NA	2.3E-03
Copper	NA	190,000	Gastrointestinal System	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	1.3 J		NA	6.8E-06	1.6 J		NA	8.4E-06	0.12 J		NA	6.3E-07
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	71.1 J		NA	2.2E-05	5250		NA	1.6E-03	20500		NA	6.2E-03	384		NA	1.2E-04	358		NA	1.1E-04	31800		NA	9.6E-03
Lead	NA	NA	Neurological	1 UJ		NA	NA	1 U		NA	NA	4.6		NA	NA	0.64 J		NA	NA	0.87 J		NA	NA	0.74 J		NA	NA
Magnesium	NA	NA	Essential Nutrient	16700 J		NA	NA	16700		NA	NA	19200		NA	NA	15000		NA	NA	15300		NA	NA	36500		NA	NA
Manganese	NA	24,000	Central Nervous System	11.9		NA	5.0E-04	449		NA	1.9E-02	386		NA	1.6E-02	78.8		NA	3.3E-03	82.2		NA	3.4E-03	1250		NA	5.2E-02
Mercury	NA	460	Central Nervous System	0.2 U		NA	NA	0.094 J		NA	2.0E-04	0.065 J		NA	1.4E-04	0.2 U		NA	NA	0.044 J		NA	9.6E-05	0.042 J		NA	9.1E-05
Nickel	NA	58,000	Body Weight	0.84 J		NA	1.4E-05	0.67 J		NA	1.2E-05	48.3 J		NA	8.3E-04	0.85 J		NA	1.5E-05	0.96 J		NA	1.7E-05	5.6		NA	9.7E-05
Potassium	NA	NA	Essential Nutrient	4500 J		NA	NA	5000		NA	NA	47700		NA	NA	4390		NA	NA	4570		NA	NA	26700		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	20.3 J		NA	8.5E-04	0.75 J		NA	3.1E-05	0.9 J		NA	3.8E-05	6.3		NA	2.6E-04
Sodium	NA	NA	Essential Nutrient	39400 J		NA	NA	39600 J		NA	NA	627000 J		NA	NA	36800		NA	NA	37800		NA	NA	173000		NA	NA
Vanadium	NA	3,500	Kidney	5.2 U		NA	NA	2.6 U		NA	NA	5.5		NA	1.6E-03	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA
Zinc	NA	1,500,000	Blood	9.4		NA	6.3E-06	3.4		NA	2.3E-06	7.3		NA	4.9E-06	8.6 J		NA	5.7E-06	15.9 J		NA	1.1E-05	2.9 J		NA	1.9E-06
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Risk/Hazard Index						4.9E-07	4.7E-03			7.2E-07	2.4E-02			**1.9E-05**	6.6E-02			4.5E-07	6.7E-03			4.5E-07	7.7E-03			4.6E-06	7.5E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	LDCA-PW-1603-04-20130912 20130912				LDCA-PW-1603-04-20130912-D 20130912				PW-1802 LDCA-PW-1802-00-20130913 20130913				PW-1802 LDCA-PW-1802-02-20130913 20130913				PW-1803 LDCA-PW-1803-00-20130913 20130913				PW-2501 LDCA-PW-2501-00-20130912 20130912			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	420	160,000	Liver, Kidney	180		4.3E-07	1.1E-03	160		3.8E-07	1.0E-03	2.5 UJ		NA	NA	2.5 UJ		NA	NA	2.5 U		NA	NA	70		1.7E-07	4.4E-04
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	1.4 J		NA	1.3E-04	1.1 J		NA	1.0E-04	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	2.5 J		NA	8.1E-05	2.4 J		NA	7.7E-05	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	3 J		6.3E-10	1.1E-05	2.1 J		4.4E-10	7.5E-06	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	1 J		NA	1.7E-04	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 U		NA	NA	5 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	3,100	Kidney	1.5 J		NA	4.8E-04	1.5 J		NA	4.8E-04	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	780	Respiratory	0.58		NA	7.4E-04	0.4		NA	5.1E-04	0.0069 J		NA	8.8E-06	0.0081 J		NA	1.0E-05	0.01 J		NA	1.3E-05	0.062 J		NA	7.9E-05
Acenaphthene	NA	11,000	Liver	0.1 J		NA	9.1E-06	0.11 J		NA	1.0E-05	0.1 U		NA	NA	0.014 J		NA	1.3E-06	0.1 U		NA	NA	0.031 J		NA	2.8E-06
Acenaphthylene	NA	11,000	None Reported	0.1 U		NA	NA	0.018 J		NA	1.6E-06	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.12		NA	1.1E-05
Anthracene	NA	31,000	Whole Body	0.91		NA	2.9E-05	1.5		NA	4.8E-05	0.011 J		NA	3.5E-07	0.021 J		NA	6.8E-07	0.033 J		NA	1.1E-06	0.45		NA	1.5E-05
Benzo(a)anthracene	14	NA	Cancer	0.16		1.1E-08	NA	0.16 J		1.1E-08	NA	0.012 J		8.6E-10	NA	0.017 J		1.2E-09	NA	0.01 J		7.1E-10	NA	0.1		7.1E-09	NA
Benzo(a)pyrene	1	NA	Cancer	0.025 J		1.8E-08	NA	0.041 J		2.9E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.047 J		3.4E-09	NA	0.069 J		4.9E-09	NA	0.016 J		1.1E-09	NA	0.015 J		1.1E-09	NA	0.017 J		1.2E-09	NA	0.015 J		1.1E-09	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.0071 J		NA	4.2E-08	0.0096 J		NA	5.6E-08	0.0059 J		NA	3.5E-08	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 UJ		NA	NA
Benzo(k)fluoranthene	140	NA	Cancer	0.1 U		NA	NA	0.036 J		2.6E-10	NA	0.0075 J		5.4E-11	NA	0.1 U		NA	NA	0.0055 J		3.9E-11	NA	0.0061 J		4.4E-11	NA
Chrysene	1,400	NA	Cancer	0.033 J		2.4E-11	NA	0.022 J		1.6E-11	NA	0.016 J		1.1E-11	NA	0.019 J		1.4E-11	NA	0.017 J		1.2E-11	NA	0.011 J		7.9E-12	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.1 UJ		NA	NA	0.1 R		7.1E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Fluoranthene	NA	230,000	Kidney	0.44		NA	1.9E-06	0.46 J		NA	2.0E-06	0.031 J		NA	1.3E-07	0.046 J		NA	2.0E-07	0.03 J		NA	1.3E-07	0.055 J		NA	2.4E-07
Fluorene	NA	5,800	Blood	0.09 J		NA	1.6E-05	0.074 J		NA	1.3E-05	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.0075 J		5.4E-10	NA	0.012 J		8.6E-10	NA	0.0065 J		4.6E-10	NA	0.1 U		NA	NA	0.0051 J		3.6E-10	NA	0.0052 J		3.7E-10	NA
Naphthalene	NA	8,100	Body Weight	0.67		NA	8.3E-05	0.61		NA	7.5E-05	0.023 J		NA	2.8E-06	0.028 J		NA	3.5E-06	0.015 J		NA	1.9E-06	0.11		NA	1.4E-05
Pentachlorophenol	1	370	Reproductive	0.2 R		NA	NA	0.2 R		NA	NA	0.11 J		1.0E-07	3.0E-04	0.042 J		3.8E-08	1.1E-04	0.14 J		1.3E-07	3.8E-04	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	1		NA	3.2E-04	1.9		NA	6.1E-04	0.018 J		NA	5.8E-06	0.056 J		NA	1.8E-05	0.022 J		NA	7.1E-06	0.04 J		NA	1.3E-05
Pyrene	NA	1,900	Kidney	0.4		NA	2.1E-04	0.43 J		NA	2.3E-04	0.052 J		NA	2.7E-05	0.09 J		NA	4.7E-05	0.031 J		NA	1.6E-05	0.09 J		NA	4.7E-05
Pesticides (ug/L)																											
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140	NA	Cancer	0.0022 J		1.6E-11	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.018 J		1.3E-10	6.4E-06	0.012 J		8.6E-11	4.3E-06	0.0021 J		1.5E-11	7.5E-07	0.0016 J		1.1E-11	5.7E-07	0.0047 J		3.4E-11	1.7E-06	0.012 J		8.6E-11	4.3E-06
Aldrin	3	170	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0012 J		3.5E-09	4.1E-07
alpha-Chlordane	2	70	Liver	0.005 U		NA	NA	0.0019 J		8.3E-10	2.7E-05	0.0027 J		1.2E-09	3.9E-05	0.0016 J		7.0E-10	2.3E-05	0.0024 J		1.0E-09	3.4E-05	0.005 U		NA	NA
beta-BHC	1	NA	Cancer	0.0043 J		3.6E-09	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	0	2,900	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0016 J		4.7E-09	5.5E-07
Dieldrin	0	8	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.014 J		2.5E-07	1.8E-03	0.0066		1.2E-07	8.7E-04	0.017 J		3.1E-07	2.2E-03	0.012 J		2.2E-07	1.6E-03
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.0011 J		NA	1.7E-07	0.0011 J		NA	1.7E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0022 J		NA	3.4E-07
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.01 U		NA	NA	0.01 U		NA	NA	0.0031 J		NA	4.8E-07	0.0019 J		NA	2.9E-07	0.0022 J		NA	3.4E-07	0.0028 J		NA	4.3E-07
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0017 J		NA	3.7E-05
Endrin Aldehyde	NA	82	Central Nervous System	0.0022 J		NA	2.7E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0012 J		NA	1.5E-05	0.01 U		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.0019 J		NA	3.0E-05	0.0016 J		NA	2.5E-05	0.0029 J		NA	4.6E-05	0.0018 J		NA	2.9E-05
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.007 J		5.4E-11	2.5E-06	0.005 U		NA	NA	0.0021 J		1.6E-11	7.5E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.0028 J		2.2E-11	1.0E-06
Heptachlor	0	19	Reproductive	0.0063 J		1.3E-07	3.3E-04	0.004 J		8.3E-08	2.1E-04	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	0	3	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.0021		1.5E-08	7.2E-04	0.002 U		NA	NA	0.0023		1.6E-08	7.9E-04	0.0018 J		1.3E-08	6.2E-04
Methoxychlor	NA	730	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.0055 J		NA	7.5E-06
Dioxins/Furans (pg/L)																											
TEQ	360	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	4,800,000	Neurological	81.6		NA	1.7E-05	45.2		NA	9.4E-06	75.9		NA	1.6E-05	20.5		NA	4.3E-06	120 J		NA	2.5E-05	41.7		NA	8.7E-06
Arsenic	25	1,400	Skin, Cardiovascular System	7.8 J+		3.1E-07	5.6E-03	7.8 J+		3.1E-07	5.6E-03	1.1 J+		4.4E-08	7.9E-04	0.76 J+		3.0E-08	5.4E-04	0.76 J+		3.0E-08	5.4E-04	10.7 J+		4.3E-07	7.6E-03
Barium	NA	310,000	Neurological	637 J		NA	2.1E-03	643 J		NA	2.1E-03	52.1 J		NA	1.7E-04	63.1 J		NA	2.0E-04	33.5 J		NA	1.1E-04	635 J		NA	2.0E-03
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	626		NA	6.5E-04	657		NA	6.8E-04	30.7		NA	3.2E-05	42.8		NA	4.5E-05	21.9		NA	2.3E-05	3400		NA	3.5E-03
Calcium	NA	NA	Essential Nutrient	58900		NA	NA	62900		NA	NA	22200		NA	NA	38300		NA	NA	15000 J		NA	NA	97200		NA	NA
Chromium	1	1,100	None Reported	16.8		**1.7E-05**	1.5E-02	16.4		**1.6E-05**	1.5E-02	0.39 J		3.9E-07	3.5E-04	0.21 J		2.1E-07	1.9E-04	0.57 J		5.7E-07	5.2E-04	10.4		**1.0E-05**	9.5E-03
Cobalt	NA	1,600	Thyroid	20.3		NA	1.3E-02	20.8		NA	1.3E-02	0.34 J		NA	2.1E-04	0.93 J		NA	5.8E-04	1 U		NA	NA	17		NA	1.1E-02
Copper	NA	190,000	Gastrointestinal System	0.67 J		NA	3.5E-06	0.38 J-		NA	2.0E-06	5.3		NA	2.8E-05	0.62 J		NA	3.3E-06	8.8 J		NA	4.6E-05	2.2		NA	1.2E-05
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	26.6		NA	9.2E-03	21.5 J		NA	7.4E-03	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	2 J		NA	6.9E-04
Iron	NA	3,300,000	Gastrointestinal System	34700		NA	1.1E-02	33900		NA	1.0E-02	293		NA	8.9E-05	49.6 J		NA	1.5E-05	252		NA	7.6E-05	7450		NA	2.3E-03
Lead	NA	NA	Neurological	10.1		NA	NA	3.2		NA	NA	2.6		NA	NA	7.6		NA	NA	4.8 J		NA	NA	4.4		NA	NA
Magnesium	NA	NA	Essential Nutrient	37100		NA	NA	35200		NA	NA	7730		NA	NA	13900		NA	NA	5760 J		NA	NA	60700		NA	NA
Manganese	NA	24,000	Central Nervous System	850		NA	3.5E-02	887		NA	3.7E-02	147		NA	1.1E-03	138		NA	5.8E-03	10		NA	4.2E-04	5020		NA	2.1E-01
Mercury	NA	460	Central Nervous System	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA	0.047 J		NA	1.0E-04	0.034 J		NA	7.4E-05	0.2 U		NA	NA
Nickel	NA	58,000	Body Weight	36.1		NA	6.2E-04	36.4		NA	6.3E-04	1.1		NA	1.9E-05	1.7		NA	2.9E-05	0.97 J		NA	1.7E-05	40.8		NA	7.0E-04
Potassium	NA	NA	Essential Nutrient	66900		NA	NA	69600		NA	NA	3820		NA	NA	4470		NA	NA	3250 J		NA	NA	82200		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	24.1		NA	1.0E-03	25.8		NA	1.1E-03	0.5 J		NA	2.1E-05	0.3 J		NA	1.3E-05	5 U		NA	NA	9.1		NA	3.8E-04
Sodium	NA	NA	Essential Nutrient	695000		NA	NA	694000		NA	NA	19300		NA	NA	28400		NA	NA	13000 J		NA	NA	412000		NA	NA
Vanadium	NA	3,500	Kidney	7.2		NA	2.1E-03	6.9		NA	2.0E-03	2.6 U		NA	NA	5.2 U		NA	NA	2.6 U		NA	NA	7.2		NA	2.1E-03
Zinc	NA	1,500,000	Blood	14.3 J		NA	9.5E-06	7.6 J		NA	5.1E-06	13.5 J		NA	9.0E-06	32.8 J		NA	2.2E-05	12		NA	8.0E-06	39.7 J		NA	2.6E-05
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Risk/Hazard Index						**1.8E-05**	9.9E-02			**1.7E-05**	9.8E-02			8.1E-07	1.1E-02			4.0E-07	8.6E-03			1.1E-06	5.4E-03			**1.1E-05**	2.5E-01

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-2501 LDCA-PW-2501-02-20130912 20130912				PW-2502 LDCA-PW-2502-00-20130912 20130912				LDCA-PW-2502-02-20130912 20130912				PW-2503 LDCA-PW-2503-00-20130912 20130912				LDCA-PW-2503-02-20130912 20130912				PW-3301 LDCA-PW-3301-00-20130910 20130910			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	420	160,000	Liver, Kidney	89		2.1E-07	5.6E-04	31		7.4E-08	1.9E-04	100		2.4E-07	6.3E-04	3.4		8.1E-09	2.1E-05	63		1.5E-07	3.9E-04	2.5 U		NA	NA
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	1.3 J		NA	6.8E-06	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	1.3 J		NA	4.2E-05	5 U		NA	NA	1.2 J		NA	3.9E-05	5 U		NA	NA	1.8 J		NA	5.8E-05	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	2.6 J		5.4E-10	9.3E-06	5 U		NA	NA	1.9 J		4.0E-10	6.8E-06	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	3,100	Kidney	1.3 J		NA	4.2E-04	5 U		NA	NA	1.2 J		NA	3.9E-04	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	780	Respiratory	0.048 J		NA	6.2E-05	0.058 J		NA	7.4E-05	0.072 J		NA	9.2E-05	0.011 J		NA	1.4E-05	0.065 J		NA	8.3E-05	0.1 U		NA	NA
Acenaphthene	NA	11,000	Liver	0.18		NA	1.6E-05	0.047 J		NA	4.3E-06	0.19		NA	1.7E-05	0.018 J		NA	1.6E-06	0.15		NA	1.4E-05	0.1 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	0.65		NA	5.9E-05	0.058 J		NA	5.3E-06	0.15		NA	1.4E-05	0.0087 J		NA	7.9E-07	0.12		NA	1.1E-05	0.1 U		NA	NA
Anthracene	NA	31,000	Whole Body	0.55		NA	1.8E-05	0.16		NA	5.2E-06	0.7		NA	2.3E-05	0.1 U		NA	NA	0.5		NA	1.6E-05	0.1 U		NA	NA
Benzo(a)anthracene	14	NA	Cancer	0.11		7.9E-09	NA	0.037 J		2.6E-09	NA	0.2		1.4E-08	NA	0.0076 J		5.4E-10	NA	0.14		1.0E-08	NA	0.1 U		NA	NA
Benzo(a)pyrene	1	NA	Cancer	0.1 UJ		NA	NA	0.1 U		NA	NA	0.017 J		1.2E-08	NA	0.1 U		NA	NA	0.011 J		7.9E-09	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.034 J		2.4E-09	NA	0.1 U		NA	NA	0.018 J		1.3E-09	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.1 UJ		NA	NA	0.1 U		NA	NA	0.0071 J		NA	4.2E-08	0.1 U		NA	NA	0.0066 J		NA	3.9E-08	0.1 U		NA	NA
Benzo(k)fluoranthene	140	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.013 J		9.3E-11	NA	0.1 U		NA	NA	0.011 J		7.9E-11	NA	0.1 U		NA	NA
Chrysene	1,400	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.034 J		2.4E-11	NA	0.1 U		NA	NA	0.016 J		1.1E-11	NA	0.1 U		NA	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	230,000	Kidney	0.07 J		NA	3.0E-07	0.03 J		NA	1.3E-07	0.1		NA	4.3E-07	0.015 J		NA	6.5E-08	0.11		NA	4.8E-07	0.021 J		NA	9.1E-08
Fluorene	NA	5,800	Blood	0.6		NA	1.0E-04	0.1 U		NA	NA	0.2		NA	3.4E-05	0.1 U		NA	NA	0.2		NA	3.4E-05	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.03 J		2.1E-09	NA	0.1 U		NA	NA	0.0076 J		5.4E-10	NA	0.1 U		NA	NA	0.0074 J		5.3E-10	NA	0.1 U		NA	NA
Naphthalene	NA	8,100	Body Weight	0.25		NA	3.1E-05	0.1 U		NA	NA	0.15		NA	1.9E-05	0.1 U		NA	NA	0.23		NA	2.8E-05	0.018 J		NA	2.2E-06
Pentachlorophenol	1	370	Reproductive	0.2 R		NA	NA	0.042 J		3.8E-08	1.1E-04	0.58 J		5.3E-07	1.6E-03	0.2 R		NA	NA	0.2 U		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	0.081 J		NA	2.6E-05	0.061 J		NA	2.0E-05	0.17		NA	5.5E-05	0.025 J		NA	8.1E-06	0.31		NA	1.0E-04	0.014 J		NA	4.5E-06
Pyrene	NA	1,900	Kidney	0.1 U		NA	NA	0.073 J		NA	3.8E-05	0.18		NA	9.5E-05	0.048 J		NA	2.5E-05	0.15		NA	7.9E-05	0.049 J		NA	2.6E-05
Pesticides (ug/L)																											
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140	NA	Cancer	0.0013 J		9.3E-12	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0022 J		1.6E-11	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.0051 J		3.6E-11	1.8E-06	0.013 J		9.3E-11	4.6E-06	0.0043 J		3.1E-11	1.5E-06	0.0084 J		6.0E-11	3.0E-06	0.0076		5.4E-11	2.7E-06	0.01		7.1E-11	3.6E-06
Aldrin	3	170	Liver	0.0031 J		1.1E-09	1.8E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0042 J		1.5E-09	2.5E-05	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.0028 J		8.2E-09	9.7E-07	0.001 U		NA	NA	0.0013 J		3.8E-09	4.5E-07	0.001 U		NA	NA	0.0013 J		3.2E-09	3.8E-07	0.001 U		NA	NA
alpha-Chlordane	2	70	Liver	0.005 U		NA	NA	0.0019 J		8.3E-10	2.7E-05	0.005 U		NA	NA	0.0018 J		7.8E-10	2.6E-05	0.005 U		NA	NA	0.002 J		8.7E-10	2.9E-05
beta-BHC	1	NA	Cancer	0.0025 J		2.1E-09	NA	0.001 U		NA	NA	0.011 J		9.2E-09	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	0	2,900	Liver	0.0018 J		5.3E-09	6.2E-07	0.001 J		2.9E-09	3.4E-07	0.0035 J		1.0E-08	1.2E-06	0.005 U		NA	NA	0.0019 J		5.6E-09	6.6E-07	0.005 U		NA	NA
Dieldrin	0	8	Liver	0.013 J		2.4E-07	1.7E-03	0.015		2.7E-07	2.0E-03	0.016		2.9E-07	2.1E-03	0.012		2.2E-07	1.6E-03	0.012		2.2E-07	1.6E-03	0.014		2.5E-07	1.8E-03
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.0043 J		NA	6.6E-07	0.005 U		NA	NA	0.0038 J		NA	5.8E-07	0.005 U		NA	NA	0.0025 J		NA	3.8E-07	0.005 U		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.0024 J		NA	3.7E-07	0.0036 J		NA	5.5E-07	0.0027 J		NA	4.2E-07	0.0026 J		NA	4.0E-07	0.0026 J		NA	4.0E-07	0.0043 J		NA	6.6E-07
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.0018 J		NA	3.9E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.0032 J		NA	3.9E-05	0.0015 J		NA	1.8E-05	0.0025 J		NA	3.0E-05	0.01 U		NA	NA	0.0023 J		NA	2.8E-05	0.01 U		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0016 J		NA	2.5E-05	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0026 J		1.3E-09	2.4E-05	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.0028 J		2.2E-11	1.0E-06	0.005 U		NA	NA	0.0055 J		4.2E-11	2.0E-06	0.0011 J		8.5E-12	3.9E-07	0.0068		5.2E-11	2.4E-06	0.005 U		NA	NA
Heptachlor	0	19	Reproductive	0.0019 J		4.0E-08	1.0E-04	0.001 U		NA	NA	0.0032 J		6.7E-08	1.7E-04	0.001 U		NA	NA	0.0027 J		5.6E-08	1.4E-04	0.001 U		NA	NA
Heptachlor Epoxide	0	3	Liver	0.002 U		NA	NA	0.0021 J		1.5E-08	7.2E-04	0.002 U		NA	NA	0.0019 J		1.4E-08	6.6E-04	0.0026 J		1.9E-08	9.0E-04	0.002 J		1.4E-08	6.9E-04
Methoxychlor	NA	730	Developmental	0.0082 J		NA	1.1E-05	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	360	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	4,800,000	Neurological	34.5		NA	7.2E-06	11.3 J		NA	2.4E-06	229		NA	4.8E-05	23		NA	4.8E-06	69.4		NA	1.4E-05	22.6		NA	4.7E-06
Arsenic	25	1,400	Skin, Cardiovascular System	26.5 J+		1.1E-06	1.9E-02	7.2 J+		2.9E-07	5.1E-03	17.3 J+		6.9E-07	1.2E-02	2.2 J+		8.8E-08	1.6E-03	17.3 J+		6.9E-07	1.2E-02	0.74 J+		3.0E-08	5.3E-04
Barium	NA	310,000	Neurological	574 J		NA	1.9E-03	414 J		NA	1.3E-03	567 J		NA	1.8E-03	224 J		NA	7.2E-04	420 J		NA	1.4E-03	114		NA	3.7E-04
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	0.051 J		NA	1.2E-04	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	6040		NA	6.3E-03	856		NA	8.9E-04	5840		NA	6.1E-03	338		NA	3.5E-04	7310		NA	7.6E-03	44.2		NA	4.6E-05
Calcium	NA	NA	Essential Nutrient	48200		NA	NA	88300		NA	NA	60100		NA	NA	56000		NA	NA	27400		NA	NA	36100		NA	NA
Chromium	1	1,100	None Reported	18.2		**1.8E-05**	1.7E-02	2.8		2.8E-06	2.5E-03	14.2		**1.4E-05**	1.3E-02	1.2 J		1.2E-06	1.1E-03	13.2		**1.3E-05**	1.2E-02	2 U		NA	NA
Cobalt	NA	1,600	Thyroid	17.7		NA	1.1E-02	7.4		NA	4.6E-03	11.3		NA	7.1E-03	2.2		NA	1.4E-03	9.3		NA	5.8E-03	1 U		NA	NA
Copper	NA	190,000	Gastrointestinal System	1.3 J		NA	6.8E-06	1 J		NA	5.3E-06	4.4		NA	2.3E-05	1.9 J		NA	1.0E-05	1.9 J		NA	1.0E-05	2 UJ		NA	NA
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	8.2 J		NA	2.8E-03	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	1.2E-03	NA		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	15200		NA	4.6E-03	7950		NA	2.4E-03	19000		NA	5.8E-03	486		NA	1.5E-04	9300		NA	2.8E-03	33.1 J-		NA	1.0E-05
Lead	NA	NA	Neurological	4.9		NA	NA	1.1		NA	NA	19		NA	NA	1.6		NA	NA	2.9		NA	NA	1 U		NA	NA
Magnesium	NA	NA	Essential Nutrient	81100		NA	NA	35400		NA	NA	55700		NA	NA	21600		NA	NA	41400		NA	NA	14200		NA	NA
Manganese	NA	24,000	Central Nervous System	3210		NA	1.3E-01	3850		NA	1.6E-01	2450		NA	1.0E-01	840		NA	3.5E-02	987		NA	4.1E-02	582		NA	2.4E-02
Mercury	NA	460	Central Nervous System	0.2 U		NA	NA	0.2 U		NA	NA	0.035 J		NA	7.6E-05	0.2 U		NA	NA	0.034 J		NA	7.4E-05	0.1 J		NA	2.2E-04
Nickel	NA	58,000	Body Weight	30.5		NA	5.3E-04	17.2		NA	3.0E-04	31.7		NA	5.5E-04	6.4		NA	1.1E-04	33.3		NA	5.7E-04	1.4 J		NA	2.4E-05
Potassium	NA	NA	Essential Nutrient	147000		NA	NA	20700		NA	NA	148000		NA	NA	8480		NA	NA	169000		NA	NA	4860		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	12.1		NA	5.0E-04	4 J		NA	1.7E-04	12.4		NA	5.2E-04	1.6 J		NA	6.7E-05	11.6		NA	4.8E-04	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	651000		NA	NA	181000		NA	NA	727000		NA	NA	88200		NA	NA	723000		NA	NA	42900 J		NA	NA
Vanadium	NA	3,500	Kidney	14		NA	4.0E-03	5.2 U		NA	NA	7.9		NA	2.3E-03	5.2 U		NA	NA	9.2		NA	2.6E-03	2.6 U		NA	NA
Zinc	NA	1,500,000	Blood	33.7 J		NA	2.2E-05	16.1 J		NA	1.1E-05	49 J		NA	3.3E-05	17.7 J		NA	1.2E-05	3.8 J		NA	2.5E-06	9.2		NA	6.1E-06
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Risk/Hazard Index						**2.0E-05**	2.0E-01			3.5E-06	1.8E-01			**1.6E-05**	1.6E-01			1.5E-06	4.3E-02			**1.4E-05**	9.2E-02			3.0E-07	2.8E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Lifetime Recreational Users Exposed to Pore Water (Septemebr 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-3301 LDCA-PW-3301-02-20130910 20130910				PW-3302 LDCA-PW-3302-00-20130910 20130910				LDCA-PW-3302-02-20130910 20130910				LDCA-PW-3302-04-20130910 20130910				PW-3303 LDCA-PW-3303-00-20130910 20130910				LDCA-PW-3303-02-20130910 20130910			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	420	160,000	Liver, Kidney	2.5 U		NA	NA	2.5 U		NA	NA	2.5 U		NA	NA	0.15 J		3.6E-10	9.4E-07	2.5 UJ		NA	NA	0.23 J		5.5E-10	1.4E-06
2-Methylnaphthalene	NA	780	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	94,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	190,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	11,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	11,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	31,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	4,800	280,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	10	1,700	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	1,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,400	110,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	2,200,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	10,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	10	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	20,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	230,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	5,800	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	100	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	8,100	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	4,500	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	960	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	1	370	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	3,100	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	1,900	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	780	Respiratory	0.0072 J		NA	9.2E-06	0.0085 J		NA	1.1E-05	0.0052 J		NA	6.7E-06	0.016 J		NA	2.1E-05	0.0069 J		NA	8.8E-06	0.006 J		NA	7.7E-06
Acenaphthene	NA	11,000	Liver	0.022 J		NA	2.0E-06	0.026 J		NA	2.4E-06	0.13		NA	1.2E-05	0.24		NA	2.2E-05	0.028 J		NA	2.5E-06	0.48		NA	4.4E-05
Acenaphthylene	NA	11,000	None Reported	0.1 U		NA	NA	0.0051 J		NA	4.6E-07	0.01 J		NA	9.1E-07	0.016 J		NA	1.5E-06	0.0058 J		NA	5.3E-07	0.012 J		NA	1.1E-06
Anthracene	NA	31,000	Whole Body	0.023 J		NA	7.4E-07	0.1 U		NA	NA	0.028 J		NA	9.0E-07	0.041 J		NA	1.3E-06	0.02 J		NA	6.5E-07	0.064 J		NA	2.1E-06
Benzo(a)anthracene	14	NA	Cancer	0.013 J		9.3E-10	NA	0.0055 J		3.9E-10	NA	0.07 J		5.0E-09	NA	0.08 J		5.7E-09	NA	0.1 U		NA	NA	0.0081 J		5.8E-10	NA
Benzo(a)pyrene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.04 J		2.9E-08	NA	0.045 J		3.2E-08	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	14	NA	Cancer	0.0095 J		6.8E-10	NA	0.1 U		NA	NA	0.055 J		3.9E-09	NA	0.066 J		4.7E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	170,000	Kidney	0.1 U		NA	NA	0.1 U		NA	NA	0.019 J		NA	1.1E-07	0.026 J		NA	1.5E-07	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(k)fluoranthene	140	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.021 J		1.5E-10	NA	0.019 J		1.4E-10	NA	0.1 U		NA	NA	0.1 U		NA	NA
Chrysene	1,400	NA	Cancer	0.011 J		7.9E-12	NA	0.0057 J		4.1E-12	NA	0.056 J		4.0E-11	NA	0.063 J		4.5E-11	NA	0.1 U		NA	NA	0.0059 J		4.2E-12	NA
Dibenzo(a,h)anthracene	1	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.0063 J		4.5E-09	NA	0.007 J		5.0E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	230,000	Kidney	0.061 J		NA	2.7E-07	0.029 J		NA	1.3E-07	0.11		NA	4.8E-07	0.12		NA	5.2E-07	0.035 J		NA	1.5E-07	0.055 J		NA	2.4E-07
Fluorene	NA	5,800	Blood	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	14	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.019 J		1.4E-09	NA	0.026 J		1.9E-09	NA	0.1 U		NA	NA	0.1 U		NA	NA
Naphthalene	NA	8,100	Body Weight	0.029 J		NA	3.5E-06	0.036 J		NA	4.4E-06	0.02 J		NA	2.5E-06	0.032 J		NA	4.0E-06	0.014 J		NA	1.7E-06	0.016 J		NA	2.0E-06
Pentachlorophenol	1	370	Reproductive	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	3,100	Kidney	0.047 J		NA	1.5E-05	0.028 J		NA	9.0E-06	0.034 J		NA	1.1E-05	0.089 J		NA	2.9E-05	0.015 J		NA	4.8E-06	0.09 J		NA	2.9E-05
Pyrene	NA	1,900	Kidney	0.076 J		NA	4.0E-05	0.024 J		NA	1.3E-05	0.16		NA	8.4E-05	0.18		NA	9.5E-05	0.03 J		NA	1.6E-05	0.093 J		NA	4.9E-05
Pesticides (ug/L)																											
4,4'-DDD	1	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140	2,800	Liver	0.0014 J		1.0E-11	5.0E-07	0.0072 J		5.1E-11	2.6E-06	0.01 U		NA	NA	0.0016 J		1.1E-11	5.7E-07	0.0083 J		5.9E-11	3.0E-06	0.01 U		NA	NA
Aldrin	3	170	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	0	2,900	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
alpha-Chlordane	2	70	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.0026 J		1.1E-09	3.7E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
beta-BHC	1	NA	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	0	2,900	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	0	8	Liver	0.008		1.5E-07	1.1E-03	0.012 J		2.2E-07	1.6E-03	0.0094		1.7E-07	1.2E-03	0.0023 J		4.2E-08	3.0E-04	0.012		2.2E-07	1.6E-03	0.0045		8.2E-08	5.9E-04
Endosulfan I	NA	6,500	Cardiovascular System, Urinary	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Endosulfan II	NA	6,500	Cardiovascular System, Urinary	0.01 U		NA	NA	0.0025 J		NA	3.8E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.0032 J		NA	4.9E-07	0.01 U		NA	NA
Endrin	NA	46	Central Nervous System	0.01 U		NA	NA	0.0016 J		NA	3.5E-05	0.01 U		NA	NA	0.01 U		NA	NA	0.003 J		NA	6.5E-05	0.01 U		NA	NA
Endrin Aldehyde	NA	82	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0027 J		NA	3.3E-05	0.01 U		NA	NA
Endrin Ketone	NA	63	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	2	110	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	130	2,800	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.0021 J		1.6E-11	7.5E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Heptachlor	0	19	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0012		2.5E-08	6.3E-05	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	0	3	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA
Methoxychlor	NA	730	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	360	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	4,800,000	Neurological	84.2		NA	1.8E-05	20 U		NA	NA	54.3		NA	1.1E-05	103		NA	2.1E-05	20 U		NA	NA	20 U		NA	NA
Arsenic	25	1,400	Skin, Cardiovascular System	8.1 J+		3.2E-07	5.8E-03	3.6 J+		1.4E-07	2.6E-03	3 J+		1.2E-07	2.1E-03	2.1 J+		8.4E-08	1.5E-03	3 J+		1.2E-07	2.1E-03	3.5 J+		1.4E-07	2.5E-03
Barium	NA	310,000	Neurological	41.4		NA	1.3E-04	104		NA	3.4E-04	91.7		NA	3.0E-04	378		NA	1.2E-03	52.5		NA	1.7E-04	424		NA	1.4E-03
Beryllium	NA	410	Gastrointestinal System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	960,000	Developmental	129		NA	1.3E-04	48.8		NA	5.1E-05	119		NA	1.2E-04	777		NA	8.1E-04	118		NA	1.2E-04	1630		NA	1.7E-03
Calcium	NA	NA	Essential Nutrient	59100		NA	NA	38000		NA	NA	27700		NA	NA	60300		NA	NA	37700		NA	NA	139000		NA	NA
Chromium	1	1,100	None Reported	0.25 J		2.5E-07	2.3E-04	0.24 J		2.4E-07	2.2E-04	0.86 J		8.6E-07	7.8E-04	2.3		2.3E-06	2.1E-03	0.12 J		1.2E-07	1.1E-04	0.88 J		8.8E-07	8.0E-04
Cobalt	NA	1,600	Thyroid	1 U		NA	NA	1.3		NA	8.1E-04	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Copper	NA	190,000	Gastrointestinal System	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	4.3		NA	2.3E-05	2 UJ		NA	NA	2 UJ		NA	NA
Cyanide	NA	2,900	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	3,300,000	Gastrointestinal System	9050		NA	2.7E-03	2370		NA	7.2E-04	2850		NA	8.6E-04	15100		NA	4.6E-03	3060		NA	9.3E-04	20500		NA	6.2E-03
Lead	NA	NA	Neurological	1.4		NA	NA	1 U		NA	NA	2.7		NA	NA	5.1		NA	NA	1 U		NA	NA	1.7		NA	NA
Magnesium	NA	NA	Essential Nutrient	17500		NA	NA	12700		NA	NA	9060		NA	NA	25800		NA	NA	17500		NA	NA	86200		NA	NA
Manganese	NA	24,000	Central Nervous System	877		NA	3.7E-02	802		NA	3.3E-02	302		NA	1.3E-02	1120		NA	4.7E-02	605		NA	2.5E-02	1400		NA	5.8E-02
Mercury	NA	460	Central Nervous System	0.071 J		NA	1.5E-04	0.13 J		NA	2.8E-04	0.11 J		NA	2.4E-04	0.13 J		NA	2.8E-04	0.093 J		NA	2.0E-04	0.062 J		NA	1.3E-04
Nickel	NA	58,000	Body Weight	1 J		NA	1.7E-05	1.3 J		NA	2.2E-05	0.78 J		NA	1.3E-05	1.8 J		NA	3.1E-05	1.4 J		NA	2.4E-05	3.2 J		NA	5.5E-05
Potassium	NA	NA	Essential Nutrient	8540		NA	NA	4190		NA	NA	5010		NA	NA	25800		NA	NA	6230		NA	NA	48500		NA	NA
Selenium	NA	24,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	176000 J		NA	NA	36000 J		NA	NA	47200 J		NA	NA	748000 J		NA	NA	39600 J		NA	NA	319000 J		NA	NA
Vanadium	NA	3,500	Kidney	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA
Zinc	NA	1,500,000	Blood	4.2		NA	2.8E-06	3.9		NA	2.6E-06	5.4		NA	3.6E-06	9.8		NA	6.5E-06	5.1		NA	3.4E-06	2.7		NA	1.8E-06
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	510	4,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Non-Dioxin-Like PCBs	120,000,000	NA	Cancer	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Total Risk/Hazard Index						7.2E-07	4.7E-02			6.0E-07	4.0E-02			1.2E-06	1.8E-02			2.5E-06	5.8E-02			4.6E-07	3.1E-02			1.1E-06	7.2E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-0301									PW-0302						PW-0303		
				LDCA-PW-0301-00-20130909 20130909				LDCA-PW-0301-02-20130909 20130909				LDCA-PW-0301-02-20130909-D 20130909				LDCA-PW-0302-00-20130909 20130909				LDCA-PW-0302-02-20130909 20130909				LDCA-PW-0303-00-20130909 20130909			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	0.59 J		2.0E-12	2.7E-09	8.9		3.0E-11	4.0E-08	9.6		3.2E-11	4.4E-08	2.5 U		NA	NA	7.8		2.6E-11	3.5E-08	2.5 U		NA	NA
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	430,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.017 J		NA	1.5E-06	0.01 J		NA	9.1E-07	0.012 J		NA	1.1E-06	0.012 J		NA	1.1E-06	0.035 J		NA	3.2E-06	0.0056 J		NA	5.1E-07
Acenaphthene	NA	540,000	Liver	0.033 J		NA	6.1E-08	0.094 J		NA	1.7E-07	0.1		NA	1.9E-07	0.028 J		NA	5.2E-08	0.11		NA	2.0E-07	0.01 J		NA	1.9E-08
Acenaphthylene	NA	290,000	None Reported	0.012 J		NA	4.1E-08	0.021 J		NA	7.2E-08	0.024 J		NA	8.3E-08	0.1 U		NA	NA	0.018 J		NA	6.2E-08	0.1 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	0.077 J		NA	1.0E-09	0.098		NA	1.3E-09	0.11		NA	1.4E-09	0.011 J		NA	1.4E-10	0.15		NA	1.9E-09	0.1 U		NA	NA
Benzo(a)anthracene	67,000	NA	Cancer	0.1 U		NA	NA	0.038 J		5.7E-13	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.09 J		1.3E-12	NA	0.018 J		2.7E-13	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.035 J		5.2E-12	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.054 J		8.1E-13	NA	0.028 J		4.2E-13	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.018 J		NA	2.8E-10	0.013 J		NA	2.0E-10
Benzo(k)fluoranthene	670,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.021 J		3.1E-14	NA	0.011 J		1.6E-14	NA
Chrysene	6,700,000	NA	Cancer	0.1 U		NA	NA	0.043 J		6.4E-15	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.076 J		1.1E-14	NA	0.019 J		2.8E-15	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	200,000	Kidney	0.037 J		NA	1.9E-07	0.052 J		NA	2.6E-07	0.04 J		NA	2.0E-07	0.03 J		NA	1.5E-07	0.16		NA	8.0E-07	0.047 J		NA	2.4E-07
Fluorene	NA	4,900,000	Blood	0.035 J		NA	7.1E-09	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.071 J		NA	1.4E-08	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.019 J		2.8E-13	NA	0.011 J		1.6E-13	NA
Naphthalene	NA	3,700,000	Body Weight	0.046 J		NA	1.2E-08	0.015 J		NA	4.1E-09	0.016 J		NA	4.3E-09	0.044 J		NA	1.2E-08	0.094 J		NA	2.5E-08	0.022 J		NA	5.9E-09
Pentachlorophenol	3,100	18,000	Reproductive	0.11 J		3.5E-11	6.1E-06	0.2 R		NA	NA	0.2 R		NA	NA	0.041 J		1.3E-11	2.3E-06	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	0.045 J		NA	1.0E-07	0.073 J		NA	1.7E-07	0.098		NA	2.3E-07	0.032 J		NA	7.4E-08	0.23		NA	5.3E-07	0.018 J		NA	4.2E-08
Pyrene	NA	270,000	Kidney	0.032 J		NA	1.2E-07	0.098		NA	3.6E-07	0.092 J		NA	3.4E-07	0.053 J		NA	2.0E-07	0.21		NA	7.8E-07	0.043 J		NA	1.6E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.011		7.9E-14	3.1E-08	0.0026 J		1.9E-14	7.4E-09	0.0089 J		6.4E-14	2.5E-08
Aldrin	2,900	28,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0019 J		NA	1.6E-06	0.005 U		NA	NA	0.005 U		NA	NA
beta-BHC	210	3,200	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	NA	43,000	Liver	0.001 J		NA	2.3E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	9.4	210	Liver	0.0099		1.1E-09	4.7E-05	0.0057 J		6.1E-10	2.7E-05	0.0052 J		5.5E-10	2.5E-05	0.012		1.3E-09	5.7E-05	0.0094		1.0E-09	4.5E-05	0.0096		1.0E-09	4.6E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.001 J		NA	1.1E-08	0.001 J		NA	1.1E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.0045 J		NA	5.0E-08	0.01 U		NA	NA	0.01 U		NA	NA	0.0037 J		NA	4.1E-08	0.01 U		NA	NA	0.0024 J		NA	2.7E-08
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.0013 J		NA	3.2E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0015 J		NA	3.6E-09	0.0016 J		NA	3.8E-09	0.005 U		NA	NA
Heptachlor	8	52	Reproductive	0.001 J		1.3E-10	1.9E-05	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	24	41	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.0022 J		9.2E-11	5.4E-05	0.002 U		NA	NA	0.002 U		NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	10 U		NA	NA	10 U		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	40		NA	8.5E-08	101		NA	2.1E-07	20 U		NA	NA	20 U		NA	NA	20 U		NA	NA	20 U		NA	NA
Arsenic	22,000	140,000	Skin, Cardiovascular System	14.7 J+		6.7E-10	1.1E-04	8.1 J+		3.7E-10	5.8E-05	8.4 J+		3.8E-10	6.0E-05	3.3 J+		1.5E-10	2.4E-05	11.4 J+		5.2E-10	8.1E-05	1.2 J+		5.5E-11	8.6E-06
Barium	NA	18,000,000	Neurological	469		NA	2.6E-05	466		NA	2.6E-05	453		NA	2.5E-05	112		NA	6.2E-06	480		NA	2.7E-05	95.7		NA	5.3E-06
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	475		NA	3.4E-06	952		NA	6.8E-06	948		NA	6.8E-06	41.6		NA	3.0E-07	946		NA	6.8E-06	43.5		NA	3.1E-07
Calcium	NA	NA	Essential Nutrient	106000		NA	NA	127000		NA	NA	122000		NA	NA	39200		NA	NA	97500		NA	NA	37400		NA	NA
Chromium	2,500	89,000	None Reported	0.84 J		3.4E-10	9.4E-06	2.7		1.1E-09	3.0E-05	1.9 J		7.6E-10	2.1E-05	0.19 J		7.6E-11	2.1E-06	0.91 J		3.6E-10	1.0E-05	0.2 J		8.0E-11	2.2E-06
Cobalt	NA	1,800,000	Thyroid	3.1		NA	1.7E-06	2.3		NA	1.3E-06	2.1		NA	1.2E-06	1.8		NA	1.0E-06	1.6		NA	8.9E-07	1 U		NA	NA
Copper	NA	4,700,000	Gastrointestinal System	2 UJ		NA	NA	2.7		NA	5.7E-07	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	81500		NA	2.5E-04	76000		NA	2.3E-04	72300		NA	2.2E-04	2500		NA	7.6E-06	78700		NA	2.4E-04	1230		NA	3.7E-06
Lead	NA	NA	Neurological	4		NA	NA	9.3		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Magnesium	NA	NA	Essential Nutrient	45800		NA	NA	64100		NA	NA	60400		NA	NA	16100		NA	NA	61400		NA	NA	16700		NA	NA
Manganese	NA	1,300,000	Central Nervous System	3200		NA	2.5E-03	2360		NA	1.8E-03	2360		NA	1.8E-03	1100		NA	8.5E-04	1960		NA	1.5E-03	280		NA	2.2E-04
Mercury	NA	180,000	Central Nervous System	0.13 J		NA	7.2E-07	0.12 J		NA	6.7E-07	0.099 J		NA	5.5E-07	0.13 J		NA	7.2E-07	0.2 U		NA	NA	0.13 J		NA	7.2E-07
Nickel	NA	4,100,000	Body Weight	2.5 J		NA	6.1E-07	2.4 J		NA	5.9E-07	1.6 J		NA	3.9E-07	1.9 J		NA	4.6E-07	1.6 J		NA	3.9E-07	0.98 J		NA	2.4E-07
Potassium	NA	NA	Essential Nutrient	11400		NA	NA	16500		NA	NA	16100		NA	NA	5210		NA	NA	14300		NA	NA	4560		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	60800 J		NA	NA	131000 J		NA	NA	126000 J		NA	NA	39000 J		NA	NA	107000 J		NA	NA	40000 J		NA	NA
Vanadium	NA	360,000	Kidney	2.6 U		NA	NA	2.6 UJ		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA
Zinc	NA	160,000,000	Blood	7.6		NA	4.8E-08	11		NA	6.9E-08	12		NA	7.5E-08	9.6		NA	6.0E-08	3.2		NA	2.0E-08	7.3		NA	4.6E-08
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma	0.015		3.8E-14	NA	0.019		4.9E-14	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer	3126		2.6E-14	NA	6844		5.7E-14	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Risks						2.2E-09	2.9E-03			2.1E-09	2.2E-03			1.7E-09	2.2E-03			1.6E-09	1.0E-03			1.9E-09	1.9E-03			1.2E-09	2.8E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-0303 LDCA-PW-0303-02-20130909 20130909				PW-1001 LDCA-PW-1001-00-20130911 20130911				LDCA-PW-1001-02-20130911 20130911				LDCA-PW-1001-02-20130911-D 20130911				LDCA-PW-1001-04-20130911 20130911				LDCA-PW-1002-00-20130911 20130911			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	4.5		1.5E-11	2.0E-08	0.54 J		1.8E-12	2.5E-09	11		3.7E-11	5.0E-08	5.2 J		1.7E-11	2.4E-08	51		1.7E-10	2.3E-07	2.5 U		NA	NA
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 UJ		NA	NA	5 UJ		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA	10 U		NA	NA
Phenanthrene	NA	430,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.018 J		NA	1.6E-06	0.017 J		NA	1.5E-06	0.024 J		NA	2.2E-06	0.014 J		NA	1.3E-06	0.074 J		NA	6.7E-06	0.01 J		NA	9.1E-07
Acenaphthene	NA	540,000	Liver	0.11		NA	2.0E-07	0.031 J		NA	5.7E-08	0.1		NA	1.9E-07	0.088 J		NA	1.6E-07	0.21 J		NA	3.9E-07	0.029 J		NA	5.4E-08
Acenaphthylene	NA	290,000	None Reported	0.011 J		NA	3.8E-08	0.1 U		NA	NA	0.04 J		NA	1.4E-07	0.028 J		NA	9.7E-08	0.063 J		NA	2.2E-07	0.1 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	0.091 J		NA	1.2E-09	0.018 J		NA	2.3E-10	0.079 J		NA	1.0E-09	0.07 J		NA	9.1E-10	0.33		NA	4.3E-09	0.021 J		NA	2.7E-10
Benzo(a)anthracene	67,000	NA	Cancer	0.088 J		1.3E-12	NA	0.1 U		NA	NA	0.046 J		6.9E-13	NA	0.1 U		NA	NA	0.069 J		1.0E-12	NA	0.0068 J		1.0E-13	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.052 J		7.8E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.073 J		1.1E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.032 J		NA	4.9E-10	0.1 U		NA	NA	0.0065 J		NA	1.0E-10	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA
Benzo(k)fluoranthene	670,000	NA	Cancer	0.024 J		3.6E-14	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Chrysene	6,700,000	NA	Cancer	0.067 J		1.0E-14	NA	0.1 U		NA	NA	0.032 J		4.8E-15	NA	0.1 U		NA	NA	0.023 J		3.4E-15	NA	0.0065 J		9.7E-16	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.0072 J		1.1E-12	NA	0.1 U		NA	NA	0.0095 J		1.4E-12	NA	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	200,000	Kidney	0.17		NA	8.5E-07	0.027 J		NA	1.4E-07	0.047 J		NA	2.4E-07	0.044 J		NA	2.2E-07	0.12		NA	6.0E-07	0.047 J		NA	2.4E-07
Fluorene	NA	4,900,000	Blood	0.043 J		NA	8.8E-09	0.024 J		NA	4.9E-09	0.049 J		NA	1.0E-08	0.041 J		NA	8.4E-09	0.23 J		NA	4.7E-08	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.031 J		4.6E-13	NA	0.1 U		NA	NA	0.0079 J		1.2E-13	NA	0.1 U		NA	NA	0.017 J		2.5E-13	NA	0.1 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	0.065 J		NA	1.8E-08	0.034 J		NA	9.2E-09	0.1 U		NA	NA	0.017 J		NA	4.6E-09	0.1 U		NA	NA	0.1 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	0.2 R		NA	NA	0.064 J		2.1E-11	3.6E-06	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	0.18		NA	4.2E-07	0.033 J		NA	7.7E-08	0.11		NA	2.6E-07	0.1		NA	2.3E-07	0.47		NA	1.1E-06	0.026 J		NA	6.0E-08
Pyrene	NA	270,000	Kidney	0.21		NA	7.8E-07	0.045 J		NA	1.7E-07	0.071 J		NA	2.6E-07	0.034 J		NA	1.3E-07	0.23		NA	8.5E-07	0.061 J		NA	2.3E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0034 J		2.4E-14	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.0022 J		1.6E-14	6.3E-09	0.0092 J		6.6E-14	2.6E-08	0.01 U		NA	NA	0.01 U		NA	NA	0.002 J		1.4E-14	5.7E-09	0.013 J		9.3E-14	3.7E-08
Aldrin	2,900	28,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0013 J		4.5E-13	4.6E-08	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0016 J		2.7E-11	3.7E-08	0.001 U		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.005 U		NA	NA	0.0023 J		NA	1.9E-06	0.0022 J		NA	1.8E-06	0.005 U		NA	NA	0.005 U		NA	NA	0.0023 J		NA	1.9E-06
beta-BHC	210	3,200	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.0039 J		1.9E-11	1.2E-06	0.001 U		NA	NA	0.0023 J		1.1E-11	7.2E-07	0.001 U		NA	NA
delta-BHC	NA	43,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 J		NA	1.2E-07	0.0053		NA	1.2E-07	0.0066 J		NA	1.5E-07	0.005 U		NA	NA
Dieldrin	9.4	210	Liver	0.0047 J		5.0E-10	2.2E-05	0.013		1.4E-09	6.2E-05	0.0074 J		7.9E-10	3.5E-05	0.0079 J		8.4E-10	3.8E-05	0.0042 J		4.5E-10	2.0E-05	0.016		1.7E-09	7.6E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0017 J		NA	1.9E-08	0.005 U		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.0031 J		NA	3.4E-08	0.0024 J		NA	2.7E-08	0.01 U		NA	NA	0.01 U		NA	NA	0.0026 J		NA	2.9E-08	0.0036 J		NA	4.0E-08
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.0024 J		NA	5.9E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0031 J		NA	7.6E-07	0.01 U		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0015 J		4.4E-12	2.8E-05	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.005 U		NA	NA	0.0013 J		NA	3.1E-09	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0013 J		NA	3.1E-09
Heptachlor	8	52	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	24	41	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.0021		8.8E-11	5.1E-05
Methoxychlor	NA	3,500,000	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	NA		NA	NA	10 U		NA	NA	NA		NA	NA	NA		NA	NA	0.072		1.9E-13	5.1E-09	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	1420		NA	3.0E-06	10.2 J		NA	2.2E-08	1.4 J		NA	3.0E-09	1.6 J		NA	3.4E-09	34.6		NA	7.4E-08	20 U		NA	NA
Arsenic	22,000	140,000	Skin, Cardiovascular System	6.8 J+		3.1E-10	4.9E-05	10 J+		4.5E-10	7.1E-05	1.1 J+		5.0E-11	7.9E-06	1.2 J+		5.5E-11	8.6E-06	6.2 J+		2.8E-10	4.4E-05	4.2 J+		1.9E-10	3.0E-05
Barium	NA	18,000,000	Neurological	472		NA	2.6E-05	401 J		NA	2.2E-05	143 J		NA	7.9E-06	143 J		NA	7.9E-06	438		NA	2.4E-05	217		NA	1.2E-05
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	642		NA	4.6E-06	285		NA	2.0E-06	2040		NA	1.5E-05	1720		NA	1.2E-05	5830		NA	4.2E-05	62.6		NA	4.5E-07
Calcium	NA	NA	Essential Nutrient	94700		NA	NA	95400		NA	NA	126000		NA	NA	106000		NA	NA	143000		NA	NA	38300		NA	NA
Chromium	2,500	89,000	None Reported	20.6		8.2E-09	2.3E-04	0.83 J		3.3E-10	9.3E-06	1.4 J		5.6E-10	1.6E-05	1.5 J		6.0E-10	1.7E-05	10		4.0E-09	1.1E-04	0.17 J		6.8E-11	1.9E-06
Cobalt	NA	1,800,000	Thyroid	3		NA	1.7E-06	7.6		NA	4.2E-06	1.8		NA	1.0E-06	1.7		NA	9.4E-07	7.9		NA	4.4E-06	2.1		NA	1.2E-06
Copper	NA	4,700,000	Gastrointestinal System	10.8		NA	2.3E-06	0.29 J-		NA	6.2E-08	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	45900		NA	1.4E-04	23800		NA	7.2E-05	8860		NA	2.7E-05	10000		NA	3.0E-05	41400		NA	1.3E-04	3530		NA	1.1E-05
Lead	NA	NA	Neurological	183		NA	NA	0.8 J		NA	NA	1 UJ		NA	NA	0.23 J		NA	NA	1.8		NA	NA	1 U		NA	NA
Magnesium	NA	NA	Essential Nutrient	56400		NA	NA	35600		NA	NA	69500		NA	NA	60000		NA	NA	124000		NA	NA	15600		NA	NA
Manganese	NA	1,300,000	Central Nervous System	2440		NA	1.9E-03	4430		NA	3.4E-03	2410		NA	1.9E-03	2080		NA	1.6E-03	744		NA	5.7E-04	1340		NA	1.0E-03
Mercury	NA	180,000	Central Nervous System	0.11 J		NA	6.1E-07	0.035 J		NA	1.9E-07	0.2 U		NA	NA	0.037 J		NA	2.1E-07	0.054 J		NA	3.0E-07	0.058 J		NA	3.2E-07
Nickel	NA	4,100,000	Body Weight	11.5 J		NA	2.8E-06	5.4		NA	1.3E-06	2.1		NA	5.1E-07	1.8		NA	4.4E-07	5.4 J		NA	1.3E-06	2 J		NA	4.9E-07
Potassium	NA	NA	Essential Nutrient	8960		NA	NA	9910		NA	NA	21200		NA	NA	21500		NA	NA	74600		NA	NA	5680		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	5 U		NA	NA	1.2 J		NA	5.0E-07	2.9 J		NA	1.2E-06	2.8 J		NA	1.2E-06	7.9 J		NA	3.3E-06	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	93400 J		NA	NA	51200		NA	NA	136000		NA	NA	117000		NA	NA	358000 J		NA	NA	39800 J		NA	NA
Vanadium	NA	360,000	Kidney	12.5		NA	3.5E-05	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	5.5 J		NA	1.5E-05	2.6 U		NA	NA
Zinc	NA	160,000,000	Blood	133		NA	8.3E-07	21.3 J		NA	1.3E-07	2.8 J		NA	1.8E-08	1.7 J		NA	1.1E-08	4.5		NA	2.8E-08	13.9		NA	8.7E-08
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma			0.0E+00	NA	0.023		6.1E-14	NA			0.0E+00	NA			0.0E+00	NA	0.130		3.4E-13	NA			0.0E+00	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer			0.0E+00	NA	4626		3.9E-14	NA			0.0E+00	NA			0.0E+00	NA	27397		2.3E-13	NA			0.0E+00	NA
Total Risks						9.1E-09	2.4E-03			2.2E-09	3.7E-03			1.5E-09	2.0E-03			1.5E-09	1.7E-03			4.9E-09	1.0E-03			2.0E-09	1.2E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-1002 LDCA-PW-1002-02-20130911 20130911				LDCA-PW-1002-04-20130911 20130911				PW-1003 LDCA-PW-1003-00-20130910 20130910				LDCA-PW-1003-02-20130910 20130910				PW-1601 LDCA-PW-1601-00-20130911 20130911				LDCA-PW-1601-02-20130911 20130911			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	2.1 J		7.0E-12	9.5E-09	37		1.2E-10	1.7E-07	2.5 U		NA	NA	2.5 U		NA	NA	2.5 U		NA	NA	20		6.7E-11	9.1E-08
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	5 U		NA	NA	5 UJ		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	430,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.0091 J		NA	8.3E-07	0.047 J		NA	4.3E-06	0.1 U		NA	NA	0.013 J		NA	1.2E-06	0.0068 J		NA	6.2E-07	0.079 J		NA	7.2E-06
Acenaphthene	NA	540,000	Liver	0.066 J		NA	1.2E-07	0.23		NA	4.3E-07	0.1 U		NA	NA	0.062 J		NA	1.1E-07	0.056 J		NA	1.0E-07	0.14		NA	2.6E-07
Acenaphthylene	NA	290,000	None Reported	0.013 J		NA	4.5E-08	0.075 J		NA	2.6E-07	0.1 U		NA	NA	0.0075 J		NA	2.6E-08	0.0078 J		NA	2.7E-08	0.059 J		NA	2.0E-07
Anthracene	NA	77,000,000	Whole Body	0.06 J		NA	7.8E-10	0.55		NA	7.1E-09	0.1 U		NA	NA	0.036 J		NA	4.7E-10	0.019 J		NA	2.5E-10	0.16		NA	2.1E-09
Benzo(a)anthracene	67,000	NA	Cancer	0.016 J		2.4E-13	NA	0.055 J		8.2E-13	NA	0.1 U		NA	NA	0.04 J		6.0E-13	NA	0.015 J		2.2E-13	NA	0.052 J		7.8E-13	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.1 U		NA	NA	0.015 J		2.2E-12	NA	0.1 U		NA	NA	0.031 J		4.6E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.0097 J		1.4E-13	NA	0.026 J		3.9E-13	NA	0.1 U		NA	NA	0.054 J		8.1E-13	NA	0.015 J		2.2E-13	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.1 U		NA	NA	0.0065 J		NA	1.0E-10	0.1 U		NA	NA	0.023 J		NA	3.5E-10	0.0075 J		NA	1.2E-10	0.1 U		NA	NA
Benzo(k)fluoranthene	670,000	NA	Cancer	0.1 U		NA	NA	0.012 J		1.8E-14	NA	0.1 U		NA	NA	0.021 J		3.1E-14	NA	0.0063 J		9.4E-15	NA	0.1 U		NA	NA
Chrysene	6,700,000	NA	Cancer	0.011 J		1.6E-15	NA	0.018 J		2.7E-15	NA	0.1 U		NA	NA	0.034 J		5.1E-15	NA	0.015 J		2.2E-15	NA	0.025 J		3.7E-15	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	200,000	Kidney	0.053 J		NA	2.7E-07	0.089 J		NA	4.5E-07	0.021 J		NA	1.1E-07	0.12		NA	6.0E-07	0.047 J		NA	2.4E-07	0.078 J		NA	3.9E-07
Fluorene	NA	4,900,000	Blood	0.1 U		NA	NA	0.19		NA	3.9E-08	0.1 U		NA	NA	0.06 J		NA	1.2E-08	0.1 U		NA	NA	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.1 U		NA	NA	0.0071 J		1.1E-13	NA	0.1 U		NA	NA	0.022 J		3.3E-13	NA	0.0068 J		1.0E-13	NA	0.1 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	0.1 U		NA	NA	0.1 U		NA	NA	0.022 J		NA	5.9E-09	0.058 J		NA	1.6E-08	0.1 U		NA	NA	0.1 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	0.2 R		NA	NA	0.056 J		1.8E-11	3.1E-06	0.2 R		NA	NA	0.13 J		4.2E-11	7.2E-06	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	0.045 J		NA	1.0E-07	0.25		NA	5.8E-07	0.019 J		NA	4.4E-08	0.073 J		NA	1.7E-07	0.023 J		NA	5.3E-08	0.053 J		NA	1.2E-07
Pyrene	NA	270,000	Kidney	0.044 J		NA	1.6E-07	0.11		NA	4.1E-07	0.051 J		NA	1.9E-07	0.12		NA	4.4E-07	0.084 J		NA	3.1E-07	0.095 J		NA	3.5E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0028 J		2.3E-11	NA
4,4'-DDE	140,000	NA	Cancer	0.01 U		NA	NA	0.0012 J		8.6E-15	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01		7.1E-14	2.9E-08	0.011		7.9E-14	3.1E-08	0.015 J		1.1E-13	4.3E-08	0.0053 J		3.8E-14	1.5E-08
Aldrin	2,900	28,000	Liver	0.005 U		NA	NA	0.0021 J		7.2E-13	7.5E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0015		2.5E-11	3.5E-08
alpha-Chlordane	NA	1,200	Liver	0.0019 J		NA	1.6E-06	0.005 U		NA	NA	0.0021 J		NA	1.8E-06	0.002 J		NA	1.7E-06	0.0035 J		NA	2.9E-06	0.005 U		NA	NA
beta-BHC	210	3,200	Cancer	0.001 U		NA	NA	0.0035 J		1.7E-11	1.1E-06	0.0027		1.3E-11	8.4E-07	0.001 U		NA	NA	0.001 U		NA	NA	0.0031 J		1.5E-11	9.7E-07
delta-BHC	NA	43,000	Liver	0.005 U		NA	NA	0.0042 J		NA	9.8E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	9.4	210	Liver	0.0097		1.0E-09	4.6E-05	0.0058 J		6.2E-10	2.8E-05	0.014		1.5E-09	6.7E-05	0.011		1.2E-09	5.2E-05	0.02		2.1E-09	9.5E-05	0.0034 J		3.6E-10	1.6E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005 U		NA	NA	0.0021 J		NA	2.3E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.0013 J		NA	1.4E-08	0.005 U		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01 U		NA	NA	0.01 U		NA	NA	0.0048 J		NA	5.3E-08	0.01 U		NA	NA	0.0047 J		NA	5.2E-08	0.0019 J		NA	2.1E-08
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.0021 J		NA	2.7E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.0019 J		NA	4.6E-07	0.0022 J		NA	5.4E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0017 J		NA	2.8E-07	0.01 U		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.0015 J		4.4E-12	2.8E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.005 U		NA	NA	0.0018 J		NA	4.3E-09	0.0012 J		NA	2.9E-09	0.0014 J		NA	3.3E-09	0.0025 J		NA	6.0E-09	0.0041 J		NA	9.8E-09
Heptachlor	8	52	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0011 J		1.4E-10	2.1E-05	0.0036		4.5E-10	6.9E-05
Heptachlor Epoxide	24	41	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.0021 J		8.8E-11	5.1E-05	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.0061 J		NA	1.7E-09
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	10 U		NA	NA	0.144		3.8E-13	1.0E-08
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	29.1		NA	6.2E-08	20 U		NA	NA	11.2 J		NA	2.4E-08	20.4		NA	4.3E-08	18.4 J		NA	3.9E-08	26.9		NA	5.7E-08
Arsenic	22,000	140,000	Skin, Cardiovascular System	7.5 J+		3.4E-10	5.4E-05	3.3 J+		1.5E-10	2.4E-05	0.55 J+		2.5E-11	3.9E-06	4.1 J+		1.9E-10	2.9E-05	1.6 J+		7.3E-11	1.1E-05	3.5 J+		1.6E-10	2.5E-05
Barium	NA	18,000,000	Neurological	258		NA	1.4E-05	230		NA	1.3E-05	97.8 J		NA	5.4E-06	102 J		NA	5.7E-06	96.8 J		NA	5.4E-06	96.2 J		NA	5.3E-06
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	559		NA	4.0E-06	5670		NA	4.1E-05	29.2		NA	2.1E-07	24.2		NA	1.7E-07	48.1		NA	3.4E-07	805		NA	5.8E-06
Calcium	NA	NA	Essential Nutrient	65600		NA	NA	150000		NA	NA	38600		NA	NA	37800		NA	NA	36800		NA	NA	36200		NA	NA
Chromium	2,500	89,000	None Reported	0.84 J		3.4E-10	9.4E-06	7.7		3.1E-09	8.7E-05	2 U		NA	NA	0.28 J		1.1E-10	3.1E-06	0.26 J		1.0E-10	2.9E-06	7.2		2.9E-09	8.1E-05
Cobalt	NA	1,800,000	Thyroid	1 U		NA	NA	7		NA	3.9E-06	0.5 J		NA	2.8E-07	0.72 J		NA	4.0E-07	0.54 J		NA	3.0E-07	2.1		NA	1.2E-06
Copper	NA	4,700,000	Gastrointestinal System	2 UJ		NA	NA	2 UJ		NA	NA	0.93 J		NA	2.0E-07	0.094 J		NA	2.0E-08	0.92 J		NA	2.0E-07	0.11 J-		NA	2.3E-08
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	31500		NA	9.5E-05	8420		NA	2.6E-05	34 J		NA	1.0E-07	5890		NA	1.8E-05	1080		NA	3.3E-06	2030		NA	6.2E-06
Lead	NA	NA	Neuorological	2.4		NA	NA	1 U		NA	NA	0.41 J		NA	NA	0.58 J		NA	NA	1.9		NA	NA	1.4		NA	NA
Magnesium	NA	NA	Essential Nutrient	25600		NA	NA	119000		NA	NA	15500		NA	NA	14300		NA	NA	14500		NA	NA	19900		NA	NA
Manganese	NA	1,300,000	Central Nervous System	1690		NA	1.3E-03	647		NA	5.0E-04	357		NA	2.7E-04	958		NA	7.4E-04	433		NA	3.3E-04	213		NA	1.6E-04
Mercury	NA	180,000	Central Nervous System	0.13 J		NA	7.2E-07	0.064 J		NA	3.6E-07	0.043 J		NA	2.4E-07	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
Nickel	NA	4,100,000	Body Weight	0.75 J		NA	1.8E-07	4.7 J		NA	1.1E-06	1.1		NA	2.7E-07	0.95 J		NA	2.3E-07	1.2		NA	2.9E-07	3		NA	7.3E-07
Potassium	NA	NA	Essential Nutrient	10900		NA	NA	80900		NA	NA	4570		NA	NA	4360		NA	NA	4740		NA	NA	23200		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	5 U		NA	NA	6.8 J		NA	2.8E-06	0.55 J		NA	2.3E-07	0.48 J		NA	2.0E-07	0.64 J		NA	2.7E-07	2.6 J		NA	1.1E-06
Sodium	NA	NA	Essential Nutrient	53100 J		NA	NA	306000 J		NA	NA	37300		NA	NA	29300		NA	NA	34700		NA	NA	144000		NA	NA
Vanadium	NA	360,000	Kidney	2.6 UJ		NA	NA	2.6 UJ		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	5.2 U		NA	NA	6.5 J		NA	1.8E-05
Zinc	NA	160,000,000	Blood	4.3		NA	2.7E-08	1.6 J		NA	1.0E-08	7 J		NA	4.4E-08	3.9 J		NA	2.4E-08	7.6 J		NA	4.8E-08	2 J		NA	1.3E-08
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA	0.029		7.7E-14	NA	0.072		1.9E-13	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA	5289		4.4E-14	NA	18840		1.6E-13	NA
Total Risks						1.7E-09	1.5E-03			4.0E-09	7.6E-04			1.6E-09	4.1E-04			1.5E-09	8.6E-04			2.4E-09	4.8E-04			4.0E-09	4.0E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-1602 LDCA-PW-1602-00-20130911 20130911				PW-1602 LDCA-PW-1602-02-20130911 20130911				LDCA-PW-1602-04-20130911 20130911				LDCA-PW-1603-00-20130912 20130912				LDCA-PW-1603-00-20130912-D 20130912				PW-1603 LDCA-PW-1603-02-20130912 20130912			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	2.5 U		NA	NA	2.5 U		NA	NA	170		5.7E-10	7.7E-07	2.5 U		NA	NA	2.5 U		NA	NA	32		1.1E-10	1.5E-07
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	2.5 J		NA	3.2E-08	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	1.5 J		NA	4.1E-07	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA	10 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	430,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.1 U		NA	NA	0.0085 J		NA	7.7E-07	0.24		NA	2.2E-05	0.1 U		NA	NA	0.1 U		NA	NA	0.055 J		NA	5.0E-06
Acenaphthene	NA	540,000	Liver	0.1 U		NA	NA	0.059 J		NA	1.1E-07	0.12 J		NA	2.2E-07	0.022 J		NA	4.1E-08	0.0089 J		NA	1.6E-08	0.26		NA	4.8E-07
Acenaphthylene	NA	290,000	None Reported	0.1 U		NA	NA	0.0063 J		NA	2.2E-08	0.084 J		NA	2.9E-07	0.1 U		NA	NA	0.1 U		NA	NA	0.035 J		NA	1.2E-07
Anthracene	NA	77,000,000	Whole Body	0.013 J		NA	1.7E-10	0.026 J		NA	3.4E-10	0.79		NA	1.0E-08	0.1 U		NA	NA	0.1 U		NA	NA	0.36		NA	4.7E-09
Benzo(a)anthracene	67,000	NA	Cancer	0.1 U		NA	NA	0.026 J		3.9E-13	NA	0.28		4.2E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.084 J		1.3E-12	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.052 J		7.8E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.1 U		NA	NA	0.02 J		3.0E-13	NA	0.084 J		1.3E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.1 U		NA	NA	0.0066 J		NA	1.0E-10	0.012 J		NA	1.8E-10	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Benzo(k)fluoranthene	670,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.038 J		5.7E-14	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Chrysene	6,700,000	NA	Cancer	0.1 U		NA	NA	0.019 J		2.8E-15	NA	0.059 J		8.8E-15	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.029 J		4.3E-15	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Fluoranthene	NA	200,000	Kidney	0.011 J		NA	5.5E-08	0.086 J		NA	4.3E-07	0.22		NA	1.1E-06	0.027 J		NA	1.4E-07	0.028 J		NA	1.4E-07	0.12		NA	6.0E-07
Fluorene	NA	4,900,000	Blood	0.1 U		NA	NA	0.1 U		NA	NA	0.12 J		NA	2.4E-08	0.1 U		NA	NA	0.1 U		NA	NA	0.072 J		NA	1.5E-08
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.1 U		NA	NA	0.0071 J		1.1E-13	NA	0.015 J		2.2E-13	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Naphthalene	NA	3,700,000	Body Weight	0.1 U		NA	NA	0.1 U		NA	NA	0.88		NA	2.4E-07	0.1 U		NA	NA	0.1 U		NA	NA	0.12		NA	3.2E-08
Pentachlorophenol	3,100	18,000	Reproductive	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	0.0073 J		NA	1.7E-08	0.039 J		NA	9.1E-08	0.18		NA	4.2E-07	0.0081 J		NA	1.9E-08	0.1 U		NA	NA	0.022 J		NA	5.1E-08
Pyrene	NA	270,000	Kidney	0.1 U		NA	NA	0.11		NA	4.1E-07	0.45		NA	1.7E-06	0.056 J		NA	2.1E-07	0.029 J		NA	1.1E-07	0.14		NA	5.2E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.0013 J		9.3E-15	NA	0.0011 J		7.9E-15	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.0097 J		6.9E-14	2.8E-08	0.003 J		2.1E-14	8.6E-09	0.0041 J		2.9E-14	1.2E-08	0.0067 J		4.8E-14	1.9E-08	0.0021 J		1.5E-14	6.0E-09	0.0073 J		5.2E-14	2.1E-08
Aldrin	2,900	28,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.0019 J		3.2E-11	4.4E-08	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.0024 J		NA	2.0E-06	0.0022 J		NA	1.8E-06	0.0027 J		NA	2.3E-06	0.005 U		NA	NA	0.0022 J		NA	1.8E-06	0.005 U		NA	NA
beta-BHC	210	3,200	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.0026 J		1.2E-11	8.1E-07	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	NA	43,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	9.4	210	Liver	0.017		1.8E-09	8.1E-05	0.0073		7.8E-10	3.5E-05	0.002 U		NA	NA	0.011		1.2E-09	5.2E-05	0.012		1.3E-09	5.7E-05	0.0052		5.5E-10	2.5E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005 U		NA	NA	0.005 U		NA	NA	0.0025 J		NA	2.8E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.0027 J		NA	3.0E-08	0.0034 J		NA	3.8E-08	0.01 U		NA	NA	0.0022 J		NA	2.4E-08	0.0022 J		NA	2.4E-08	0.01 U		NA	NA
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.0014 J		NA	1.8E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.0049 J		NA	1.2E-06	0.0018 J		NA	4.4E-07	0.0012 J		NA	2.9E-07	0.0014 J		NA	3.4E-07
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.0028 J		NA	4.7E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.0017 J		NA	2.8E-07	0.0021 J		NA	3.5E-07	0.01 U		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.0015 J		4.4E-12	2.8E-05	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.005 U		NA	NA	0.0019 J		NA	4.5E-09	0.0023 J		NA	5.5E-09	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Heptachlor	8	52	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.0039		4.9E-10	7.5E-05	0.001 U		NA	NA	0.001 U		NA	NA	0.0015		1.9E-10	2.9E-05
Heptachlor Epoxide	24	41	Liver	0.0026 J		1.1E-10	6.3E-05	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.0018 J		7.5E-11	4.4E-05	0.002 U		NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.0055 J		NA	1.6E-09	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	20 UJ		NA	NA	20 U		NA	NA	91.4		NA	1.9E-07	12.7 J		NA	2.7E-08	15.2 J		NA	3.2E-08	16 J		NA	3.4E-08
Arsenic	22,000	140,000	Skin, Cardiovascular System	0.72 J+		3.3E-11	5.1E-06	1.9 J+		8.6E-11	1.4E-05	6.9 J+		3.1E-10	4.9E-05	1.4 J+		6.4E-11	1.0E-05	1.4 J+		6.4E-11	1.0E-05	6.8 J+		3.1E-10	4.9E-05
Barium	NA	18,000,000	Neurological	86 J		NA	4.8E-06	100		NA	5.6E-06	447		NA	2.5E-05	106 J		NA	5.9E-06	117 J		NA	6.5E-06	301 J		NA	1.7E-05
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	31.2		NA	2.2E-07	38.5		NA	2.8E-07	1160		NA	8.3E-06	36.6		NA	2.6E-07	34.9		NA	2.5E-07	218		NA	1.6E-06
Calcium	NA	NA	Essential Nutrient	38600 J		NA	NA	40100		NA	NA	24200		NA	NA	36100		NA	NA	38400		NA	NA	80800		NA	NA
Chromium	2,500	89,000	None Reported	0.13 J		5.2E-11	1.5E-06	0.51 J		2.0E-10	5.7E-06	18.2		7.3E-09	2.0E-04	0.19 J		7.6E-11	2.1E-06	0.16 J		6.4E-11	1.8E-06	4.1		1.6E-09	4.6E-05
Cobalt	NA	1,800,000	Thyroid	1 U		NA	NA	1 U		NA	NA	21.9		NA	1.2E-05	0.2 J		NA	1.1E-07	0.2 J		NA	1.1E-07	3.6		NA	2.0E-06
Copper	NA	4,700,000	Gastrointestinal System	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	1.3 J		NA	2.8E-07	1.6 J		NA	3.4E-07	0.12 J-		NA	2.6E-08
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	71.1 J		NA	2.2E-07	5250		NA	1.6E-05	20500		NA	6.2E-05	384		NA	1.2E-06	358		NA	1.1E-06	31800		NA	9.6E-05
Lead	NA	NA	Neurological	1 UJ		NA	NA	1 U		NA	NA	4.6		NA	NA	0.64 J		NA	NA	0.87 J		NA	NA	0.74 J		NA	NA
Magnesium	NA	NA	Essential Nutrient	16700 J		NA	NA	16700		NA	NA	19200		NA	NA	15000		NA	NA	15300		NA	NA	36500		NA	NA
Manganese	NA	1,300,000	Central Nervous System	11.9		NA	9.2E-06	449		NA	3.5E-04	386		NA	3.0E-04	78.8		NA	6.1E-05	82.2		NA	6.3E-05	1250		NA	9.6E-04
Mercury	NA	180,000	Central Nervous System	0.2 U		NA	NA	0.094 J		NA	5.2E-07	0.065 J		NA	3.6E-07	0.2 U		NA	NA	0.044 J		NA	2.4E-07	0.042 J		NA	2.3E-07
Nickel	NA	4,100,000	Body Weight	0.84 J		NA	2.0E-07	0.67 J		NA	1.6E-07	48.3 J		NA	1.2E-05	0.85 J		NA	2.1E-07	0.96 J		NA	2.3E-07	5.6		NA	1.4E-06
Potassium	NA	NA	Essential Nutrient	4500 J		NA	NA	5000		NA	NA	47700		NA	NA	4390		NA	NA	4570		NA	NA	26700		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	20.3 J		NA	8.5E-06	0.75 J		NA	3.1E-07	0.9 J		NA	3.8E-07	6.3		NA	2.6E-06
Sodium	NA	NA	Essential Nutrient	39400 J		NA	NA	39600 J		NA	NA	627000 J		NA	NA	36800		NA	NA	37800		NA	NA	173000		NA	NA
Vanadium	NA	360,000	Kidney	5.2 U		NA	NA	2.6 U		NA	NA	5.5		NA	1.5E-05	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA
Zinc	NA	160,000,000	Blood	9.4		NA	5.9E-08	3.4		NA	2.1E-08	7.3		NA	4.6E-08	8.6 J		NA	5.4E-08	15.9 J		NA	9.9E-08	2.9 J		NA	1.8E-08
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Risks						2.0E-09	1.7E-04			1.1E-09	4.3E-04			8.7E-09	8.3E-04			1.3E-09	1.3E-04			1.5E-09	1.9E-04			2.8E-09	1.2E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	LDCA-PW-1603-04-20130912 20130912				LDCA-PW-1603-04-20130912-D 20130912				PW-1802 LDCA-PW-1802-00-20130913 20130913				PW-1802 LDCA-PW-1802-02-20130913 20130913				PW-1803 LDCA-PW-1803-00-20130913 20130913				PW-2501 LDCA-PW-2501-00-20130912 20130912			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	180		6.0E-10	8.2E-07	160		5.3E-10	7.3E-07	2.5 UJ		NA	NA	2.5 UJ		NA	NA	2.5 U		NA	NA	70		2.3E-10	3.2E-07
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	1.4 J		NA	2.6E-06	1.1 J		NA	2.0E-06	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	2.5 J		NA	3.2E-08	2.4 J		NA	3.1E-08	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	3 J		2.5E-13	2.1E-08	2.1 J		1.8E-13	1.5E-08	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	1 J		NA	2.0E-07	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	50 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 UJ		NA	NA
Phenanthrene	NA	430,000	Kidney	1.5 J		NA	3.5E-06	1.5 J		NA	3.5E-06	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.58		NA	5.3E-05	0.4		NA	3.6E-05	0.0069 J		NA	6.3E-07	0.0081 J		NA	7.4E-07	0.01 J		NA	9.1E-07	0.062 J		NA	5.6E-06
Acenaphthene	NA	540,000	Liver	0.1 J		NA	1.9E-07	0.11 J		NA	2.0E-07	0.1 U		NA	NA	0.014 J		NA	2.6E-08	0.1 U		NA	NA	0.031 J		NA	5.7E-08
Acenaphthylene	NA	290,000	None Reported	0.1 U		NA	NA	0.018 J		NA	6.2E-08	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.12		NA	4.1E-07
Anthracene	NA	77,000,000	Whole Body	0.91		NA	1.2E-08	1.5		NA	1.9E-08	0.011 J		NA	1.4E-10	0.021 J		NA	2.7E-10	0.033 J		NA	4.3E-10	0.45		NA	5.8E-09
Benzo(a)anthracene	67,000	NA	Cancer	0.16		2.4E-12	NA	0.16 J		2.4E-12	NA	0.012 J		1.8E-13	NA	0.017 J		2.5E-13	NA	0.01 J		1.5E-13	NA	0.1		1.5E-12	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.025 J		3.7E-12	NA	0.041 J		6.1E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.047 J		7.0E-13	NA	0.069 J		1.0E-12	NA	0.016 J		2.4E-13	NA	0.015 J		2.2E-13	NA	0.017 J		2.5E-13	NA	0.015 J		2.2E-13	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.0071 J		NA	1.1E-10	0.0096 J		NA	1.5E-10	0.0059 J		NA	9.1E-11	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 UJ		NA	NA
Benzo(k)fluoranthene	670,000	NA	Cancer	0.1 U		NA	NA	0.036 J		5.4E-14	NA	0.0075 J		1.1E-14	NA	0.1 U		NA	NA	0.0055 J		8.2E-15	NA	0.0061 J		9.1E-15	NA
Chrysene	6,700,000	NA	Cancer	0.033 J		4.9E-15	NA	0.022 J		3.3E-15	NA	0.016 J		2.4E-15	NA	0.019 J		2.8E-15	NA	0.017 J		2.5E-15	NA	0.011 J		1.6E-15	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.1 UJ		NA	NA	0.1 R		1.5E-11	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA
Fluoranthene	NA	200,000	Kidney	0.44		NA	2.2E-06	0.46 J		NA	2.3E-06	0.031 J		NA	1.6E-07	0.046 J		NA	2.3E-07	0.03 J		NA	1.5E-07	0.055 J		NA	2.8E-07
Fluorene	NA	4,900,000	Blood	0.09 J		NA	1.8E-08	0.074 J		NA	1.5E-08	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.0075 J		1.1E-13	NA	0.012 J		1.8E-13	NA	0.0065 J		9.7E-14	NA	0.1 U		NA	NA	0.0051 J		7.6E-14	NA	0.0052 J		7.8E-14	NA
Naphthalene	NA	3,700,000	Body Weight	0.67		NA	1.8E-07	0.61		NA	1.6E-07	0.023 J		NA	6.2E-09	0.028 J		NA	7.6E-09	0.015 J		NA	4.1E-09	0.11		NA	3.0E-08
Pentachlorophenol	3,100	18,000	Reproductive	0.2 R		NA	NA	0.2 R		NA	NA	0.11 J		3.5E-11	6.1E-06	0.042 J		1.4E-11	2.3E-06	0.14 J		4.5E-11	7.8E-06	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	1		NA	2.3E-06	1.9		NA	4.4E-06	0.018 J		NA	4.2E-08	0.056 J		NA	1.3E-07	0.022 J		NA	5.1E-08	0.04 J		NA	9.3E-08
Pyrene	NA	270,000	Kidney	0.4		NA	1.5E-06	0.43 J		NA	1.6E-06	0.052 J		NA	1.9E-07	0.09 J		NA	3.3E-07	0.031 J		NA	1.1E-07	0.09 J		NA	3.3E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.0022 J		1.6E-14	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.018 J		1.3E-13	5.1E-08	0.012 J		8.6E-14	3.4E-08	0.0021 J		1.5E-14	6.0E-09	0.0016 J		1.1E-14	4.9E-09	0.0047 J		3.4E-14	1.3E-08	0.012 J		8.6E-14	3.4E-08
Aldrin	2,900	28,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0012 J		2.0E-11	2.8E-08
alpha-Chlordane	NA	1,200	Liver	0.005 U		NA	NA	0.0019 J		NA	1.6E-06	0.0027 J		NA	2.3E-06	0.0016 J		NA	1.3E-06	0.0024 J		NA	2.0E-06	0.005 U		NA	NA
beta-BHC	210	3,200	Cancer	0.0043 J		2.0E-11	1.3E-06	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	NA	43,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0016 J		NA	3.7E-08
Dieldrin	9.4	210	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.014 J		1.5E-09	6.7E-05	0.0066		7.0E-10	3.1E-05	0.017 J		1.8E-09	8.1E-05	0.012 J		1.3E-09	5.7E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.0011 J		NA	1.2E-08	0.0011 J		NA	1.2E-08	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0022 J		NA	2.4E-08
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01 U		NA	NA	0.01 U		NA	NA	0.0031 J		NA	3.4E-08	0.0019 J		NA	2.1E-08	0.0022 J		NA	2.4E-08	0.0028 J		NA	3.1E-08
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0017 J		NA	2.2E-07
Endrin Aldehyde	NA	4,100	Central Nervous System	0.0022 J		NA	5.4E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0012 J		NA	2.9E-07	0.01 U		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.0019 J		NA	3.2E-07	0.0016 J		NA	2.7E-07	0.0023 J		NA	4.8E-07	0.0018 J		NA	3.0E-07
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.007 J		NA	1.7E-08	0.005 U		NA	NA	0.0021 J		NA	5.0E-09	0.005 U		NA	NA	0.005 U		NA	NA	0.0028 J		NA	6.7E-09
Heptachlor	8	52	Reproductive	0.0063 J		7.9E-10	1.2E-04	0.004 J		5.0E-10	7.7E-05	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	24	41	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.0021		8.8E-11	5.1E-05	0.002 U		NA	NA	0.0023		9.6E-11	5.6E-05	0.0018 J		7.5E-11	4.4E-05
Methoxychlor	NA	3,500,000	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.0055 J		NA	1.6E-09
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	81.6		NA	1.7E-07	45.2		NA	9.6E-08	75.9		NA	1.6E-07	20.5		NA	4.4E-08	120 J		NA	2.6E-07	41.7		NA	8.9E-08
Arsenic	22,000	140,000	Skin, Cardiovascular System	7.8 J+		3.5E-10	5.6E-05	7.8 J+		3.5E-10	5.6E-05	1.1 J+		5.0E-11	7.9E-06	0.76 J+		3.5E-11	5.4E-06	0.76 J+		3.5E-11	5.4E-06	10.7 J+		4.9E-10	7.6E-05
Barium	NA	18,000,000	Neurological	637 J		NA	3.5E-05	643 J		NA	3.6E-05	52.1 J		NA	2.9E-06	63.1 J		NA	3.5E-06	33.5 J		NA	1.9E-06	635 J		NA	3.5E-05
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	626		NA	4.5E-06	657		NA	4.7E-06	30.7		NA	2.2E-07	42.8		NA	3.1E-07	21.9		NA	1.6E-07	3400		NA	2.4E-05
Calcium	NA	NA	Essential Nutrient	58900		NA	NA	62900		NA	NA	22200		NA	NA	38300		NA	NA	15000 J		NA	NA	97200		NA	NA
Chromium	2,500	89,000	None Reported	16.8		6.7E-09	1.9E-04	16.4		6.6E-09	1.8E-04	0.39 J		1.6E-10	4.4E-06	0.21 J		8.4E-11	2.4E-06	0.57 J		2.3E-10	6.4E-06	10.4		4.2E-09	1.2E-04
Cobalt	NA	1,800,000	Thyroid	20.3		NA	1.1E-05	20.8		NA	1.2E-05	0.34 J		NA	1.9E-07	0.93 J		NA	5.2E-07	1 U		NA	NA	17		NA	9.4E-06
Copper	NA	4,700,000	Gastrointestinal System	0.67 J		NA	1.4E-07	0.38 J-		NA	8.1E-08	5.3		NA	1.1E-06	0.62 J		NA	1.3E-07	8.8 J		NA	1.9E-06	2.2		NA	4.7E-07
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	26.6		NA	2.8E-06	21.5 J		NA	2.3E-06	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	2 J		NA	2.1E-07
Iron	NA	330,000,000	Gastrointestinal System	34700		NA	1.1E-04	33900		NA	1.0E-04	293		NA	8.9E-07	49.6 J		NA	1.5E-07	252		NA	7.6E-07	7450		NA	2.3E-05
Lead	NA	NA	Neurological	10.1		NA	NA	3.2		NA	NA	2.6		NA	NA	7.6		NA	NA	4.8 J		NA	NA	4.4		NA	NA
Magnesium	NA	NA	Essential Nutrient	37100		NA	NA	35200		NA	NA	7730		NA	NA	13900		NA	NA	5760 J		NA	NA	60700		NA	NA
Manganese	NA	1,300,000	Central Nervous System	850		NA	6.5E-04	887		NA	6.8E-04	147		NA	1.1E-04	138		NA	1.1E-04	10		NA	7.7E-06	5020		NA	3.9E-03
Mercury	NA	180,000	Central Nervous System	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA	0.047 J		NA	2.6E-07	0.034 J		NA	1.9E-07	0.2 U		NA	NA
Nickel	NA	4,100,000	Body Weight	36.1		NA	8.8E-06	36.4		NA	8.9E-06	1.1		NA	2.7E-07	1.7		NA	4.1E-07	0.97 J		NA	2.4E-07	40.8		NA	1.0E-05
Potassium	NA	NA	Essential Nutrient	66900		NA	NA	69600		NA	NA	3820		NA	NA	4470		NA	NA	3250 J		NA	NA	82200		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	24.1		NA	1.0E-05	25.8		NA	1.1E-05	0.5 J		NA	2.1E-07	0.3 J		NA	1.3E-07	5 U		NA	NA	9.1		NA	3.8E-06
Sodium	NA	NA	Essential Nutrient	695000		NA	NA	694000		NA	NA	19300		NA	NA	28400		NA	NA	13000 J		NA	NA	412000		NA	NA
Vanadium	NA	360,000	Kidney	7.2		NA	2.0E-05	6.9		NA	1.9E-05	2.6 U		NA	NA	5.2 U		NA	NA	2.6 U		NA	NA	7.2		NA	2.0E-05
Zinc	NA	160,000,000	Blood	14.3 J		NA	8.9E-08	7.6 J		NA	4.8E-08	13.5 J		NA	8.4E-08	32.8 J		NA	2.1E-07	12		NA	7.5E-08	39.7 J		NA	2.5E-07
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Risks						8.5E-09	1.3E-03			8.0E-09	1.2E-03			1.8E-09	2.6E-04			8.3E-10	1.6E-04			2.2E-09	1.7E-04			6.3E-09	4.3E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-2501 LDCA-PW-2501-02-20130912 20130912				PW-2502 LDCA-PW-2502-00-20130912 20130912				LDCA-PW-2502-02-20130912 20130912				PW-2503 LDCA-PW-2503-00-20130912 20130912				LDCA-PW-2503-02-20130912 20130912				PW-3301 LDCA-PW-3301-00-20130910 20130910			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	89		3.0E-10	4.0E-07	31		1.0E-10	1.4E-07	100		3.3E-10	4.5E-07	3.4		1.1E-11	1.5E-08	63		2.1E-10	2.9E-07	2.5 U		NA	NA
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	1.3 J		NA	2.3E-05	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	1.3 J		NA	1.7E-08	5 U		NA	NA	1.2 J		NA	1.6E-08	5 U		NA	NA	1.8 J		NA	2.3E-08	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	2.6 J		2.2E-13	1.9E-08	5 U		NA	NA	1.9 J		1.6E-13	1.4E-08	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	50 U		NA	NA	5 U		NA	NA	50 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 UJ		NA	NA	10 UJ		NA	NA	10 UJ		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	430,000	Kidney	1.3 J		NA	3.0E-06	5 U		NA	NA	1.2 J		NA	2.8E-06	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.048 J		NA	4.4E-06	0.058 J		NA	5.3E-06	0.072 J		NA	6.5E-06	0.011 J		NA	1.0E-06	0.065 J		NA	5.9E-06	0.1 U		NA	NA
Acenaphthene	NA	540,000	Liver	0.18		NA	3.3E-07	0.047 J		NA	8.7E-08	0.19		NA	3.5E-07	0.018 J		NA	3.3E-08	0.15		NA	2.8E-07	0.1 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	0.65		NA	2.2E-06	0.058 J		NA	2.0E-07	0.15		NA	5.2E-07	0.0087 J		NA	3.0E-08	0.12		NA	4.1E-07	0.1 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	0.55		NA	7.1E-09	0.16		NA	2.1E-09	0.7		NA	9.1E-09	0.1 U		NA	NA	0.5		NA	6.5E-09	0.1 U		NA	NA
Benzo(a)anthracene	67,000	NA	Cancer	0.11		1.6E-12	NA	0.037 J		5.5E-13	NA	0.2		3.0E-12	NA	0.0076 J		1.1E-13	NA	0.14		2.1E-12	NA	0.1 U		NA	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.017 J		2.5E-12	NA	0.1 U		NA	NA	0.011 J		1.6E-12	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.034 J		5.1E-13	NA	0.1 U		NA	NA	0.018 J		2.7E-13	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.1 UJ		NA	NA	0.1 U		NA	NA	0.0071 J		NA	1.1E-10	0.1 U		NA	NA	0.0066 J		NA	1.0E-10	0.1 U		NA	NA
Benzo(k)fluoranthene	670,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.013 J		1.9E-14	NA	0.1 U		NA	NA	0.011 J		1.6E-14	NA	0.1 U		NA	NA
Chrysene	6,700,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.034 J		5.1E-15	NA	0.1 U		NA	NA	0.016 J		2.4E-15	NA	0.1 U		NA	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.1 UJ		NA	NA	0.1 U		NA	NA	0.1 UJ		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	200,000	Kidney	0.07 J		NA	3.5E-07	0.03 J		NA	1.5E-07	0.1		NA	5.0E-07	0.015 J		NA	7.5E-08	0.11		NA	5.5E-07	0.021 J		NA	1.1E-07
Fluorene	NA	4,900,000	Blood	0.6		NA	1.2E-07	0.1 U		NA	NA	0.2		NA	4.1E-08	0.1 U		NA	NA	0.2		NA	4.1E-08	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.03 J		4.5E-13	NA	0.1 U		NA	NA	0.0076 J		1.1E-13	NA	0.1 U		NA	NA	0.0074 J		1.1E-13	NA	0.1 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	0.25		NA	6.8E-08	0.1 U		NA	NA	0.15		NA	4.1E-08	0.1 U		NA	NA	0.23		NA	6.2E-08	0.018 J		NA	4.9E-09
Pentachlorophenol	3,100	18,000	Reproductive	0.2 R		NA	NA	0.042 J		1.4E-11	2.3E-06	0.58 J		1.9E-10	3.2E-05	0.2 R		NA	NA	0.2 U		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	0.081 J		NA	1.9E-07	0.061 J		NA	1.4E-07	0.17		NA	4.0E-07	0.025 J		NA	5.8E-08	0.31		NA	7.2E-07	0.014 J		NA	3.3E-08
Pyrene	NA	270,000	Kidney	0.1 U		NA	NA	0.073 J		NA	2.7E-07	0.18		NA	6.7E-07	0.048 J		NA	1.8E-07	0.15		NA	5.6E-07	0.049 J		NA	1.8E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.0013 J		9.3E-15	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0022 J		1.6E-14	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.0051 J		3.6E-14	1.5E-08	0.013 J		9.3E-14	3.7E-08	0.0043 J		3.1E-14	1.2E-08	0.0084 J		6.0E-14	2.4E-08	0.0076		5.4E-14	2.2E-08	0.01		7.1E-14	2.9E-08
Aldrin	2,900	28,000	Liver	0.0031 J		1.1E-12	1.1E-07	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0042 J		1.4E-12	1.5E-07	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.0028 J		4.7E-11	6.5E-08	0.001 U		NA	NA	0.0013 J		2.2E-11	3.0E-08	0.001 U		NA	NA	0.0011 J		1.8E-11	2.6E-08	0.001 U		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.005 U		NA	NA	0.0019 J		NA	1.6E-06	0.005 U		NA	NA	0.0018 J		NA	1.5E-06	0.005 U		NA	NA	0.002 J		NA	1.7E-06
beta-BHC	210	3,200	Cancer	0.0025 J		1.2E-11	7.8E-07	0.001 U		NA	NA	0.011 J		5.2E-11	3.4E-06	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	NA	43,000	Liver	0.0018 J		NA	4.2E-08	0.001 J		NA	2.3E-08	0.0035 J		NA	8.1E-08	0.005 U		NA	NA	0.0019 J		NA	4.4E-08	0.005 U		NA	NA
Dieldrin	9.4	210	Liver	0.013 J		1.4E-09	6.2E-05	0.015		1.6E-09	7.1E-05	0.016		1.7E-09	7.6E-05	0.012		1.3E-09	5.7E-05	0.012		1.3E-09	5.7E-05	0.014		1.5E-09	6.7E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.0043 J		NA	4.8E-08	0.005 U		NA	NA	0.0038 J		NA	4.2E-08	0.005 U		NA	NA	0.0025 J		NA	2.8E-08	0.005 U		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.0024 J		NA	2.7E-08	0.0036 J		NA	4.0E-08	0.0027 J		NA	3.0E-08	0.0026 J		NA	2.9E-08	0.0026 J		NA	2.9E-08	0.0043 J		NA	4.8E-08
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.0018 J		NA	2.3E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.0032 J		NA	7.8E-07	0.0015 J		NA	3.7E-07	0.0025 J		NA	6.1E-07	0.01 U		NA	NA	0.0023 J		NA	5.6E-07	0.01 U		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0016 J		NA	2.7E-07	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.0026 J		7.6E-12	4.8E-05	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.0028 J		NA	6.7E-09	0.005 U		NA	NA	0.0055 J		NA	1.3E-08	0.0011 J		NA	2.6E-09	0.0068		NA	1.6E-08	0.005 U		NA	NA
Heptachlor	8	52	Reproductive	0.0019 J		2.4E-10	3.7E-05	0.001 U		NA	NA	0.0032 J		4.0E-10	6.2E-05	0.001 U		NA	NA	0.0027 J		3.4E-10	5.2E-05	0.001 U		NA	NA
Heptachlor Epoxide	24	41	Liver	0.002 U		NA	NA	0.0021 J		8.8E-11	5.1E-05	0.002 U		NA	NA	0.0019 J		7.9E-11	4.6E-05	0.0026 J		1.1E-10	6.3E-05	0.002 J		8.3E-11	4.9E-05
Methoxychlor	NA	3,500,000	Developmental	0.0082 J		NA	2.3E-09	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	34.5		NA	7.3E-08	11.3 J		NA	2.4E-08	229		NA	4.9E-07	23		NA	4.9E-08	69.4		NA	1.5E-07	22.6		NA	4.8E-08
Arsenic	22,000	140,000	Skin, Cardiovascular System	26.5 J+		1.2E-09	1.9E-04	7.2 J+		3.3E-10	5.1E-05	17.3 J+		7.9E-10	1.2E-04	2.2 J+		1.0E-10	1.6E-05	17.3 J+		7.9E-10	1.2E-04	0.74 J+		3.4E-11	5.3E-06
Barium	NA	18,000,000	Neurological	574 J		NA	3.2E-05	414 J		NA	2.3E-05	567 J		NA	3.2E-05	224 J		NA	1.2E-05	420 J		NA	2.3E-05	114		NA	6.3E-06
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	0.051 J		NA	1.0E-06	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	6040		NA	4.3E-05	856		NA	6.1E-06	5840		NA	4.2E-05	338		NA	2.4E-06	7310		NA	5.2E-05	44.2		NA	3.2E-07
Calcium	NA	NA	Essential Nutrient	48200		NA	NA	88300		NA	NA	60100		NA	NA	56000		NA	NA	27400		NA	NA	36100		NA	NA
Chromium	2,500	89,000	None Reported	18.2		7.3E-09	2.0E-04	2.8		1.1E-09	3.1E-05	14.2		5.7E-09	1.6E-04	1.2 J		4.8E-10	1.3E-05	13.2		5.3E-09	1.5E-04	2 U		NA	NA
Cobalt	NA	1,800,000	Thyroid	17.7		NA	9.8E-06	7.4		NA	4.1E-06	11.3		NA	6.3E-06	2.2		NA	1.2E-06	9.3		NA	5.2E-06	1 U		NA	NA
Copper	NA	4,700,000	Gastrointestinal System	1.3 J		NA	2.8E-07	1 J		NA	2.1E-07	4.4		NA	9.4E-07	1.9 J		NA	4.0E-07	1.9 J		NA	4.0E-07	2 UJ		NA	NA
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	8.2 J		NA	8.6E-07	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	3.5 J		NA	3.7E-07	NA		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	15200		NA	4.6E-05	7950		NA	2.4E-05	19000		NA	5.8E-05	486		NA	1.5E-06	9300		NA	2.8E-05	33.1 J-		NA	1.0E-07
Lead	NA	NA	Neurological	4.9		NA	NA	1.1		NA	NA	19		NA	NA	1.6		NA	NA	2.9		NA	NA	1 U		NA	NA
Magnesium	NA	NA	Essential Nutrient	81100		NA	NA	35400		NA	NA	55700		NA	NA	21600		NA	NA	41400		NA	NA	14200		NA	NA
Manganese	NA	1,300,000	Central Nervous System	3210		NA	2.5E-03	3850		NA	3.0E-03	2450		NA	1.9E-03	840		NA	6.5E-04	987		NA	7.6E-04	582		NA	4.5E-04
Mercury	NA	180,000	Central Nervous System	0.2 U		NA	NA	0.2 U		NA	NA	0.035 J		NA	1.9E-07	0.2 U		NA	NA	0.034 J		NA	1.9E-07	0.1 J		NA	5.6E-07
Nickel	NA	4,100,000	Body Weight	30.5		NA	7.4E-06	17.2		NA	4.2E-06	31.7		NA	7.7E-06	6.4		NA	1.6E-06	33.3		NA	8.1E-06	1.4 J		NA	3.4E-07
Potassium	NA	NA	Essential Nutrient	147000		NA	NA	20700		NA	NA	148000		NA	NA	8480		NA	NA	169000		NA	NA	4860		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	12.1		NA	5.0E-06	4 J		NA	1.7E-06	12.4		NA	5.2E-06	1.6 J		NA	6.7E-07	11.6		NA	4.8E-06	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	651000		NA	NA	181000		NA	NA	727000		NA	NA	88200		NA	NA	723000		NA	NA	42900 J		NA	NA
Vanadium	NA	360,000	Kidney	14		NA	3.9E-05	5.2 U		NA	NA	7.9		NA	2.2E-05	5.2 U		NA	NA	9.2		NA	2.6E-05	2.6 U		NA	NA
Zinc	NA	160,000,000	Blood	33.7 J		NA	2.1E-07	16.1 J		NA	1.0E-07	49 J		NA	3.1E-07	17.7 J		NA	1.1E-07	3.8 J		NA	2.4E-08	9.2		NA	5.8E-08
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Risks						1.0E-08	3.2E-03			3.2E-09	3.3E-03			9.2E-09	2.5E-03			1.9E-09	8.0E-04			8.0E-09	1.4E-03			1.6E-09	5.8E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

Risk for Construction Workers Exposed to Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-3301 LDCA-PW-3301-02-20130910 20130910				LDCA-PW-3302-00-20130910 20130910				PW-3302 LDCA-PW-3302-02-20130910 20130910				LDCA-PW-3302-04-20130910 20130910				PW-3303 LDCA-PW-3303-00-20130910 20130910				LDCA-PW-3303-02-20130910 20130910			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
Semivolatiles (ug/L)																											
1,4-Dioxane	300,000	220,000,000	Liver, Kidney	2.5 U		NA	NA	2.5 U		NA	NA	2.5 U		NA	NA	0.15 J		5.0E-13	6.8E-10	2.5 UJ		NA	NA	0.23 J		7.7E-13	1.0E-09
2-Methylnaphthalene	NA	11,000	Respiratory	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
2-Methylphenol	NA	8,200,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
4-Methylphenol	NA	56,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthene	NA	540,000	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Acenaphthylene	NA	290,000	None Reported	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Anthracene	NA	77,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzaldehyde	12,000,000	140,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)anthracene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(a)pyrene	49,000	210,000	Developmental, Immune, Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(b)fluoranthene	490,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Benzo(k)fluoranthene	4,900,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Bis(2-ethylhexyl)phthalate	3,500,000	70,000,000	Reproductive	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Caprolactam	NA	1,400,000	Developmental	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Carbazole	NA	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Chrysene	49,000,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Dibenzo(a,h)anthracene	49,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
di-n-Butyl Phthalate	NA	700,000,000	Whole Body	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluoranthene	NA	200,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Fluorene	NA	4,900,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Nitrobenzene	NA	250,000	Blood	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
N-Nitrosodiphenylamine	15,000	NA	Liver	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pentachlorophenol	3,100	18,000	Reproductive	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA	10 U		NA	NA
Phenanthrene	NA	430,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Pyrene	NA	270,000	Kidney	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Polycyclic Aromatic Hydrocarbons (ug/L)																											
2-Methylnaphthalene	NA	11,000	Respiratory	0.0072 J		NA	6.5E-07	0.0085 J		NA	7.7E-07	0.0052 J		NA	4.7E-07	0.016 J		NA	1.5E-06	0.0069 J		NA	6.3E-07	0.006 J		NA	5.5E-07
Acenaphthene	NA	540,000	Liver	0.022 J		NA	4.1E-08	0.026 J		NA	4.8E-08	0.13		NA	2.4E-07	0.24		NA	4.4E-07	0.028 J		NA	5.2E-08	0.48		NA	8.9E-07
Acenaphthylene	NA	290,000	None Reported	0.1 U		NA	NA	0.0051 J		NA	1.8E-08	0.01 J		NA	3.4E-08	0.016 J		NA	5.5E-08	0.0058 J		NA	2.0E-08	0.012 J		NA	4.1E-08
Anthracene	NA	77,000,000	Whole Body	0.023 J		NA	3.0E-10	0.1 U		NA	NA	0.028 J		NA	3.6E-10	0.041 J		NA	5.3E-10	0.02 J		NA	2.6E-10	0.064 J		NA	8.3E-10
Benzo(a)anthracene	67,000	NA	Cancer	0.013 J		1.9E-13	NA	0.0055 J		8.2E-14	NA	0.07 J		1.0E-12	NA	0.08 J		1.2E-12	NA	0.1 U		NA	NA	0.0081 J		1.2E-13	NA
Benzo(a)pyrene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.04 J		6.0E-12	NA	0.045 J		6.7E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(b)fluoranthene	67,000	NA	Cancer	0.0095 J		1.4E-13	NA	0.1 U		NA	NA	0.055 J		8.2E-13	NA	0.066 J		9.9E-13	NA	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(g,h,i)perylene	NA	65,000,000	Kidney	0.1 U		NA	NA	0.1 U		NA	NA	0.019 J		NA	2.9E-10	0.026 J		NA	4.0E-10	0.1 U		NA	NA	0.1 U		NA	NA
Benzo(k)fluoranthene	670,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.021 J		3.1E-14	NA	0.019 J		2.8E-14	NA	0.1 U		NA	NA	0.1 U		NA	NA
Chrysene	6,700,000	NA	Cancer	0.011 J		1.6E-15	NA	0.0057 J		8.5E-16	NA	0.056 J		8.4E-15	NA	0.063 J		9.4E-15	NA	0.1 U		NA	NA	0.0059 J		8.8E-16	NA
Dibenzo(a,h)anthracene	6,700	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.0063 J		9.4E-13	NA	0.007 J		1.0E-12	NA	0.1 U		NA	NA	0.1 U		NA	NA
Fluoranthene	NA	200,000	Kidney	0.061 J		NA	3.1E-07	0.029 J		NA	1.5E-07	0.11		NA	5.5E-07	0.12		NA	6.0E-07	0.035 J		NA	1.8E-07	0.055 J		NA	2.8E-07
Fluorene	NA	4,900,000	Blood	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA	0.1 U		NA	NA
Indeno(1,2,3-cd)pyrene	67,000	NA	Cancer	0.1 U		NA	NA	0.1 U		NA	NA	0.019 J		2.8E-13	NA	0.026 J		3.9E-13	NA	0.1 U		NA	NA	0.1 U		NA	NA
Naphthalene	NA	3,700,000	Body Weight	0.028 J		NA	7.6E-09	0.036 J		NA	9.7E-09	0.02 J		NA	5.4E-09	0.032 J		NA	8.6E-09	0.014 J		NA	3.8E-09	0.016 J		NA	4.3E-09
Pentachlorophenol	3,100	18,000	Reproductive	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA	0.2 R		NA	NA
Phenanthrene	NA	430,000	Kidney	0.047 J		NA	1.1E-07	0.028 J		NA	6.5E-08	0.034 J		NA	7.9E-08	0.089 J		NA	2.1E-07	0.015 J		NA	3.5E-08	0.09 J		NA	2.1E-07
Pyrene	NA	270,000	Kidney	0.076 J		NA	2.8E-07	0.024 J		NA	8.9E-08	0.16		NA	5.9E-07	0.18		NA	6.7E-07	0.03 J		NA	1.1E-07	0.093 J		NA	3.4E-07
Pesticides (ug/L)																											
4,4'-DDD	120	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDE	140,000	NA	Cancer	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
4,4'-DDT	140,000	350,000	Liver	0.0014 J		1.0E-14	4.0E-09	0.0072 J		5.1E-14	2.1E-08	0.01 U		NA	NA	0.01 U		1.1E-14	4.6E-09	0.0083 J		5.9E-14	2.4E-08	0.01 U		NA	NA
Aldrin	2,900	28,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
alpha-BHC	60	43,000	Liver	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
alpha-Chlordane	NA	1,200	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.0026 J		NA	2.2E-06	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
beta-BHC	210	3,200	Cancer	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA
delta-BHC	NA	43,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Dieldrin	9.4	210	Liver	0.008		8.5E-10	3.8E-05	0.012 J		1.3E-09	5.7E-05	0.0094		1.0E-09	4.5E-05	0.0023 J		2.4E-10	1.1E-05	0.012		1.3E-09	5.7E-05	0.0045		4.8E-10	2.1E-05
Endosulfan I	NA	90,000	Cardiovascular System, Urinary	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Endosulfan II	NA	90,000	Cardiovascular System, Urinary	0.01 U		NA	NA	0.0025 J		NA	2.8E-08	0.01 U		NA	NA	0.01 U		NA	NA	0.0032 J		NA	3.6E-08	0.01 U		NA	NA
Endrin	NA	7,900	Central Nervous System	0.01 U		NA	NA	0.0016 J		NA	2.0E-07	0.01 U		NA	NA	0.01 U		NA	NA	0.003 J		NA	3.8E-07	0.01 U		NA	NA
Endrin Aldehyde	NA	4,100	Central Nervous System	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.0027 J		NA	6.6E-07	0.01 U		NA	NA
Endrin Ketone	NA	6,000	Central Nervous System, Liver	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA	0.01 U		NA	NA
gamma-BHC (Lindane)	340	54	Immune System	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
gamma-Chlordane	NA	420,000	Liver	0.005 U		NA	NA	0.005 U		NA	NA	0.0021 J		NA	5.0E-09	0.005 U		NA	NA	0.005 U		NA	NA	0.005 U		NA	NA
Heptachlor	8	52	Reproductive	0.001 U		NA	NA	0.001 U		NA	NA	0.001 U		NA	NA	0.0012		1.5E-10	2.3E-05	0.001 U		NA	NA	0.001 U		NA	NA
Heptachlor Epoxide	24	41	Liver	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA	0.002 U		NA	NA
Methoxychlor	NA	3,500,000	Developmental	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA	0.05 U		NA	NA
Dioxins/Furans (pg/L)																											
TEQ	380,000	14,000,000	Lymphoma	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Metals (ug/L)																											
Aluminum	NA	470,000,000	Neurological	84.2		NA	1.8E-07	20 U		NA	NA	54.3		NA	1.2E-07	103		NA	2.2E-07	20 U		NA	NA	20 U		NA	NA
Arsenic	22,000	140,000	Skin, Cardiovascular System	8.1 J+		3.7E-10	5.8E-05	3.6 J+		1.6E-10	2.6E-05	3 J+		1.4E-10	2.1E-05	2.1 J+		9.5E-11	1.5E-05	3 J+		1.4E-10	2.1E-05	3.5 J+		1.6E-10	2.5E-05
Barium	NA	18,000,000	Neurological	41.4		NA	2.3E-06	104		NA	5.8E-06	91.7		NA	5.1E-06	378		NA	2.1E-05	52.5		NA	2.9E-06	424		NA	2.4E-05
Beryllium	NA	51,000	GS	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Boron	NA	140,000,000	Developmental	129		NA	9.2E-07	48.8		NA	3.5E-07	119		NA	8.5E-07	777		NA	5.6E-06	118		NA	8.4E-07	1630		NA	1.2E-05
Calcium	NA	NA	Essential Nutrient	59100		NA	NA	38000		NA	NA	27700		NA	NA	60300		NA	NA	37700		NA	NA	139000		NA	NA
Chromium	2,500	89,000	None Reported	0.25 J		1.0E-10	2.8E-06	0.24 J		9.6E-11	2.7E-06	0.86 J		3.4E-10	9.7E-06	2.3		9.2E-10	2.6E-05	0.12 J		4.8E-11	1.3E-06	0.88 J		3.5E-10	9.9E-06
Cobalt	NA	1,800,000	Thyroid	1 U		NA	NA	1.3		NA	7.2E-07	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
Copper	NA	4,700,000	Gastrointestinal System	2 UJ		NA	NA	2 UJ		NA	NA	2 UJ		NA	NA	4.3		NA	9.1E-07	2 UJ		NA	NA	2 UJ		NA	NA
Cyanide	NA	9,500,000	Thyroid, Central Nervous System, Body Weight	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA
Iron	NA	330,000,000	Gastrointestinal System	9050		NA	2.7E-05	2370		NA	7.2E-06	2850		NA	8.6E-06	15100		NA	4.6E-05	3060		NA	9.3E-06	20500		NA	6.2E-05
Lead	NA	NA	Neurological	1.4		NA	NA	1 U		NA	NA	2.7		NA	NA	5.1		NA	NA	1 U		NA	NA	1.7		NA	NA
Magnesium	NA	NA	Essential Nutrient	17500		NA	NA	12700		NA	NA	9060		NA	NA	25800		NA	NA	17500		NA	NA	86200		NA	NA
Manganese	NA	1,300,000	Central Nervous System	877		NA	6.7E-04	802		NA	6.2E-04	302		NA	2.3E-04	1120		NA	8.6E-04	605		NA	4.7E-04	1400		NA	1.1E-03
Mercury	NA	180,000	Central Nervous System	0.071 J		NA	3.9E-07	0.13 J		NA	7.2E-07	0.11 J		NA	6.1E-07	0.13 J		NA	7.2E-07	0.093 J		NA	5.2E-07	0.062 J		NA	3.4E-07
Nickel	NA	4,100,000	Body Weight	1 J		NA	2.4E-07	1.3 J		NA	3.2E-07	0.78 J		NA	1.9E-07	1.8 J		NA	4.4E-07	1.4 J		NA	3.4E-07	3.2 J		NA	7.8E-07
Potassium	NA	NA	Essential Nutrient	8540		NA	NA	4190		NA	NA	5010		NA	NA	25800		NA	NA	6230		NA	NA	48500		NA	NA
Selenium	NA	2,400,000	Skin, Central Nervous System	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
Sodium	NA	NA	Essential Nutrient	176000 J		NA	NA	36000 J		NA	NA	47200 J		NA	NA	748000 J		NA	NA	39600 J		NA	NA	319000 J		NA	NA
Vanadium	NA	360,000	Kidney	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA	2.6 U		NA	NA
Zinc	NA	160,000,000	Blood	4.2		NA	2.6E-08	3.9		NA	2.4E-08	5.4		NA	3.4E-08	9.8		NA	6.1E-08	5.1		NA	3.2E-08	2.7		NA	1.7E-08
PCBs (pg/L)																											
Dioxin-Like PCBs - TEQ	380,000	NA	Lymphoma			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Non-Dioxin-Like PCBs	1.2E+11	NA	Cancer			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA			0.0E+00	NA
Total Risks						1.3E-09	8.1E-04			1.5E-09	7.2E-04			1.5E-09	3.3E-04			1.4E-09	1.0E-03			1.5E-09	5.6E-04			9.9E-10	1.2E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Rejected results (R qualifier, highlighted yellow) were not used for calculating risks.

February 2016

Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-0301											
				LDCA-PW-0301-00-0216-TM				LDCA-PW-0301-02-0216-TM				LDCA-PW-0301-02-0216-TM-D			
				2/25/2016				2/25/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neurological	384		NA	8.0E-05	120		NA	2.5E-05	52.3		NA	1.1E-05
ARSENIC	25.0	1,400	Skin, Cardiovascular System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
BARIUM	NA	310,000	Neurological	186		NA	6.0E-04	183		NA	5.9E-04	187		NA	6.0E-04
CADMIUM	NA	590	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	60000		NA	NA	66300		NA	NA	66500		NA	NA
CHROMIUM	1.00	1,100	None Reported	2 U		NA	NA	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,600	Thyroid	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
COPPER	NA	190,000	Gastrointestinal System	8.9		NA	4.7E-05	4.3		NA	2.3E-05	2.8		NA	1.5E-05
IRON	NA	3,300,000	Gastrointestinal System	40900		NA	1.2E-02	40300		NA	1.2E-02	40700		NA	1.2E-02
LEAD	NA	NA	Neurological	11.4		NA	NA	1.3		NA	NA	1 U		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	25900		NA	NA	28600		NA	NA	28300		NA	NA
MANGANESE	NA	24,000	Central Nervous System	3080		NA	1.3E-01	3300		NA	1.4E-01	3340		NA	1.4E-01
NICKEL	NA	58,000	Body Weight	2.2		NA	3.8E-05	2		NA	3.4E-05	1.8		NA	3.1E-05
POTASSIUM	NA	NA	Essential Nutrient	5030		NA	NA	4970		NA	NA	4990		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	85600		NA	NA	48400		NA	NA	48200		NA	NA
THALLIUM	NA	48	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	1,500,000	Blood	13		NA	8.7E-06	5.2 J		NA	3.5E-06	2.5		NA	1.7E-06
Total Risk/Hazard Index						0.0E+00	1.4E-01			0.0E+00	1.5E-01			0.0E+00	1.5E-01

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

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Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-0301				PW-0303							
				LDCA-PW-0301-04-0216-TM				LDCA-PW-0303-00-0216-TM				LDCA-PW-0303-02-0216-TM			
				2/25/2016				2/25/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neuorological	11000		NA	2.3E-03	125		NA	2.6E-05	87.1		NA	1.8E-05
ARSENIC	25.0	1,400	Skin, Cardiovascular System	4.7		1.9E-07	3.4E-03	1 U		NA	NA	1 U		NA	NA
BARIUM	NA	310,000	Neuorological	380		NA	1.2E-03	109		NA	3.5E-04	161		NA	5.2E-04
CADMIUM	NA	590	Urinary	1.4		NA	2.4E-03	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	157000		NA	NA	42300		NA	NA	60200		NA	NA
CHROMIUM	1.00	1,100	None Reported	37		**3.7E-05**	3.4E-02	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,600	Thyroid	9.2		NA	5.8E-03	1 U		NA	NA	1 U		NA	NA
COPPER	NA	190,000	Gastrointestinal System	68.9 J		NA	3.6E-04	8.6		NA	4.5E-05	8.9		NA	4.7E-05
IRON	NA	3,300,000	Gastrointestinal System	70300		NA	2.1E-02	250		NA	7.6E-05	16400		NA	5.0E-03
LEAD	NA	NA	Neuorological	425		NA	NA	1.9		NA	NA	3.2		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	89300		NA	NA	20100		NA	NA	26600		NA	NA
MANGANESE	NA	24,000	Central Nervous System	2080		NA	8.7E-02	8.9		NA	3.7E-04	776		NA	3.2E-02
NICKEL	NA	58,000	Body Weight	22.4		NA	3.9E-04	2.7		NA	4.7E-05	1.9		NA	3.3E-05
POTASSIUM	NA	NA	Essential Nutrient	15600		NA	NA	4640		NA	NA	6150		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	98200		NA	NA	86400		NA	NA	97000		NA	NA
THALLIUM	NA	48	Skin	0.2		NA	4.2E-03	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	31.5 J		NA	9.0E-03	5 U		NA	NA	5 U		NA	NA
ZINC	NA	1,500,000	Blood	327		NA	2.2E-04	23.1		NA	1.5E-05	3.9		NA	2.6E-06
Total Risk/Hazard Index						**3.7E-05**	1.7E-01			0.0E+00	9.3E-04			0.0E+00	3.8E-02

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Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

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Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-1601				PW-1603							
				LDCA-PW-1601-00-0216-TM				LDCA-PW-1603-00-0216-TM				LDCA-PW-1603-02-0216-TM			
				2/25/2016				2/26/2016				2/26/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neuorological	110		NA	2.3E-05	559		NA	1.2E-04	33.6		NA	7.0E-06
ARSENIC	25.0	1,400	Skin, Cardiovascular System	4.5		1.8E-07	3.2E-03	1.7		6.8E-08	1.2E-03	1 U		NA	NA
BARIUM	NA	310,000	Neuorological	218		NA	7.0E-04	134		NA	4.3E-04	119		NA	3.8E-04
CADMIUM	NA	590	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	85100		NA	NA	69000		NA	NA	65300		NA	NA
CHROMIUM	1.00	1,100	None Reported	13.8		**1.4E-05**	1.3E-02	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,600	Thyroid	4.7		NA	2.9E-03	1 U		NA	NA	1 U		NA	NA
COPPER	NA	190,000	Gastrointestinal System	30.7		NA	1.6E-04	5.5		NA	2.9E-05	3.2		NA	1.7E-05
IRON	NA	3,300,000	Gastrointestinal System	5700		NA	1.7E-03	33700		NA	1.0E-02	31900		NA	9.7E-03
LEAD	NA	NA	Neuorological	1.8		NA	NA	6.6		NA	NA	1.1		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	61900		NA	NA	22800		NA	NA	24500		NA	NA
MANGANESE	NA	24,000	Central Nervous System	282		NA	1.2E-02	4030		NA	1.7E-01	3540		NA	1.5E-01
NICKEL	NA	58,000	Body Weight	10.5		NA	1.8E-04	2.7		NA	4.7E-05	1.7		NA	2.9E-05
POTASSIUM	NA	NA	Essential Nutrient	101000		NA	NA	4810		NA	NA	4990		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	469000		NA	NA	33600		NA	NA	34100		NA	NA
THALLIUM	NA	48	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	1,500,000	Blood	6.6		NA	4.4E-06	10.8		NA	7.2E-06	2 U		NA	NA
Total Risk/Hazard Index						**1.4E-05**	3.3E-02			6.8E-08	1.8E-01			0.0E+00	1.6E-01

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

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Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-1603								PW-2501			
				LDCA-PW-1603-04-0216-TM				LDCA-PW-1603-04-0216-TM-D				LDCA-PW-2501-00-0216-TM			
				2/26/2016				2/26/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neuorological	20 U		NA	NA	20 U		NA	NA	1870		NA	3.9E-04
ARSENIC	25.0	1,400	Skin, Cardiovascular System	1 U		NA	NA	1.1		4.4E-08	7.9E-04	11.8		4.7E-07	8.4E-03
BARIUM	NA	310,000	Neuorological	165		NA	5.3E-04	166		NA	5.4E-04	433		NA	1.4E-03
CADMIUM	NA	590	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2		NA	3.4E-04
CALCIUM	NA	NA	Essential Nutrient	89400		NA	NA	88900		NA	NA	121000		NA	NA
CHROMIUM	1.00	1,100	None Reported	2 U		NA	NA	2 U		NA	NA	17.1		**1.7E-05**	1.6E-02
COBALT	NA	1,600	Thyroid	1 U		NA	NA	1 U		NA	NA	6.8		NA	4.3E-03
COPPER	NA	190,000	Gastrointestinal System	3.3		NA	1.7E-05	2.2		NA	1.2E-05	57.6		NA	3.0E-04
IRON	NA	3,300,000	Gastrointestinal System	51000		NA	1.5E-02	50700		NA	1.5E-02	28200		NA	8.5E-03
LEAD	NA	NA	Neuorological	1 U		NA	NA	1 U		NA	NA	31.3		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	44200		NA	NA	43800		NA	NA	74300		NA	NA
MANGANESE	NA	24,000	Central Nervous System	4080		NA	1.7E-01	4050		NA	1.7E-01	522		NA	2.2E-02
NICKEL	NA	58,000	Body Weight	2.7		NA	4.7E-05	2.7		NA	4.7E-05	14.6		NA	2.5E-04
POTASSIUM	NA	NA	Essential Nutrient	7480		NA	NA	7550		NA	NA	80900		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	38200		NA	NA	39100		NA	NA	422000		NA	NA
THALLIUM	NA	48	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	5 U		NA	NA	5 U		NA	NA	14.6		NA	4.2E-03
ZINC	NA	1,500,000	Blood	2 U		NA	NA	5.5		NA	3.7E-06	74.5		NA	5.0E-05
Total Risk/Hazard Index						0.0E+00	1.9E-01			4.4E-08	1.9E-01			**1.8E-05**	6.5E-02

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Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

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Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-2501				PW-2503							
				LDCA-PW-2501-02-0216-TM				LDCA-PW-2503-00-0216-TM				LDCA-PW-2503-02-0216-TM			
				2/25/2016				2/26/2016				2/26/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neuorological	554		NA	1.2E-04	248		NA	5.2E-05	35.5		NA	7.4E-06
ARSENIC	25.0	1,400	Skin, Cardiovascular System	7		2.8E-07	5.0E-03	1.1		4.4E-08	7.9E-04	1 U		NA	NA
BARIUM	NA	310,000	Neuorological	499		NA	1.6E-03	228		NA	7.4E-04	130		NA	4.2E-04
CADMIUM	NA	590	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	139000		NA	NA	69400		NA	NA	50600		NA	NA
CHROMIUM	1.00	1,100	None Reported	11.5		**1.2E-05**	1.0E-02	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,600	Thyroid	6.7		NA	4.2E-03	1 U		NA	NA	1 U		NA	NA
COPPER	NA	190,000	Gastrointestinal System	54.5		NA	2.9E-04	6.1		NA	3.2E-05	2 U		NA	NA
IRON	NA	3,300,000	Gastrointestinal System	41900		NA	1.3E-02	76700		NA	2.3E-02	60400		NA	1.8E-02
LEAD	NA	NA	Neuorological	3.6		NA	NA	3		NA	NA	1 U		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	92300		NA	NA	25100		NA	NA	19900		NA	NA
MANGANESE	NA	24,000	Central Nervous System	2480		NA	1.0E-01	6930		NA	2.9E-01	3370		NA	1.4E-01
NICKEL	NA	58,000	Body Weight	12.4		NA	2.1E-04	2.1		NA	3.6E-05	1.4		NA	2.4E-05
POTASSIUM	NA	NA	Essential Nutrient	84400		NA	NA	7010		NA	NA	4300		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	462000		NA	NA	39100		NA	NA	36400		NA	NA
THALLIUM	NA	48	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	1,500,000	Blood	6.4		NA	4.3E-06	10.4		NA	6.9E-06	2 U		NA	NA
Total Risk/Hazard Index						**1.2E-05**	1.4E-01			4.4E-08	3.1E-01			0.0E+00	1.6E-01

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Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-LD103											
				LDCA-PW-LD103-00-0216-TM				LDCA-PW-LD103-02-0216-TM				LDCA-PW-LD103-04-0216-TM			
				2/26/2016				2/26/2016				2/26/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neuorological	139		NA	2.9E-05	20 U		NA	NA	26.8		NA	5.6E-06
ARSENIC	25.0	1,400	Skin, Cardiovascular System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
BARIUM	NA	310,000	Neuorological	69.8		NA	2.3E-04	86.1		NA	2.8E-04	106		NA	3.4E-04
CADMIUM	NA	590	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	29800		NA	NA	35300		NA	NA	63500		NA	NA
CHROMIUM	1.00	1,100	None Reported	2 U		NA	NA	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,600	Thyroid	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
COPPER	NA	190,000	Gastrointestinal System	6.4		NA	3.4E-05	10.9		NA	5.7E-05	2.2		NA	1.2E-05
IRON	NA	3,300,000	Gastrointestinal System	245		NA	7.4E-05	2.6 U		NA	NA	5740		NA	1.7E-03
LEAD	NA	NA	Neuorological	2.1		NA	NA	1 U		NA	NA	1.4		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	10200		NA	NA	13700		NA	NA	23900		NA	NA
MANGANESE	NA	24,000	Central Nervous System	70.9		NA	3.0E-03	10.4		NA	4.3E-04	813		NA	3.4E-02
NICKEL	NA	58,000	Body Weight	2		NA	3.4E-05	2		NA	3.4E-05	2		NA	3.4E-05
POTASSIUM	NA	NA	Essential Nutrient	3420		NA	NA	5450		NA	NA	4630		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	59300		NA	NA	145000		NA	NA	47700		NA	NA
THALLIUM	NA	48	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	1,500,000	Blood	16.8		NA	1.1E-05	9.6		NA	6.4E-06	2.6		NA	1.7E-06
Total Risk/Hazard Index						0.0E+00	3.4E-03			0.0E+00	8.1E-04			0.0E+00	3.6E-02

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Risks for Lifetime Recreational Users Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer[1]	RSL Non-cancer[2]	Target Organ	PW-LD108								PW-LD126			
				LDCA-PW-LD108HT-00-0216-TM				LDCA-PW-LD108-00-0216-TM				LDCA-PW-LD126-00-0216-TM			
				2/25/2016				2/25/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	4,800,000	Neuorological	1290		NA	2.7E-04	1310		NA	2.7E-04	613		NA	1.3E-04
ARSENIC	25.0	1,400	Skin, Cardiovascular System	1.2		4.8E-08	8.6E-04	2.1		8.4E-08	1.5E-03	1.8		7.2E-08	1.3E-03
BARIUM	NA	310,000	Neuorological	380		NA	1.2E-03	214		NA	6.9E-04	206		NA	6.6E-04
CADMIUM	NA	590	Urinary	0.3		NA	5.1E-04	0.2		NA	3.4E-04	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	118000		NA	NA	84000		NA	NA	58500		NA	NA
CHROMIUM	1.00	1,100	None Reported	2.1		2.1E-06	1.9E-03	5.1		5.1E-06	4.6E-03	2 U		NA	NA
COBALT	NA	1,600	Thyroid	2.5		NA	1.6E-03	1.7		NA	1.1E-03	2.6		NA	1.6E-03
COPPER	NA	190,000	Gastrointestinal System	15.5		NA	8.2E-05	16.9		NA	8.9E-05	18.3		NA	9.6E-05
IRON	NA	3,300,000	Gastrointestinal System	2460		NA	7.5E-04	2970		NA	9.0E-04	12100		NA	3.7E-03
LEAD	NA	NA	Neuorological	3.5		NA	NA	18.5		NA	NA	10.2		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	52700		NA	NA	41400		NA	NA	28500		NA	NA
MANGANESE	NA	24,000	Central Nervous System	180		NA	7.5E-03	191		NA	8.0E-03	1210		NA	5.0E-02
NICKEL	NA	58,000	Body Weight	9.8		NA	1.7E-04	8.3		NA	1.4E-04	4.6		NA	7.9E-05
POTASSIUM	NA	NA	Essential Nutrient	29700		NA	NA	18800		NA	NA	7040		NA	NA
SELENIUM	NA	24,000	Skin, Central Nervous System	1.1		NA	4.6E-05	1		NA	4.2E-05	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	64600		NA	NA	68500		NA	NA	129000		NA	NA
THALLIUM	NA	48	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	3,500	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	1,500,000	Blood	32.3		NA	2.2E-05	37.1		NA	2.5E-05	54.7		NA	3.6E-05
Total Risk/Hazard Index						2.1E-06	1.5E-02			5.2E-06	1.8E-02			7.2E-08	5.8E-02

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-0301											
				LDCA-PW-0301-00-0216-TM				LDCA-PW-0301-02-0216-TM				LDCA-PW-0301-02-0216-TM-D			
				2/25/2016				2/25/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	384		NA	8.2E-07	120		NA	2.6E-07	52.3		NA	1.1E-07
ARSENIC	22,000	140,000	Skin, Cardiovascular System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
BARIUM	NA	18,000,000	Neuorological	186		NA	1.0E-05	183		NA	1.0E-05	187		NA	1.0E-05
CADMIUM	NA	33,000	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	60000		NA	NA	66300		NA	NA	66500		NA	NA
CHROMIUM	2,500	89,000	None Reported	2 U		NA	NA	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,800,000	Thyroid	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
COPPER	NA	4,700,000	Gastrointestinal System	8.9		NA	1.9E-06	4.3		NA	9.1E-07	2.8		NA	6.0E-07
IRON	NA	330,000,000	Gastrointestinal System	40900		NA	1.2E-04	40300		NA	1.2E-04	40700		NA	1.2E-04
LEAD	NA	NA	Neuorological	11.4		NA	NA	1.3		NA	NA	1 U		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	25900		NA	NA	28600		NA	NA	28300		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	3080		NA	2.4E-03	3300		NA	2.5E-03	3340		NA	2.6E-03
NICKEL	NA	4,100,000	Body Weight	2.2		NA	5.4E-07	2		NA	4.9E-07	1.8		NA	4.4E-07
POTASSIUM	NA	NA	Essential Nutrient	5030		NA	NA	4970		NA	NA	4990		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	85600		NA	NA	48400		NA	NA	48200		NA	NA
THALLIUM	NA	19,000	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	160,000,000	Blood	13		NA	8.1E-08	5.2 J		NA	3.3E-08	2.5		NA	1.6E-08
Total Risk/Hazard Index						0.0E+00	2.5E-03			0.0E+00	2.7E-03			0.0E+00	2.7E-03

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-0301				PW-0303							
				LDCA-PW-0301-04-0216-TM				LDCA-PW-0303-00-0216-TM				LDCA-PW-0303-02-0216-TM			
				2/25/2016				2/25/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	11000		NA	2.3E-05	125		NA	2.7E-07	87.1		NA	1.9E-07
ARSENIC	22,000	140,000	Skin, Cardiovascular System	4.7		2.1E-10	3.4E-05	1 U		NA	NA	1 U		NA	NA
BARIUM	NA	18,000,000	Neuorological	380		NA	2.1E-05	109		NA	6.1E-06	161		NA	8.9E-06
CADMIUM	NA	33,000	Urinary	1.4		NA	4.2E-05	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	157000		NA	NA	42300		NA	NA	60200		NA	NA
CHROMIUM	2,500	89,000	None Reported	37		1.5E-08	4.2E-04	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,800,000	Thyroid	9.2		NA	5.1E-06	1 U		NA	NA	1 U		NA	NA
COPPER	NA	4,700,000	Gastrointestinal System	68.9 J		NA	1.5E-05	8.6		NA	1.8E-06	8.9		NA	1.9E-06
IRON	NA	330,000,000	Gastrointestinal System	70300		NA	2.1E-04	250		NA	7.6E-07	16400		NA	5.0E-05
LEAD	NA	NA	Neuorological	425		NA	NA	1.9		NA	NA	3.2		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	89300		NA	NA	20100		NA	NA	26600		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	2080		NA	1.6E-03	8.9		NA	6.8E-06	776		NA	6.0E-04
NICKEL	NA	4,100,000	Body Weight	22.4		NA	5.5E-06	2.7		NA	6.6E-07	1.9		NA	4.6E-07
POTASSIUM	NA	NA	Essential Nutrient	15600		NA	NA	4640		NA	NA	6150		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	98200		NA	NA	86400		NA	NA	97000		NA	NA
THALLIUM	NA	19,000	Skin	0.2		NA	1.1E-05	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	31.5 J		NA	8.8E-05	5 U		NA	NA	5 U		NA	NA
ZINC	NA	160,000,000	Blood	327		NA	2.0E-06	23.1		NA	1.4E-07	3.9		NA	2.4E-08
Total Risk/Hazard Index						1.5E-08	2.5E-03			0.0E+00	1.7E-05			0.0E+00	6.6E-04

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-1601				PW-1603							
				LDCA-PW-1601-00-0216-TM				LDCA-PW-1603-00-0216-TM				LDCA-PW-1603-02-0216-TM			
				2/25/2016				2/26/2016				2/26/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	110		NA	2.3E-07	559		NA	1.2E-06	33.6		NA	7.1E-08
ARSENIC	22,000	140,000	Skin, Cardiovascular System	4.5		2.0E-10	3.2E-05	1.7		7.7E-11	1.2E-05	1 U		NA	NA
BARIUM	NA	18,000,000	Neuorological	218		NA	1.2E-05	134		NA	7.4E-06	119		NA	6.6E-06
CADMIUM	NA	33,000	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	85100		NA	NA	69000		NA	NA	65300		NA	NA
CHROMIUM	2,500	89,000	None Reported	13.8		5.5E-09	1.6E-04	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,800,000	Thyroid	4.7		NA	2.6E-06	1 U		NA	NA	1 U		NA	NA
COPPER	NA	4,700,000	Gastrointestinal System	30.7		NA	6.5E-06	5.5		NA	1.2E-06	3.2		NA	6.8E-07
IRON	NA	330,000,000	Gastrointestinal System	5700		NA	1.7E-05	33700		NA	1.0E-04	31900		NA	9.7E-05
LEAD	NA	NA	Neuorological	1.8		NA	NA	6.6		NA	NA	1.1		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	61900		NA	NA	22800		NA	NA	24500		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	282		NA	2.2E-04	4030		NA	3.1E-03	3540		NA	2.7E-03
NICKEL	NA	4,100,000	Body Weight	10.5		NA	2.6E-06	2.7		NA	6.6E-07	1.7		NA	4.1E-07
POTASSIUM	NA	NA	Essential Nutrient	101000		NA	NA	4810		NA	NA	4990		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	469000		NA	NA	33600		NA	NA	34100		NA	NA
THALLIUM	NA	19,000	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	160,000,000	Blood	6.6		NA	4.1E-08	10.8		NA	6.8E-08	2 U		NA	NA
Total Risk/Hazard Index						5.7E-09	4.5E-04			7.7E-11	3.2E-03			0.0E+00	2.8E-03

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-1603								PW-2501			
				LDCA-PW-1603-04-0216-TM				LDCA-PW-1603-04-0216-TM-D				LDCA-PW-2501-00-0216-TM			
				2/26/2016				2/26/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	20 U		NA	NA	20 U		NA	NA	1870		NA	4.0E-06
ARSENIC	22,000	140,000	Skin, Cardiovascular System	1 U		NA	NA	1.1		5.0E-11	7.9E-06	11.8		5.4E-10	8.4E-05
BARIUM	NA	18,000,000	Neuorological	165		NA	9.2E-06	166		NA	9.2E-06	433		NA	2.4E-05
CADMIUM	NA	33,000	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2		NA	6.1E-06
CALCIUM	NA	NA	Essential Nutrient	89400		NA	NA	88900		NA	NA	121000		NA	NA
CHROMIUM	2,500	89,000	None Reported	2 U		NA	NA	2 U		NA	NA	17.1		6.8E-09	1.9E-04
COBALT	NA	1,800,000	Thyroid	1 U		NA	NA	1 U		NA	NA	6.8		NA	3.8E-06
COPPER	NA	4,700,000	Gastrointestinal System	3.3		NA	7.0E-07	2.2		NA	4.7E-07	57.6		NA	1.2E-05
IRON	NA	330,000,000	Gastrointestinal System	51000		NA	1.5E-04	50700		NA	1.5E-04	28200		NA	8.5E-05
LEAD	NA	NA	Neuorological	1 U		NA	NA	1 U		NA	NA	31.3		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	44200		NA	NA	43800		NA	NA	74300		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	4080		NA	3.1E-03	4050		NA	3.1E-03	522		NA	4.0E-04
NICKEL	NA	4,100,000	Body Weight	2.7		NA	6.6E-07	2.7		NA	6.6E-07	14.6		NA	3.6E-06
POTASSIUM	NA	NA	Essential Nutrient	7480		NA	NA	7550		NA	NA	80900		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	38200		NA	NA	39100		NA	NA	422000		NA	NA
THALLIUM	NA	19,000	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	5 U		NA	NA	5 U		NA	NA	14.6		NA	4.1E-05
ZINC	NA	160,000,000	Blood	2 U		NA	NA	5.5		NA	3.4E-08	74.5		NA	4.7E-07
Total Risk/Hazard Index						0.0E+00	3.3E-03			5.0E-11	3.3E-03			7.4E-09	8.6E-04

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-2501				PW-2503							
				LDCA-PW-2501-02-0216-TM				LDCA-PW-2503-00-0216-TM				LDCA-PW-2503-02-0216-TM			
				2/25/2016				2/26/2016				2/26/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	554		NA	1.2E-06	248		NA	5.3E-07	35.5		NA	7.6E-08
ARSENIC	22,000	140,000	Skin, Cardiovascular System	7		3.2E-10	5.0E-05	1.1		5.0E-11	7.9E-06	1 U		NA	NA
BARIUM	NA	18,000,000	Neuorological	499		NA	2.8E-05	228		NA	1.3E-05	130		NA	7.2E-06
CADMIUM	NA	33,000	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	139000		NA	NA	69400		NA	NA	50600		NA	NA
CHROMIUM	2,500	89,000	None Reported	11.5		4.6E-09	1.3E-04	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,800,000	Thyroid	6.7		NA	3.7E-06	1 U		NA	NA	1 U		NA	NA
COPPER	NA	4,700,000	Gastrointestinal System	54.5		NA	1.2E-05	6.1		NA	1.3E-06	2 U		NA	NA
IRON	NA	330,000,000	Gastrointestinal System	41900		NA	1.3E-04	76700		NA	2.3E-04	60400		NA	1.8E-04
LEAD	NA	NA	Neuorological	3.6		NA	NA	3		NA	NA	1 U		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	92300		NA	NA	25100		NA	NA	19900		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	2480		NA	1.9E-03	6930		NA	5.3E-03	3370		NA	2.6E-03
NICKEL	NA	4,100,000	Body Weight	12.4		NA	3.0E-06	2.1		NA	5.1E-07	1.4		NA	3.4E-07
POTASSIUM	NA	NA	Essential Nutrient	84400		NA	NA	7010		NA	NA	4300		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	462000		NA	NA	39100		NA	NA	36400		NA	NA
THALLIUM	NA	19,000	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	160,000,000	Blood	6.4		NA	4.0E-08	10.4		NA	6.5E-08	2 U		NA	NA
Total Risk/Hazard Index						4.9E-09	2.3E-03			5.0E-11	5.6E-03			0.0E+00	2.8E-03

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-LD103											
				LDCA-PW-LD103-00-0216-TM				LDCA-PW-LD103-02-0216-TM				LDCA-PW-LD103-04-0216-TM			
				2/26/2016				2/26/2016				2/26/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	139		NA	3.0E-07	20 U		NA	NA	26.8		NA	5.7E-08
ARSENIC	22,000	140,000	Skin, Cardiovascular System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
BARIUM	NA	18,000,000	Neuorological	69.8		NA	3.9E-06	86.1		NA	4.8E-06	106		NA	5.9E-06
CADMIUM	NA	33,000	Urinary	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	29800		NA	NA	35300		NA	NA	63500		NA	NA
CHROMIUM	2,500	89,000	None Reported	2 U		NA	NA	2 U		NA	NA	2 U		NA	NA
COBALT	NA	1,800,000	Thyroid	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
COPPER	NA	4,700,000	Gastrointestinal System	6.4		NA	1.4E-06	10.9		NA	2.3E-06	2.2		NA	4.7E-07
IRON	NA	330,000,000	Gastrointestinal System	245		NA	7.4E-07	2.6 U		NA	NA	5740		NA	1.7E-05
LEAD	NA	NA	Neuorological	2.1		NA	NA	1 U		NA	NA	1.4		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	10200		NA	NA	13700		NA	NA	23900		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	70.9		NA	5.5E-05	10.4		NA	8.0E-06	813		NA	6.3E-04
NICKEL	NA	4,100,000	Body Weight	2		NA	4.9E-07	2		NA	4.9E-07	2		NA	4.9E-07
POTASSIUM	NA	NA	Essential Nutrient	3420		NA	NA	5450		NA	NA	4630		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1 U		NA	NA	1 U		NA	NA	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	59300		NA	NA	145000		NA	NA	47700		NA	NA
THALLIUM	NA	19,000	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	160,000,000	Blood	16.8		NA	1.1E-07	9.6		NA	6.0E-08	2.6		NA	1.6E-08
Total Risk/Hazard Index						0.0E+00	6.1E-05			0.0E+00	1.6E-05			0.0E+00	6.5E-04

Risks for Construction Workers Exposed to Pore Water (February 2016)
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater, Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Chemical	RSL Cancer	RSL Non-cancer	Target Organ	PW-LD108								PW-LD126			
				LDCA-PW-LD108HT-00-0216-TM				LDCA-PW-LD108-00-0216-TM				LDCA-PW-LD126-00-0216-TM			
				2/25/2016				2/25/2016				2/25/2016			
				Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
METALS (UG/L)															
ALUMINUM	NA	470,000,000	Neuorological	1290		NA	2.7E-06	1310		NA	2.8E-06	613		NA	1.3E-06
ARSENIC	22,000	140,000	Skin, Cardiovascular System	1.2		5.5E-11	8.6E-06	2.1		9.5E-11	1.5E-05	1.8		8.2E-11	1.3E-05
BARIUM	NA	18,000,000	Neuorological	380		NA	2.1E-05	214		NA	1.2E-05	206		NA	1.1E-05
CADMIUM	NA	33,000	Urinary	0.3		NA	9.1E-06	0.2		NA	6.1E-06	0.2 U		NA	NA
CALCIUM	NA	NA	Essential Nutrient	118000		NA	NA	84000		NA	NA	58500		NA	NA
CHROMIUM	2,500	89,000	None Reported	2.1		8.4E-10	2.4E-05	5.1		2.0E-09	5.7E-05	2 U		NA	NA
COBALT	NA	1,800,000	Thyroid	2.5		NA	1.4E-06	1.7		NA	9.4E-07	2.6		NA	1.4E-06
COPPER	NA	4,700,000	Gastrointestinal System	15.5		NA	3.3E-06	16.9		NA	3.6E-06	18.3		NA	3.9E-06
IRON	NA	330,000,000	Gastrointestinal System	2460		NA	7.5E-06	2970		NA	9.0E-06	12100		NA	3.7E-05
LEAD	NA	NA	Neuorological	3.5		NA	NA	18.5		NA	NA	10.2		NA	NA
MAGNESIUM	NA	NA	Essential Nutrient	52700		NA	NA	41400		NA	NA	28500		NA	NA
MANGANESE	NA	1,300,000	Central Nervous System	180		NA	1.4E-04	191		NA	1.5E-04	1210		NA	9.3E-04
NICKEL	NA	4,100,000	Body Weight	9.8		NA	2.4E-06	8.3		NA	2.0E-06	4.6		NA	1.1E-06
POTASSIUM	NA	NA	Essential Nutrient	29700		NA	NA	18800		NA	NA	7040		NA	NA
SELENIUM	NA	2,400,000	Skin, Central Nervous System	1.1		NA	4.6E-07	1		NA	4.2E-07	1 U		NA	NA
SODIUM	NA	NA	Essential Nutrient	64600		NA	NA	68500		NA	NA	129000		NA	NA
THALLIUM	NA	19,000	Skin	0.2 U		NA	NA	0.2 U		NA	NA	0.2 U		NA	NA
VANADIUM	NA	360,000	Urinary	5 U		NA	NA	5 U		NA	NA	5 U		NA	NA
ZINC	NA	160,000,000	Blood	32.3		NA	2.0E-07	37.1		NA	2.3E-07	54.7		NA	3.4E-07
Total Risk/Hazard Index						8.9E-10	2.2E-04			2.1E-09	2.6E-04			8.2E-11	1.0E-03

APPENDIX H

ECOLOGICAL RISK ASSESSMENT

APPENDIX H-1

EVALUATION OF PREVIOUS HHRA AND ERA PORE WATER DATA

Technical Evaluation – Ecological and Human Health Evaluation of Pore Water Data
Lower Darby Creek Area Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

This document presents a brief ecological and human health evaluation of the pore water samples collected from Darby Creek. One round of samples was collected in May 2013 and a second round of sample was collected in September 2013. The May 2013 pore water samples were collected from 12 sampling stations along the stream bank closest to the landfill (see Figure 1). Slotted PCV pipes were driven horizontally into the bank and water discharging from the top of the pipe was collected. The September 2013 pore water samples were collected from six transects along the stream bank, each with 2 to 3 sampling stations across the stream (see Figure 2). These samples were collected by driving slotted PCV pipes vertically into the creek bottom and using a peristaltic pump to collect the pore water. The September 2013 samples were collected from various depths beneath the sediment surface. These are noted in the station ID with a "-00", "-02", or "-04" indicating the samples were collected from right beneath the sediment surface, from 2 feet beneath the sediment surface, for from 4 feet beneath the sediment surface, respectively.

Ecological Evaluation

Tables 1 through 4 present the May 2013 data for inorganics, semivolatile organic compounds (SVOCs), pesticides, and PCBs, respectively. Tables 5 through 10 present the September 2013 data for inorganics, SVOCs, polycyclic aromatic hydrocarbons (PAHs), pesticides, PCBs, and dioxins respectively. The tables only show the chemicals that were detected in at least one sample. The tables also list the USEPA Region 3 Biological Technical Assistance Group (BTAG) Freshwater Surface Water Screening Benchmarks, the maximum detected concentrations, the number of samples in which the chemical was detected, and the number of samples in which the chemical concentration exceeded its screening benchmark.

The concentration of nearly every detected inorganic chemical exceeded their respective surface water benchmarks in at least one sample during both sampling rounds. The five chemicals with the greatest number of exceedences in May 2013 were barium, iron, lead, manganese, and selenium while the five chemicals with the greatest number of exceedences in September 2013 were barium, boron, iron, manganese, and mercury.

Several SVOCs were detected at concentrations that exceeded their surface water benchmarks, most of which were PAHs. The two PAHs with the greatest number of exceedences were anthracene and pryene. Note that PAH concentrations were much greater in the May 2013 samples than the September 2013 samples.

Several pesticides were detected in the pore water samples at concentrations that exceeded the surface water benchmarks, the most frequent of which were 4,4'-DDT and alpha chlordane.

The pore water samples were analyzed for all 209 PCB congeners, and then the results were summed to calculate total homologue groups and total PCBs. Only the total PCB results were compared to the total PCB screening benchmark. The total PCB concentrations in all samples exceeded its screening benchmark.

The only dioxin that was detected in the pore water samples was OCDD. The concentrations in this sample were used to calculate total toxicity equivalent quotients levels for birds, fish, and mammals. The BTAG value for 2,3,7,8-TCDD is used as the screening benchmark for fish and the concentrations in both samples in which OCDD was detected exceeded the screening benchmark.

In summary, numerous inorganic and organic chemicals in the pore water samples were detected at concentrations that exceeded their respective BTAG surface water benchmarks, indicating that potential impacts to sediment invertebrates exposed to these chemicals in pore water are possible. The pore water samples were not filtered so the inorganic results are total concentrations, not dissolved concentrations. Therefore, the potential impacts from inorganics are likely overestimated because generally only the dissolved portion of metals in surface/pore water is bioavailable to aquatic organisms, and dissolved concentrations would likely be much lower than the total concentrations. The fact the numerous PCBs and PAHs were detected in the pore water samples indicates that the samples likely had some suspended solids because PCBs and PAHs generally any not very water soluble. Also, some of the BTAG screening benchmarks could be refined with more appropriate values that may reduce the number of exceedences. Nevertheless, it is likely that several chemicals would still be detected at concentrations that exceed benchmarks, if dissolved metals were collected and if alternate benchmarks were to be used. The concentrations in the surface water are expected to be much lower because of mixing, so potential risks to organisms that live only in the surface water cannot be determined.

Human Health Evaluation

The human health evaluation was performed using site-specific regional screening levels (RSLs) that were previously developed for construction workers and recreational users exposed to pore water. Recreational users are potentially exposed to surface water contaminants through incidental ingestion and dermal contact. Construction workers are similarly exposed to surface water contaminants.

For a recreational receptor, exposures were assumed to occur for a 2 hour event duration on 2 days per week during the warmest 6 months of the year (52 days per year). Due to shallow water depths (1 foot or less), it was assumed that the skin surface area exposed to surface water for the adult would be limited to feet, lower legs, and hands. For the child, skins surface area exposed to surface water would be limited to hands, forearms, lower legs, and feet. The recreational receptors were assumed to ingest 0.01 L/hr of surface water, which is one-fifth the amount that is estimated to be ingested while swimming. The recreational child is defined as a between the ages of 0 and 6; the recreational adult is assumed to be exposed for 12 years between the ages of 6 and 18.

For a construction worker, exposures were assumed to occur for 10 minutes per day (0.16 hr), once per week during the warmest 6 months of the year (26 days per year). The ingestion rate for the construction worker is the same as that for the recreational user, 0.01 L/hr. The construction worker is assumed to be exposed to the site over a one-year period.

Risk estimates were calculated using a simple risk-ratio methodology and the RSLs. The RSLs for receptor exposures to pore water represent, in effect, an HQ of 1 (i.e., the no-adverse-effect concentration) for non-carcinogens and a $1x10^{-6}$ target cancer risk level for carcinogens. Cancer and non-cancer risk estimates were developed using the risk-ratio technique demonstrated in the following formula:

$$\frac{\text{RSL for Receptor}}{\text{EPC for Chemical}} = \frac{\text{Target HI of 1 or Target Cancer Risk Estimate of } 1\text{x}10^{-6}}{\text{HI or Cancer Risk Estimate}}$$

Solving this equation for HQ or cancer risk yields:

$$\text{HI or Cancer Risk Estimate} = \frac{\text{EPC for Chemical x Target HI or 1 or Target Cancer Risk Estimate of } 1\text{x}10^{-6}}{\text{RSL for Receptor}}$$

A summary of the estimated cancer risks and hazard indices for construction workers and recreational users are presented in Table 11. Chemical specific cancer risks and hazard indices for the construction worker are presented in Tables 12 and 13 for the May and September data, respectively. Chemical specific cancer risks and hazard indices for recreational users are presented in Tables 14 and 15 for the May and September data, respectively. For the construction worker all cancer risks were less than USEPA's target risk range of 10^{-4} to 10^{-6}. All hazard indices for the construction worker were less than the acceptable level of 1.

For the September 2013 data, all cancer risks for recreational users were less than or equal to $1x10^{-6}$ and all hazard indices were less than 1. For the May 2014 data, the cancer risk of $4x10^{-4}$ at location LD132 exceeded USEPA's target risk range. The cancer risk of $8x10^{-6}$ in the duplicate sample collected at this location was within USEPA's target risk range. Hazard indices exceeded the acceptable level of 1 at locations LD126 (HI=40) and LD132 (HI=30). The hazard index for the duplicate sample (HI=0.7) collected at location LD132 was less than 1. Dioxin-like PCBs were the major contributors to cancer risks and hazard indices.

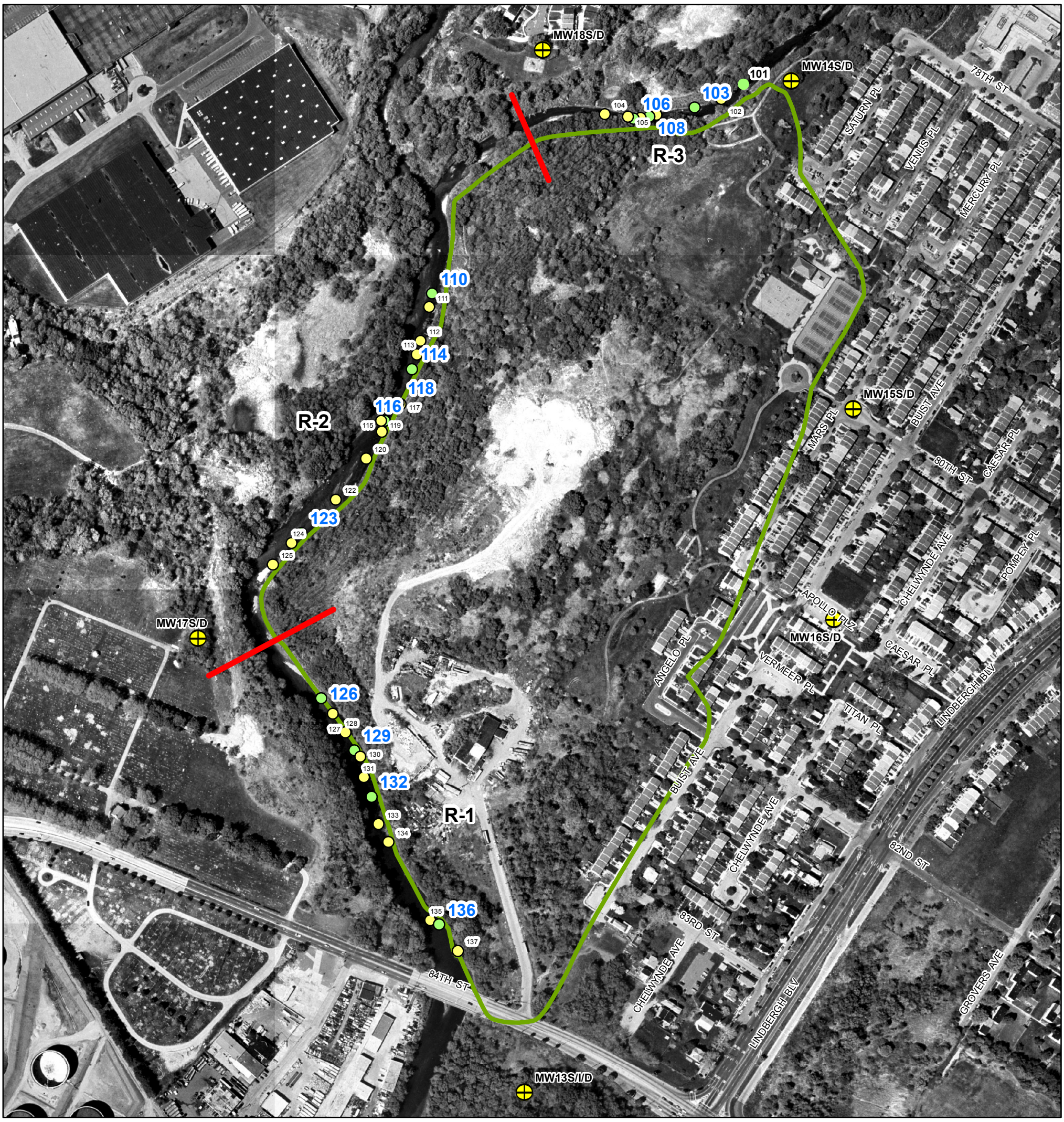

Figure 1

Proposed Pore Water Sampling Locations
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Legend

- Stations
- Proposed sampling locations

400 200 0 400 800 1,200 Feet

1:3,983 1 inch = 331.877765 feet

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S:\03-Projects\Federal\EPA R3 RAC Assignments\Lower Darby\112G03943 - LDCA OU3 RI_FS - JCK\Documents\OU-3 RI\Pore Water and Sediment\LDCA proposed pore water sampling locations.mxd

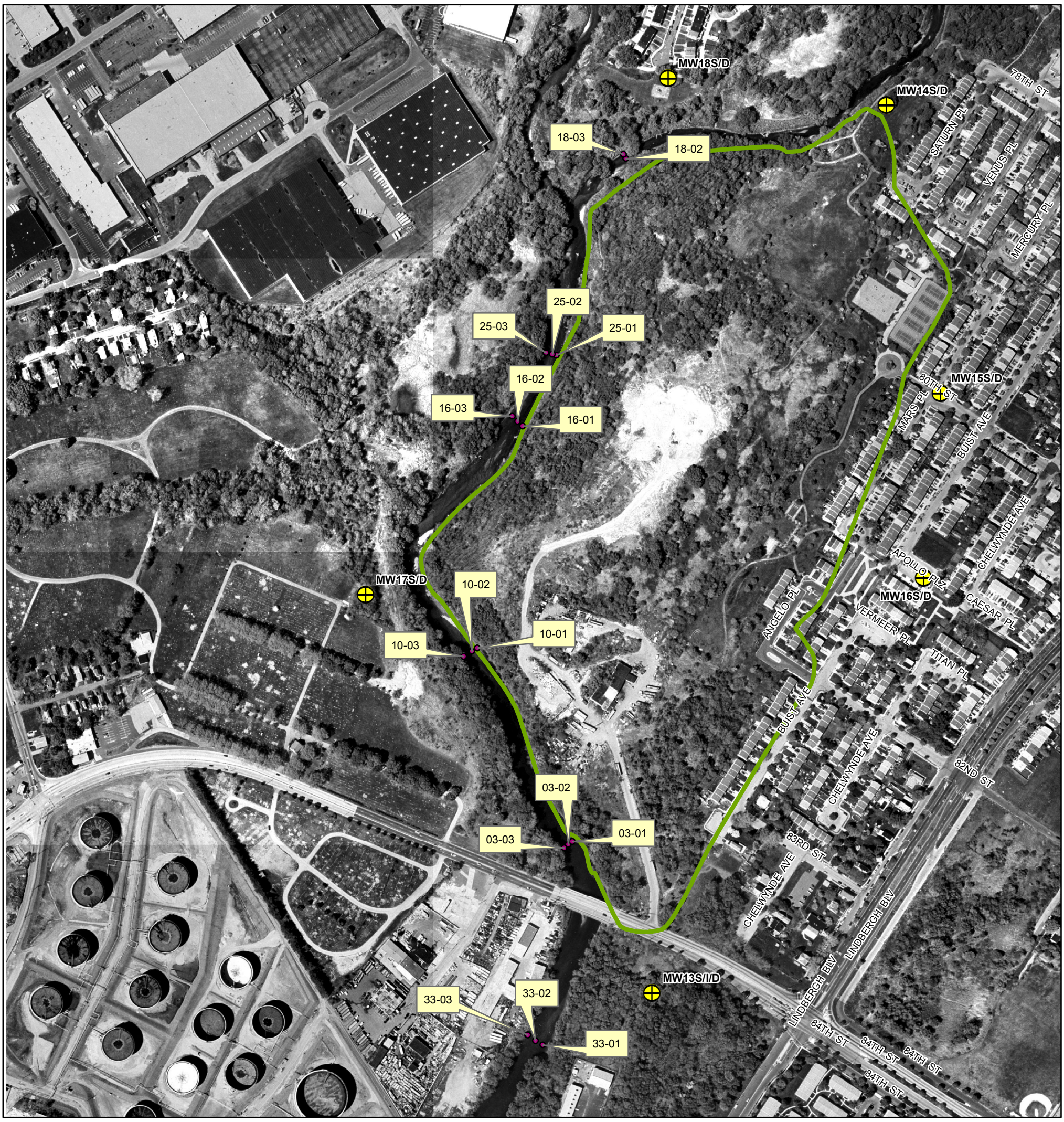

Figure 2

Legend

- Pore Water Sampling Locations
- Stations
- Proposed sampling locations

August USGS Pore Water Sampling Locations
Lower Darby Creek Area (LDCA) Site
Clearview Landfill Groundwater (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

400 200 0 400 800 1,200 Feet

1:4,537 1 inch = 378.053354 feet

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Table 1 - Total Metals Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS	Units	BTAG	B	Summary Statistics[1]			LD103		LD106		LD108		LD110		LD114		LD116		LD118		LD123		LD126		LD129		LD132	
					Maximum Detection	Number of Detections	Number of Exceedances	5/2/13		5/2/13		5/2/13		5/2/13		5/3/13		5/3/13		5/3/13		5/3/13		5/2/13		5/2/13		5/2/13	
								Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aluminum	7429-90-5	ug/L	87	-	6680	10	8	445				1080		215		1310		84.8		213				5350		872		57.2	
Arsenic	7440-38-2	ug/L	5	B	14.9	12	7	2.5	J	6.1	J	12.3	J	14.9	J	6.7	J	4.7	J	4.1	J	4.2	J	7.3	J	5.4	J	3.1	J
Barium	7440-39-3	ug/L	4	-	1390	12	12	809		825		1390		535		496		311		336		953		1290		818		1320	
Beryllium	7440-41-7	ug/L	0.66	-	1.4	2	2																	1.3					
Cadmium	7440-43-9	ug/L	0.25	B	5	2	2																	5					
Calcium	7440-70-2	ug/L	116000	-	176000	12	5	167000		128000		95800		142000		76300		106000		104000		101000		159000		108000		176000	
Chromium	7440-47-3	ug/L	85	-	32.4	12	0	4.8		4.2		11.4		18.8		32.4		21.8		18.9		11.9		17.2		7.3		2.6	
Cobalt	7440-48-4	ug/L	23	-	16.6	12	0	2.2	J	3.2	J	3.9	J	7.5	J	10.9	J	10.8	J	8.5	J	8.4	J	14.9	J	5.3	J	1.1	J
Copper	7440-50-8	ug/L	9	B	371	9	6	14.1	J			40	J	6.5	J	14.6	J	2.1	J	3.8	J			371	J	37	J		
Iron	7439-89-6	ug/L	300	-	46700	12	12	37100	J	25900	J	46700	J	32200	J	15200	J	14600	J	12500	J	16400	J	31600	J	17000	J	34300	J
Lead	7439-92-1	ug/L	2.5	B	676	11	10	39.5		2.1		176		21.8		73.4		6		9.1				676		80.4		15.2	
Magnesium	7439-95-4	ug/L	82000	-	130000	12	4	68700		86500		76400		76300		74500		70200		71500		122000		130000		98200		72800	
Manganese	7439-96-5	ug/L	120	-	4890	12	11	725		144		362		404		274		270		295		71.3		1190		271		380	
Nickel	7440-02-0	ug/L	52	B	26.6	12	0	5.2	J	7.7	J	7.2	J	8.9	J	17.5	J	13.2	J	9.9	J	6.6	J	26.6	J	8	J	2.1	J
Potassium	7440-09-7	ug/L	53000	-	127000	12	9	36300	J	57800	J	57800	J	90900	J	127000	J	111000	J	97500	J	108000	J	65700	J	68100	J	28200	J
Selenium	7782-49-2	ug/L	1	B	8.1	10	10	2	J	2.1	J	2	J	5.3		8.1		6.5		5.5		5.8		4.3	J	5.4			
Sodium	7440-23-5	ug/L	700000	-	834000	12	1	114000		127000		113000		517000		834000		632000		574000		494000		313000		298000		103000	
Vanadium	7440-62-2	ug/L	20	-	44.1	10	4	7.9	J			10.6	J	22.8	J	29.3	J	18.9	J	8.7	J	3.4	J	39.2	J	8.9	J		
Zinc	7440-66-6	ug/L	120	B	1080	12	3	44.4		67.6		100		19		120		12.3		9.5		2	J	1080		137		11.5	

NA = Not Analyzed

Blank Cell = Not Detected

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchmark.

The BTAG values in bold are expressed in terms of dissolved metals.

1 - Duplicate samples were not included in the summary statistics.

Table 1 - Total Metals Detected in Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS	Units	BTAG	B	LD132D 5/2/13 Result	LD132D 5/2/13 Flag	LD136 5/2/13 Result	LD136 5/2/13 Flag
Aluminum	7429-90-5	ug/L	87	-	6290		6680	
Arsenic	7440-38-2	ug/L	5	B	7.5	J	7.5	J
Barium	7440-39-3	ug/L	4	-	462		500	
Beryllium	7440-41-7	ug/L	0.66	-	1.3		1.4	
Cadmium	7440-43-9	ug/L	0.25	B	2.4		2.5	
Calcium	7440-70-2	ug/L	116000	-	66500		74500	
Chromium	7440-47-3	ug/L	85	-	15.4		14.2	
Cobalt	7440-48-4	ug/L	23	-	13.8	J	16.6	J
Copper	7440-50-8	ug/L	9	B	110	J	82.4	J
Iron	7439-89-6	ug/L	300	-	33100	J	38200	J
Lead	7439-92-1	ug/L	2.5	B	279		263	
Magnesium	7439-95-4	ug/L	82000	-	23000		26600	
Manganese	7439-96-5	ug/L	120	-	4370		4890	
Nickel	7440-02-0	ug/L	52	B	20.6	J	24.2	J
Potassium	7440-09-7	ug/L	53000	-	5600	J	5900	J
Selenium	7782-49-2	ug/L	1	B				
Sodium	7440-23-5	ug/L	700000	-	33300		34100	
Vanadium	7440-62-2	ug/L	20	-	36.2	J	44.1	J
Zinc	7440-66-6	ug/L	120	B	555		613	

NA = Not Analyzed
Blank Cell = Not Detected
BTAG = EPA Region III BTAG Fresh Water Screen
B = Bioaccumulative
Highlighted values indicate their exceedances of
The BTAG values in bold are expressed in terms
1 - Duplicate samples were not included in the s

Table 2 - Semivolatile Organic Compounds (SVOCs) Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	LD103 5/2/2013 Result	Flag	LD106 5/2/2013 Result	Flag	LD108 5/2/2013 Result	Flag	LD110 5/2/2013 Result	Flag	LD114 5/3/2013 Result	Flag	LD116 5/3/2013 Result	Flag	LD118 5/3/2013 Result	Flag	LD123 5/3/2013 Result	Flag	LD126 5/2/2013 Result	Flag	LD129 5/2/2013 Result	Flag
1,4-Dioxane	123-91-1	ug/L	-	-	170	11	0	4.9	J	14	J	12	J	63	J	150	J	11	J	130	J	69	J	110	J	170	J
2-Methylphenol	95-48-7	ug/L	13	-	17	1	1																				
4-Methylphenol	106-44-5	ug/L	543	-	71	2	0																			9.3	J
Anthracene	120-12-7	ug/L	0.012	B	2.8	1	1																				
Benzaldehyde	100-52-7	ug/L	-	-	24	3	0																	5.8	J	7.6	J
Benzo(a)anthracene	56-55-3	ug/L	0.018	B	12	3	3							5.1	J											4.1	J
Benzo(a)pyrene	50-32-8	ug/L	0.015	B	11	3	3							4.3	J											4	J
Benzo(b)fluoranthene	205-99-2	ug/L	-	B	14	3	0							4.5	J											5.1	J
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B	9.8	3	0							3.3	J											3.7	J
Benzo(k)fluoranthene	207-08-9	ug/L	-	B	11	3	0							3.9	J											3.7	J
Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	16	-	13	8	0			2.6	J			6.9	J	2.6	J	10	J					2.8	J	6.3	J
Caprolactam	105-60-2	ug/L	-	-	3.7	1	0																				
Carbazole	86-74-8	ug/L	-	-	4.4	1	0																				
Chrysene	218-01-9	ug/L	-	B	16	3	0							6.3	J											6.3	J
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B	4.1	1	0																				
Di-n-butylphthalate	84-74-2	ug/L	19	-	2.5	1	0																				
Fluoranthene	206-44-0	ug/L	0.04	B	29	4	4							12	J									3.3	J	12	J
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B	9.3	3	0							3.2	J											3.2	J
N-Nitrosodiphenylamine	86-30-6	ug/L	210	-	4.4	1	0									4.4	J										
Phenanthrene	85-01-8	ug/L	0.4	B	17	3	3							7.1	J											6.5	J
Pyrene	129-00-0	ug/L	0.025	B	22	4	4							9.4	J									2.6	J	8.8	J

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchmark.

1 - Duplicate samples were not included in the summary statistics.

Table 2 - Semivolatile Organic Compounds (SVOCs) Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	LD132 5/2/2013 Result	LD132 5/2/2013 Flag	LD136 5/2/2013 Result	LD136 5/2/2013 Flag	LD136DUP 5/2/2013 Result	LD136DUP 5/2/2013 Flag
1,4-Dioxane	123-91-1	ug/L	-	-	25	J				
2-Methylphenol	95-48-7	ug/L	13	-			17	J	8	J
4-Methylphenol	106-44-5	ug/L	543	-			71	J	2.9	J
Anthracene	120-12-7	ug/L	0.012	B			2.8	J		
Benzaldehyde	100-52-7	ug/L	-	-			24	J	5.5	J
Benzo(a)anthracene	56-55-3	ug/L	0.018	B			12	J		
Benzo(a)pyrene	50-32-8	ug/L	0.015	B			11	J		
Benzo(b)fluoranthene	205-99-2	ug/L	-	B			14	J		
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B			9.8	J		
Benzo(k)fluoranthene	207-08-9	ug/L	-	B			11	J		
Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	16	-	13	J	11	J	5.4	J
Caprolactam	105-60-2	ug/L	-	-			3.7	J	3.5	J
Carbazole	86-74-8	ug/L	-	-			4.4	J		
Chrysene	218-01-9	ug/L	-	B			16	J	2.8	J
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B			4.1	J		
Di-n-butylphthalate	84-74-2	ug/L	19	-			2.5	J		
Fluoranthene	206-44-0	ug/L	0.04	B			29	J	5.3	J
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B			9.3	J		
N-Nitrosodiphenylamine	86-30-6	ug/L	210	-						
Phenanthrene	85-01-8	ug/L	0.4	B			17	J	2.5	J
Pyrene	129-00-0	ug/L	0.025	B			22	J	3.8	J

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchma

1 - Duplicate samples were not included in the summary statisti

Table 3 - Pesticides Detected in Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[(1)]			LD103		LD106		LD108		LD110		LD114		LD116		LD118		LD123		LD126		LD129		LD13
					Maximum Detection	Number of Detections	Number of Exceedances	5/2/2013		5/2/2013		5/2/2013		5/2/2013		5/3/2013		5/3/2013		5/3/2013		5/3/2013		5/2/2013		5/2/2013		5/2/2(
								Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result
4,4'-DDD	72-54-8	ug/L	0.011	B	0.057	2	2							0.057	J													
4,4'-DDE	72-55-9	ug/L	-	B	0.037	4	0							0.037	J							0.0019	J	0.013	J			
4,4'-DDT	50-29-3	ug/L	0.0005	B	0.12	3	3							0.12	J									0.016	J			
alpha-Chlordane	5103-71-9	ug/L	0.0022	-	0.39	4	4							0.029	J									0.063	J	0.0052	J	
Dieldrin	60-57-1	ug/L	0.056	B	0.0082	1	0							0.0082	J													
Endosulfan II	33213-65-9	ug/L	0.051	B	0.01	1	0							0.01	J													
Endrin aldehyde	7421-93-4	ug/L	-	-	0.036	3	0							0.036	J									0.0025	J			
Endrin ketone	53494-70-5	ug/L	-	-	0.017	1	0							0.017	J													
gamma-BHC (Lindane)	58-89-9	ug/L	0.01	B	0.021	1	1															0.021	J					
gamma-Chlordane	5103-74-2	ug/L	0.0022	-	0.2	2	2																	0.031	J			
Heptachlor epoxide	1024-57-3	ug/L	0.0019	B	0.022	2	2																	0.0045	J			

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)
B = Bioaccumulative
Highlighted values indicate their exceedances of BTAG benchmark.
1 - Duplicate samples were not included in the summary statistics.

Table 3 - Pesticides Detected in Pore Water (May 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	32 013 Flag	LD136 5/2/2013 Result	Flag	LD136DUP 5/2/2013 Result	Flag
4,4'-DDD	72-54-8	ug/L	0.011	B		0.054	J	0.052	J
4,4'-DDE	72-55-9	ug/L	-	B		0.031	J	0.05	J
4,4'-DDT	50-29-3	ug/L	0.0005	B		0.039	J	0.064	J
alpha-Chlordane	5103-71-9	ug/L	0.0022	-		0.39	J	0.4	J
Dieldrin	60-57-1	ug/L	0.056	B					
Endosulfan II	33213-65-9	ug/L	0.051	B					
Endrin aldehyde	7421-93-4	ug/L	-	-		0.031	J	0.011	J
Endrin ketone	53494-70-5	ug/L	-	-					
gamma-BHC (Lindane)	58-89-9	ug/L	0.01	B					
gamma-Chlordane	5103-74-2	ug/L	0.0022	-		0.2	J	0.16	J
Heptachlor epoxide	1024-57-3	ug/L	0.0019	B		0.022	J		

BTAG = EPA Region III BTAG Fresh Water Screening Benc
B = Bioaccumulative
Highlighted values indicate their exceedances of BTAG b
1 - Duplicate samples were not included in the summary

Table 4 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1]			LD126		LD129		LD132		LD132DUP		LD136	
					Maximum Detection	Number of Detections	Number of Exceedances	5/2/2013		5/2/2013		5/2/2013		5/2/2013		5/2/2013	
								Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
PCB-1	2051-60-7	pg/L	-	-	30700	4	NA	7490		5660		30700	J	19800	J	50.1	
PCB-10	33146-45-1	pg/L	-	-	3910	3	NA	561		285		3910		2020			
PCB-104	56558-16-8	pg/L	-	-	73	2	NA	73				69.3	J	83	J		
PCB-105	32598-14-4	pg/L	-	-	32100	4	NA	2980		146		32100	J	502	J	295	
PCB-107/124	70424-68-9/70424-70-3	pg/L	-	-	3210	3	NA			18.1	J	3210		52.8		37	J
PCB-109	74472-35-8	pg/L	-	-	3900	3	NA			20.5		3900				53.1	
PCB-11	2050-67-1	pg/L	-	-	1210	4	NA	1210		207		163		136		196	
PCB-110/115	38380-03-9/74472-38-1	pg/L	-	-	103000	3	NA			707		103000	J	2870		1440	
PCB-114	74472-37-0	pg/L	-	-	1610	3	NA			7.2	J	1610	J	17.2	J	13.6	J
PCB-118	31508-00-6	pg/L	-	-	80900	4	NA	9810		335		80900	J	1480	J	764	
PCB-12/13	2974-92-7/2974-90-5	pg/L	-	-	1220	3	NA	1220		94.9		256		151			
PCB-123	65510-44-3	pg/L	-	-	494	2	NA			9.6	J	494		116	J		
PCB-126	57465-28-8	pg/L	-	-	53.1	3	NA	45.2				53.1		6.5	J	8.6	J
PCB-128/166	38380-07-3/41411-63-6	pg/L	-	-	17700	4	NA	3070		153		17700		621		357	
PCB-129/138/160/163	55215-18-4/35065-28-2/41411-62-5/74472-44-9	pg/L	-	-	98400	4	NA	32500		1600		98400	J	7190		3480	
PCB-130	52663-66-8	pg/L	-	-	5350	3	NA			71.3		5350		270		138	
PCB-131	61798-70-7	pg/L	-	-	1410	1	NA					1410					
PCB-132	38380-05-1	pg/L	-	-	31300	3	NA			477		31300		2190		1030	
PCB-133	35694-04-3	pg/L	-	-	786	3	NA			19.8	J	786		104		31.6	
PCB-134/143	52704-70-8/68194-15-0	pg/L	-	-	4150	4	NA	908		59.7		4150		263		120	
PCB-135/151/154	52744-13-5/52663-63-5/60145-22-4	pg/L	-	-	18100	4	NA	18100		617		17500		3140		1130	
PCB-136	38411-22-2	pg/L	-	-	8020	2	NA			188		8020		1130			
PCB-137	35694-06-5	pg/L	-	-	5950	3	NA			165		5950				361	
PCB-139/140	56030-56-9/59291-64-4	pg/L	-	-	1710	1	NA					1710					
PCB-141	52712-04-6	pg/L	-	-	12800	4	NA	4390		352		12800		1500		745	
PCB-144	68194-14-9	pg/L	-	-	2430	3	NA			75.2		2430		409		134	
PCB-145	74472-40-5	pg/L	-	-	6070	1	NA	6070									
PCB-146	51908-16-8	pg/L	-	-	8560	3	NA			193		8560		967		380	
PCB-147/149	68194-13-8/38380-04-0	pg/L	-	-	54400	4	NA	34200		1430		54400	J	7380		2870	
PCB-148	74472-41-6	pg/L	-	-	275	1	NA	275									
PCB-15	2050-68-2	pg/L	-	-	3410	4	NA	3410		599		453	J	301	J	111	
PCB-150	68194-08-1	pg/L	-	-	104	1	NA					104		35.4			
PCB-152	68194-09-2	pg/L	-	-	84.9	1	NA					84.9		25.2			
PCB-153/168	35065-27-1/59291-65-5	pg/L	-	-	62000	4	NA	32100		1420		62000	J	6790		3100	
PCB-156/157	38380-08-4/69782-90-7	pg/L	-	-	12200	4	NA	2210		102		12200	J	457	J	228	
PCB-158	74472-42-7	pg/L	-	-	10500	4	NA	2290		126		10500		570		294	
PCB-159	39635-35-3	pg/L	-	-	271	3	NA	271				164		51.6		27.3	

Table 4 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

					Summary Statistics[(1)]			LD126		LD129		LD132		LD132DUP		LD136	
					Maximum	Number of	Number of	5/2/2013		5/2/2013		5/2/2013		5/2/2013		5/2/2013	
Analyte	CAS #	Unit	BTAG	B	Detection	Detections	Exceedances	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
PCB-16	38444-78-9	pg/L	-	-	286	1	NA							1700		286	
PCB-161	74472-43-8	pg/L	-	-	4370	1	NA	4370									
PCB-162	39635-34-2	pg/L	-	-	389	2	NA	204				389					
PCB-164	74472-45-0	pg/L	-	-	6160	4	NA	5130		125		6160				280	
PCB-167	52663-72-6	pg/L	-	-	3710	4	NA	820		43.3		3710	J	155	J	87	
PCB-169	32774-16-6	pg/L	-	-	39.7	1	NA					39.7					
PCB-17	37680-66-3	pg/L	-	-	6700	4	NA	6700		1750		6420		3900		211	
PCB-170	35065-30-6	pg/L	-	-	10200	4	NA	10200		558		8720		1880		1120	
PCB-171/173	52663-71-5/68194-16-1	pg/L	-	-	2870	4	NA	2030		185		2870		658		352	
PCB-172	52663-74-8	pg/L	-	-	3930	4	NA	3930		100		1300		329		204	
PCB-174	38411-25-5	pg/L	-	-	12200	4	NA	12200		609		8330		2240		1350	
PCB-175	40186-70-7	pg/L	-	-	303	1	NA					303					
PCB-176	52663-65-7	pg/L	-	-	1270	4	NA	1270		71.1		756		279		145	
PCB-177	52663-70-4	pg/L	-	-	6830	4	NA	6830		384		4550		1330		671	
PCB-178	52663-67-9	pg/L	-	-	2080	4	NA	2080		120		1160		461		215	
PCB-179	52663-64-6	pg/L	-	-	5560	3	NA	5560		238				1010		464	
PCB-18/30	37680-65-2/35693-92-6	pg/L	-	-	10300	4	NA	10300		4780		9000		5310		478	
PCB-180/193	35065-29-3/69782-91-8	pg/L	-	-	25300	4	NA	25300		1270		16000		4670		2650	
PCB-183/185	52663-69-1/52712-05-7	pg/L	-	-	9690	4	NA	9690		351		5350		1380		785	
PCB-187	52663-68-0	pg/L	-	-	16900	4	NA	16900		767		8540		3180		1450	
PCB-189	39635-31-9	pg/L	-	-	380	4	NA	380		24		331	J	83.6	J	36.6	
PCB-19	38444-73-4	pg/L	-	-	21000	4	NA	5780		1260		21000	J	14000	J	79.3	
PCB-190	41411-64-7	pg/L	-	-	2140	4	NA	2140		121		1440		375		230	
PCB-191	74472-50-7	pg/L	-	-	531	4	NA	531		22.6		303		75.9		38	
PCB-194	35694-08-7	pg/L	-	-	7590	4	NA	7590		307		1870		817		562	
PCB-195	52663-78-2	pg/L	-	-	3300	4	NA	3300		131		892		385		236	
PCB-196	42740-50-1	pg/L	-	-	4940	4	NA	4940		175		1300		546		344	
PCB-197/200	33091-17-7/52663-73-7	pg/L	-	-	1130	4	NA	1130		44.8		364		101		76.4	
PCB-198/199	68194-17-2/52663-75-9	pg/L	-	-	7490	4	NA	7490		310		2270		957		623	
PCB-2	2051-61-8	pg/L	-	-	358	4	NA	358		232		251		135		12.5	J
PCB-20/28	38444-84-7/7012-37-5	pg/L	-	-	7630	4	NA	7630		1120		1670		1250		530	
PCB-201	40186-71-8	pg/L	-	-	871	3	NA	871				283		111		61.1	
PCB-202	2136-99-4	pg/L	-	-	1310	4	NA	1310		56		468	J	230	J	86.1	
PCB-203	52663-76-0	pg/L	-	-	5560	4	NA	5560		224		1630		723		434	
PCB-205	74472-53-0	pg/L	-	-	337	4	NA	337		20.2		81.5	J	39.3	J	33.7	
PCB-206	40186-72-9	pg/L	-	-	3120	4	NA	3120		147		1080	J	655	J	238	
PCB-207	52663-79-3	pg/L	-	-	347	3	NA	347				129		64.8		29	
PCB-208	52663-77-1	pg/L	-	-	830	4	NA	830		40.6		390	J	256	J	66.7	
PCB-209	2051-24-3	pg/L	-	-	2320	4	NA	2320		103		792	J	682	J	137	

Table 4 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

					Summary Statistics[(1)]			LD126		LD129		LD132		LD132DUP		LD136	
					Maximum	Number of	Number of	5/2/2013		5/2/2013		5/2/2013		5/2/2013		5/2/2013	
Analyte	CAS #	Unit	BTAG	B	Detection	Detections	Exceedances	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
PCB-21/33	55702-46-0/38444-86-9	pg/L	-	-	2440	4	NA	2440		846		463		381		228	
PCB-22	38444-85-8	pg/L	-	-	2280	4	NA	2280		495		511		385		200	
PCB-24	55702-45-9	pg/L	-	-	1950	4	NA	1950		1580		1230		33		18	J
PCB-25	55712-37-3	pg/L	-	-	2170	4	NA	2170		139		783		568		51.3	
PCB-26/29	38444-81-4/15862-07-4	pg/L	-	-	3180	4	NA	3180		290		898		627		85.6	
PCB-27	38444-76-7	pg/L	-	-	6790	4	NA	3700		391		6790		3860		53.3	
PCB-3	2051-62-9	pg/L	-	-	1390	4	NA	983		479		1390	J	863	J	19.2	J
PCB-31	16606-02-3	pg/L	-	-	5990	4	NA	5990		1010		1730		1120		367	
PCB-32	38444-77-8	pg/L	-	-	4290	4	NA	4290		678		2930		1820		120	
PCB-34	37680-68-5	pg/L	-	-	72.7	2	NA	72.7				44		29.6			
PCB-35	37680-69-6	pg/L	-	-	76	2	NA	76								21.9	
PCB-37	38444-90-5	pg/L	-	-	1570	4	NA	1570		206		192	J	205	J	149	
PCB-4	13029-08-8	pg/L	-	-	127000	4	NA	16300		10300		127000	J	78900	J	186	
PCB-40/41/71	38444-93-8/52663-59-9/41464-46-4	pg/L	-	-	3980	4	NA	3980		170		2580		1160		247	
PCB-42	36559-22-5	pg/L	-	-	2190	3	NA	2190		156				723		148	
PCB-43	70362-46-8	pg/L	-	-	46.1	2	NA					46.1				21.5	
PCB-44/47/65	41464-39-5/2437-79-8/33284-54-7	pg/L	-	-	15700	4	NA	11000		441		15700		3360		407	
PCB-45/51	70362-45-7/68194-04-7	pg/L	-	-	4660	4	NA	4660		183		4280		2890		93.9	
PCB-46	41464-47-5	pg/L	-	-	693	3	NA	693		66.5				388		29.3	
PCB-48	70362-47-9	pg/L	-	-	155	3	NA			71.8		155		107		32.1	
PCB-49/69	41464-40-8/60233-24-1	pg/L	-	-	10500	4	NA	10500		240		8770		2550		228	
PCB-50/53	62796-65-0/41464-41-9	pg/L	-	-	5230	4	NA	4360		125		5230		3320		72	
PCB-52	35693-99-3	pg/L	-	-	31100	4	NA	13100		383		31100		1950		406	
PCB-54	15968-05-5	pg/L	-	-	2070	3	NA	536		13.8	J	2070		1500	J		
PCB-55	74338-24-2	pg/L	-	-	5610	1	NA	5610									
PCB-56	41464-43-1	pg/L	-	-	3380	3	NA			175		3380		360		199	
PCB-58	41464-49-7	pg/L	-	-	1130	1	NA					1130					
PCB-59/62/75	74472-33-6/54230-22-7/32598-12-2	pg/L	-	-	905	4	NA	905		40.6		227		117		38.8	J
PCB-6	25569-80-6	pg/L	-	-	5570	4	NA	2750		1190		5570		3030		64.4	
PCB-60	33025-41-1	pg/L	-	-	2510	4	NA	2510		90.9		1070		153		102	
PCB-61/70/74/76	33284-53-6/32598-11-1/32690-93-0/70362-48-0	pg/L	-	-	38500	4	NA	12000		546		38500		1110		723	
PCB-64	52663-58-8	pg/L	-	-	3560	4	NA	2260		160		3560		426		185	
PCB-66	32598-10-0	pg/L	-	-	6280	3	NA			284		6280		809		378	
PCB-7	33284-50-3	pg/L	-	-	281	3	NA	249		86.8		281		175			
PCB-77	32598-13-3	pg/L	-	-	549	4	NA	549		34.8		158		66.2		52	

Table 4 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (May 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1]			LD126		LD129		LD132		LD132DUP		LD136	
					Maximum Detection	Number of Detections	Number of Exceedances	5/2/2013		5/2/2013		5/2/2013		5/2/2013		5/2/2013	
								Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
PCB-8	34883-43-7	pg/L	-	-	5960	4	NA	5960		4570		5760		3130		217	
PCB-80	33284-52-5	pg/L	-	-	262	1	NA					262					
PCB-81	70362-50-4	pg/L	-	-	369	1	NA					369					
PCB-82	52663-62-4	pg/L	-	-	8920	3	NA			48.8		8920		135		85.5	
PCB-83/99	60145-20-2/38380-01-7	pg/L	-	-	40500	4	NA	10300		245		40500	J	1630		410	
PCB-84	52663-60-2	pg/L	-	-	19300	4	NA	2430		132		19300		461		242	
PCB-85/116/117	65510-45-4/18259-05-7/68194-11-6	pg/L	-	-	29100	4	NA	29100		82.1		17300		288		191	
PCB-86/87/97/108/119/125	55312-69-1/38380-02-8/41464-51-1/70362-41-3/56558-17-9/74472-39-2	pg/L	-	-	61200	4	NA	10400		300		61200	J	1210		616	
PCB-88/91	55215-17-3/68194-05-8	pg/L	-	-	3080	4	NA	3080		67.4		2830		666		119	
PCB-9	34883-39-1	pg/L	-	-	393	3	NA	393		181		209		116			
PCB-90/101/113	68194-07-0/37680-73-2/68194-10-5	pg/L	-	-	83800	4	NA	22000		669		83800	J	3710		1400	
PCB-92	52663-61-3	pg/L	-	-	3840	3	NA	3840		123						204	
PCB-93/95/98/100/102	73575-56-1/38379-99-6/60233-25-2/39485-83-1/68194-06-9	pg/L	-	-	65900	4	NA	20900		642		65900	J	4580		1240	
PCB-96	73575-54-9	pg/L	-	-	389	2	NA	204				389		146			
Total DiCB	25512-42-9	pg/L	-	-	135000	4	NA	32100		17500		135000		77400		775	
Total HpCB	28655-71-2	pg/L	-	-	99000	4	NA	99000		4820		59900		17900		9700	
Total HxCB	26601-64-9	pg/L	-	-	366000	4	NA	147000		7210		366000		33200		14800	
Total MoCB	27323-18-8	pg/L	-	-	36100	4	NA	8830		6370		36100		19200		81.8	
Total NoCB	53742-07-7	pg/L	-	-	4300	4	NA	4300		188		1710		853		334	
Total OcCB	55722-26-4	pg/L	-	-	32500	4	NA	32500		1270		9150		3880		2460	
Total PCBs	1111-11-1	pg/L	74[2]	-	1320000	4	4	574000		58700		1320000		227000		41600	
Total PeCB	25429-29-2	pg/L	-	-	526000	4	NA	115000		3550		526000		18000		7110	
Total TeCB	26914-33-0	pg/L	-	-	125000	4	NA	74800		3180		125000		21100		3350	
Total TEQ	2222-22-2	pg/L	-	-	10.6	4	NA	5.1		0.023		10.6		0.73		0.91	
Total TrCB	25323-68-6	pg/L	-	-	58100	4	NA	58100		14500		56300		34600		2880	

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchmark.

1 - Duplicate samples were not included in the summary statistics.

2 - Total PCB value.

Table 5 - Total Metals Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS	Units	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	0301-00 9/9/13 Result	Flag	0301-02 9/9/13 Result	Flag	0301-02DUP 9/9/13 Result	Flag	0302-00 9/9/13 Result	Flag	0302-02 9/9/13 Result	Flag	0303-00 9/9/13 Result	Flag	0303-02 9/9/13 Result	Flag	1001-00 9/11/13 Result	Flag	1001-02 9/11/13 Result	Flag	1001-02DUP 9/11/13 Result	Flag	1001- 9/11/ Result
Aluminum	7429-90-5	ug/L	87	-	1420	28	6	40		101										1420		10.2	J	1.4	J	1.6	J	34.6
Arsenic	7440-38-2	ug/L	5	B	26.5	38	16	14.7	J+	8.1	J+	8.4	J+	3.3	J+	11.4	J+	1.2	J+	6.8	J+	10	J+	1.1	J+	1.2	J+	6.2
Barium	7440-39-3	ug/L	4	-	637	38	38	469		466		453		112		480		95.7		472		401	J	143	J	143	J	438
Beryllium	7440-41-7	ug/L	0.66	-	0.051	1	0																					
Boron	7440-42-8	ug/L	1.6	-	7310	38	38	475		952		948		41.6		946		43.5		642		285		2040		1720		5830
Calcium	7440-70-2	ug/L	116000	-	150000	38	5	106000		127000		122000		39200		97500		37400		94700		95400		126000		106000		143000
Chromium	7440-47-3	ug/L	85	-	20.6	36	0	0.84	J	2.7		1.9	J	0.19	J	0.91	J	0.2	J	20.6		0.83	J	1.4	J	1.5	J	10
Cobalt	7440-48-4	ug/L	23	-	21.9	27	0	3.1		2.3		2.1		1.8		1.6				3		7.6		1.8		1.7		7.9
Copper	7440-50-8	ug/L	9	B	10.8	20	1			2.7										10.8		0.29	J-					
Cyanide	57-12-5	ug/L	5	-	26.6	4	2	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Iron	7439-89-6	ug/L	300	-	81500	38	32	81500		76000		72300		2500		78700		1230		45900		23800		8860		10000		41400
Lead	7439-92-1	ug/L	2.5	B	183	27	14	4		9.3										183		0.8	J			0.23	J	1.8
Magnesium	7439-95-4	ug/L	82000	-	124000	38	3	45800		64100		60400		16100		61400		16700		56400		35600		69500		60000		124000
Manganese	7439-96-5	ug/L	120	-	5020	38	35	3200		2360		2360		1100		1960		280		2440		4430		2410		2060		744
Mercury	7439-97-6	ug/L	0.026	-	0.13	25	25	0.13	J	0.12	J	0.099	J	0.13	J			0.13	J	0.11	J	0.035	J			0.037	J	0.054
Nickel	7440-02-0	ug/L	52	B	48.3	38	0	2.5	J	2.4	J	1.6	J	1.9	J	1.6	J	0.98	J	11.5	J	5.4		2.1		1.8		5.4
Potassium	7440-09-7	ug/L	53000	-	169000	38	7	11400		16500		16100		5210		14300		4560		8960		9910		21200		21500		74600
Selenium	7782-49-2	ug/L	1	B	24.1	20	14															1.2	J	2.9	J	2.8	J	7.9
Sodium	7440-23-5	ug/L	700000	-	748000	38	3	60800	J	131000	J	126000	J	39000	J	107000	J	40000	J	93400	J	51200		136000		117000		358000
Vanadium	7440-62-2	ug/L	20	-	14	9	0													12.5								5.5
Zinc	7440-66-6	ug/L	120	B	133	38	1	7.6		11		12		9.6		3.2		7.3		133		21.3	J	2.8	J	1.7	J	4.5

NA = Not Analyzed
Blank Cell = Not Detected
BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)
B = Bioaccumulative
Highlighted values indicate their exceedances of BTAG benchmark.
The BTAG values in bold are expressed in terms of dissolved metals.
1 - Duplicate samples were not included in the summary statistics.

Table 5 - Total Metals Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS	Units	BTAG	B	04 13 Flag	1002-00 9/11/13 Result	Flag	1002-02 9/11/13 Result	Flag	1002-04 9/11/13 Result	Flag	1003-00 9/10/13 Result	Flag	1003-02 9/10/13 Result	Flag	1601-00 9/11/13 Result	Flag	1601-02 9/11/13 Result	Flag	1602-00 9/11/13 Result	Flag	1602-02 9/11/13 Result	Flag	1602-04 9/11/13 Result	Flag	1603-00 9/12/13 Result	Flag	1603-00DUP 9/12/13 Result	Flag	1603-02 9/12/13 Result	Flag	1603- 9/12/ Result
Aluminum	7429-90-5	ug/L	87	-				29.1				11.2	J	20.4		18.4	J	26.9						91.4		12.7	J	15.2	J	16	J	81.6
Arsenic	7440-38-2	ug/L	5	B	J+	4.2	J+	7.5	J+	3.3	J+	0.55	J+	4.1	J+	1.6	J+	3.5	J+	0.72	J+	1.9	J+	6.9	J+	1.4	J+	1.4	J+	6.8	J+	7.8
Barium	7440-39-3	ug/L	4	-		217		258		230		97.8	J	102	J	96.8	J	96.2	J	86	J	100		447		106	J	117	J	301	J	637
Beryllium	7440-41-7	ug/L	0.66	-																											
Boron	7440-42-8	ug/L	1.6	-		62.6		559		5670		29.2		24.2		48.1		805		31.2		38.5		1160		36.6		34.9		218		626
Calcium	7440-70-2	ug/L	116000	-		38300		65600		150000		38600		37800		36800		36200		38600	J	40100		24200		36100		38400		80800		58900
Chromium	7440-47-3	ug/L	85	-		0.17	J	0.84	J	7.7				0.28	J	0.26	J	7.2		0.13	J	0.51	J	18.2		0.19	J	0.16	J	4.1		16.8
Cobalt	7440-48-4	ug/L	23	-		2.1				7		0.5	J	0.72	J	0.54	J	2.1						21.9		0.2	J	0.2	J	3.6		20.3
Copper	7440-50-8	ug/L	9	B								0.93	J	0.094	J	0.92	J	0.11	J-							1.3	J	1.6	J	0.12	J-	0.67
Cyanide	57-12-5	ug/L	5	-		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA								26.6
Iron	7439-89-6	ug/L	300	-		3530		31500		8420		34	J	5890		1080		2030		71.1	J	5250		20500		384		358		31800		34700
Lead	7439-92-1	ug/L	2.5	B				2.4				0.41	J	0.58	J	1.9		1.4						4.6		0.64	J	0.87	J	0.74	J	10.1
Magnesium	7439-95-4	ug/L	82000	-		15600		25600		119000		15500		14300		14500		19900		16700	J	16700		19200		15000		15300		36500		37100
Manganese	7439-96-5	ug/L	120	-		1340		1690		647		357		958		433		213		11.9		449		386		78.8		82.2		1250		850
Mercury	7439-97-6	ug/L	0.026	-	J	0.058	J	0.13	J	0.064	J	0.043	J									0.094	J	0.065	J			0.044	J	0.042	J	
Nickel	7440-02-0	ug/L	52	B	J	2	J	0.75	J	4.7	J	1.1		0.95	J	1.2		3		0.84	J	0.67	J	48.3	J	0.85	J	0.96	J	5.6		36.1
Potassium	7440-09-7	ug/L	53000	-		5680		10900		80900		4570		4360		4740		23200		4500	J	5000		47700		4390		4570		26700		66900
Selenium	7782-49-2	ug/L	1	B	J					6.8	J	0.55	J	0.48	J	0.64	J	2.6	J					20.3	J	0.75	J	0.9	J	6.3		24.1
Sodium	7440-23-5	ug/L	700000	-	J	39800	J	53100	J	306000	J	37300		29300		34700		144000		39400	J	39600	J	627000	J	36800		37800		173000		695000
Vanadium	7440-62-2	ug/L	20	-	J													6.5	J					5.5								7.2
Zinc	7440-66-6	ug/L	120	B		13.9		4.3		1.6	J	7	J	3.9	J	7.6	J	2	J	9.4		3.4		7.3		8.6	J	15.9	J	2.9	J	14.3

NA = Not Analyzed

Blank Cell = Not Detected

BTAG = EPA Region III BTAG Fresh Water Screening

B = Bioaccumulative

Highlighted values indicate their exceedances of BT

The BTAG values in bold are expressed in terms of (

1 - Duplicate samples were not included in the sum

Table 5 - Total Metals Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS	Units	BTAG	B	04	1603-04DUP		1802-00		1802-02		1803-00		2501-00		2501-02		2502-00		2502-02		2503-00		2503-02		3301-00		3301-02		3302-00		3302-
					13	9/12/13		9/13/13		9/13/13		9/13/13		9/12/13		9/12/13		9/12/13		9/12/13		9/12/13		9/12/13		9/10/13		9/10/13		9/10/13		9/10/
					Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result
Aluminum	7429-90-5	ug/L	87	-		45.2		75.9		20.5		120	J	41.7		34.5		11.3	J	229		23		69.4		22.6		84.2				54.3
Arsenic	7440-38-2	ug/L	5	B	J+	7.8	J+	1.1	J+	0.76	J+	0.76	J+	10.7	J+	26.5	J+	7.2	J+	17.3	J+	2.2	J+	17.3	J+	0.74	J+	8.1	J+	3.6	J+	3
Barium	7440-39-3	ug/L	4	-	J	643	J	52.1	J	63.1	J	33.5	J	635	J	574	J	414	J	567	J	224	J	420	J	114		41.4		104		91.7
Beryllium	7440-41-7	ug/L	0.66	-																0.051	J											
Boron	7440-42-8	ug/L	1.6	-		657		30.7		42.8		21.9		3400		6040		856		5840		338		7310		44.2		129		48.8		119
Calcium	7440-70-2	ug/L	116000	-		62900		22200		38300		15000	J	97200		48200		88300		60100		56000		27400		36100		59100		38000		27700
Chromium	7440-47-3	ug/L	85	-		16.4		0.39	J	0.21	J	0.57	J	10.4		18.2		2.8		14.2		1.2	J	13.2				0.25	J	0.24	J	0.86
Cobalt	7440-48-4	ug/L	23	-		20.8		0.34	J	0.93	J			17		17.7		7.4		11.3		2.2		9.3						1.3		
Copper	7440-50-8	ug/L	9	B	J	0.38	J-	5.3		0.62	J	8.8	J	2.2		1.3	J	1	J	4.4		1.9	J	1.9	J							
Cyanide	57-12-5	ug/L	5	-		21.5	J							2	J	8.2	J							3.5	J	NA		NA		NA		NA
Iron	7439-89-6	ug/L	300	-		33900		293		49.6	J	252		7450		15200		7950		19000		486		9300		33.1	J-	9050		2370		2850
Lead	7439-92-1	ug/L	2.5	B		3.2		2.6		7.6		4.8	J	4.4		4.9		1.1		19		1.6		2.9				1.4				2.7
Magnesium	7439-95-4	ug/L	82000	-		35200		7730		13900		5760	J	60700		81100		35400		55700		21600		41400		14200		17500		12700		9060
Manganese	7439-96-5	ug/L	120	-		887		147		138		10		5020		3210		3850		2450		840		987		582		877		802		302
Mercury	7439-97-6	ug/L	0.026	-						0.047	J	0.034	J							0.035	J			0.034	J	0.1	J	0.071	J	0.13	J	0.11
Nickel	7440-02-0	ug/L	52	B		36.4		1.1		1.7		0.97	J	40.8		30.5		17.2		31.7		6.4		33.3		1.4	J	1	J	1.3	J	0.78
Potassium	7440-09-7	ug/L	53000	-		69600		3820		4470		3250	J	82200		147000		20700		148000		8480		169000		4860		8540		4190		5010
Selenium	7782-49-2	ug/L	1	B		25.8		0.5	J	0.3	J			9.1		12.1		4	J	12.4		1.6	J	11.6								
Sodium	7440-23-5	ug/L	700000	-		694000		19300		28400		13000	J	412000		651000		181000		727000		88200		723000		42900	J	176000	J	36000	J	47200
Vanadium	7440-62-2	ug/L	20	-		6.9								7.2		14				7.9				9.2								
Zinc	7440-66-6	ug/L	120	B	J	7.6	J	13.5	J	32.8	J	12		39.7	J	33.7	J	16.1	J	49	J	17.7	J	3.8	J	9.2		4.2		3.9		5.4

NA = Not Analyzed
Blank Cell = Not Detected
BTAG = EPA Region III BTAG Fresh Water Screening
B = Bioaccumulative
Highlighted values indicate their exceedances of BT
The BTAG values in bold are expressed in terms of
1 - Duplicate samples were not included in the sum

Table 5 - Total Metals Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS	Units	BTAG	B	-02 /13 Flag	3302-04 9/10/13 Result	Flag	3303-00 9/10/13 Result	Flag	3303-02 9/10/13 Result	Flag
Aluminum	7429-90-5	ug/L	87	-		103					
Arsenic	7440-38-2	ug/L	5	B	J+	2.1	J+	3	J+	3.5	J+
Barium	7440-39-3	ug/L	4	-		378		52.5		424	
Beryllium	7440-41-7	ug/L	0.66	-							
Boron	7440-42-8	ug/L	1.6	-		777		118		1630	
Calcium	7440-70-2	ug/L	116000	-		60300		37700		139000	
Chromium	7440-47-3	ug/L	85	-	J	2.3		0.12	J	0.88	J
Cobalt	7440-48-4	ug/L	23	-							
Copper	7440-50-8	ug/L	9	B		4.3					
Cyanide	57-12-5	ug/L	5	-		NA		NA		NA	
Iron	7439-89-6	ug/L	300	-		15100		3060		20500	
Lead	7439-92-1	ug/L	2.5	B		5.1				1.7	
Magnesium	7439-95-4	ug/L	82000	-		25800		17500		86200	
Manganese	7439-96-5	ug/L	120	-		1120		605		1400	
Mercury	7439-97-6	ug/L	0.026	-	J	0.13	J	0.093	J	0.062	J
Nickel	7440-02-0	ug/L	52	B	J	1.8	J	1.4	J	3.2	J
Potassium	7440-09-7	ug/L	53000	-		25800		6230		48500	
Selenium	7782-49-2	ug/L	1	B							
Sodium	7440-23-5	ug/L	700000	-	J	748000	J	39600	J	319000	J
Vanadium	7440-62-2	ug/L	20	-							
Zinc	7440-66-6	ug/L	120	B		9.8		5.1		2.7	

NA = Not Analyzed
Blank Cell = Not Detected
BTAG = EPA Region III BTAG Fresh Water Screening
B = Bioaccumulative
Highlighted values indicate their exceedances of BT
The BTAG values in bold are expressed in terms of
1 - Duplicate samples were not included in the sum

Table 6 - Semivolatile Organic Compounds (SVOCs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	0301-00 9/9/2013 Result	Flag	0301-02 9/9/2013 Result	Flag	0301-02D 9/9/2013 Result	Flag	0302-00 9/9/2013 Result	Flag	0302-02 9/9/2013 Result	Flag	0303-00 9/9/2013 Result	Flag	0303-02 9/9/2013 Result	Flag	1001-00 9/11/2013 Result	Flag	1001-02 9/11/2013 Result	Flag	1001-02D 9/11/2013 Result	Flag
1,4-Dioxane	123-91-1	ug/L	-	-	180	21	0	0.59	J	8.9		9.6				7.8				4.5		0.54	J	11		5.2	J
2-Methylnaphthalene	91-57-6	ug/L	4.7	-	0.24	14	0																	0.024	J		
4-Methylphenol	106-44-5	ug/L	543	-	1.3	1	0																				
Acenaphthene	83-32-9	ug/L	5.8	B	0.23	12	0																	0.1			
Acenaphthylene	208-96-8	ug/L	-	B	0.12	8	0																	0.04	J		
Anthracene	120-12-7	ug/L	0.012	B	2.5	11	11																	0.079	J		
Benzaldehyde	100-52-7	ug/L	-	-	3	3	0																				
Benzo(a)anthracene	56-55-3	ug/L	0.018	B	0.2	12	7																				
Benzo(a)pyrene	50-32-8	ug/L	0.015	B	0.017	1	1																				
Benzo(b)fluoranthene	205-99-2	ug/L	-	B	0.034	2	0																				
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B	0.0075	2	0																				
Benzo(k)fluoranthene	207-08-9	ug/L	-	B	0.013	3	0																				
Chrysene	218-01-9	ug/L	-	B	0.059	11	0																	0.032	J		
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B	0.0095	1	0																	0.0095	J		
Fluoranthene	206-44-0	ug/L	0.04	B	0.12	9	6																				
Fluorene	86-73-7	ug/L	3	B	0.6	5	0																				
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B	0.0079	4	0																	0.0079	J		
Naphthalene	91-20-3	ug/L	1.1	-	0.88	7	0																				
Pentachlorophenol	87-86-5	ug/L	0.5	B	0.58	4	1																				
Phenanthrene	85-01-8	ug/L	0.4	B	1.5	10	2																				
Pyrene	129-00-0	ug/L	0.025	B	0.45	12	12																	0.071	J		

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchmark.

1 - Duplicate samples were not included in the summary statistics.

Table 6 - Semivolatile Organic Compounds (SVOCs) Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	1001-04 9/11/2013		1002-00 9/11/2013		1002-02 9/11/2013		1002-04 9/11/2013		1003-00 9/10/2013		1003-02 9/10/2013		1601-00 9/11/2013		1601-02 9/11/2013		1602-00 9/11/2013		1602-02 9/11/2013		1602-04 9/11/2013		1603-00 9/12/2013		1603-00DUP 9/12/2013	
					Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,4-Dioxane	123-91-1	ug/L	-	-	51				2.1	J	37								20						170					
2-Methylnaphthalene	91-57-6	ug/L	4.7	-	0.074	J					0.047	J					0.0068	J	0.079	J					0.24					
4-Methylphenol	106-44-5	ug/L	543	-																										
Acenaphthene	83-32-9	ug/L	5.8	B	0.21	J	0.029	J	0.066	J	0.23						0.056	J					0.059	J						
Acenaphthylene	208-96-8	ug/L	-	B					0.013	J							0.0078	J							0.084	J				
Anthracene	120-12-7	ug/L	0.012	B			0.021	J																	2.5	J				
Benzaldehyde	100-52-7	ug/L	-	-																										
Benzo(a)anthracene	56-55-3	ug/L	0.018	B	0.069	J	0.0068	J	0.016	J									0.052	J			0.026	J						
Benzo(a)pyrene	50-32-8	ug/L	0.015	B																										
Benzo(b)fluoranthene	205-99-2	ug/L	-	B																										
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B							0.0065	J					0.0075	J												
Benzo(k)fluoranthene	207-08-9	ug/L	-	B																										
Chrysene	218-01-9	ug/L	-	B			0.0065	J			0.018	J					0.015	J	0.025	J			0.019	J	0.059	J				
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B																					5	R				
Fluoranthene	206-44-0	ug/L	0.04	B	0.12														0.078	J	0.011	J	0.086	J			0.027	J		
Fluorene	86-73-7	ug/L	3	B	0.23	J					0.19														0.12	J				
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B							0.0071	J																		
Naphthalene	91-20-3	ug/L	1.1	-																					0.88					
Pentachlorophenol	87-86-5	ug/L	0.5	B					0.2	R	0.056	J					0.2	R	0.2	R							0.2	R		
Phenanthrene	85-01-8	ug/L	0.4	B					0.045	J											0.0073	J					0.0081	J		
Pyrene	129-00-0	ug/L	0.025	B	0.23		0.061	J	0.044	J							0.084	J	0.095	J			0.11		0.45		0.056	J	0.029	J

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks
B = Bioaccumulative
Highlighted values indicate their exceedances of BTAG benchma
1 - Duplicate samples were not included in the summary statisti

Table 6 - Semivolatile Organic Compounds (SVOCs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

					1603-02		1603-04		1603-04DUP		1802-00		1802-02		1803-00		2501-00		2501-02		2502-00		2502-02		2503-00		2503-02		3301-00	
					9/12/2013		9/12/2013		9/12/2013		9/13/2013		9/13/2013		9/13/2013		9/12/2013		9/12/2013		9/12/2013		9/12/2013		9/12/2013		9/12/2013		9/10/2013	
Analyte	CAS #	Unit	BTAG	B	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,4-Dioxane	123-91-1	ug/L	-	-	32		180		160								70		89		31		100		3.4		63			
2-Methylnaphthalene	91-57-6	ug/L	4.7	-	0.055	J					0.0069	J	0.0081	J	0.01	J	0.062	J	0.048	J	0.058	J					0.065	J		
4-Methylphenol	106-44-5	ug/L	543	-																	1.3	J								
Acenaphthene	83-32-9	ug/L	5.8	B			0.1	J	0.11	J									0.18		0.047	J			0.018	J	0.15			
Acenaphthylene	208-96-8	ug/L	-	B	0.035	J															0.058	J			0.0087	J	0.12			
Anthracene	120-12-7	ug/L	0.012	B	0.36		2.5	J	2.4	J			0.021	J			0.45		0.55		0.16		0.7				1.8	J		
Benzaldehyde	100-52-7	ug/L	-	-			3	J	2.1	J									2.6	J			1.9	J						
Benzo(a)anthracene	56-55-3	ug/L	0.018	B	0.084	J					0.012	J	0.017	J	0.01	J	0.1		0.11				0.2							
Benzo(a)pyrene	50-32-8	ug/L	0.015	B					0.041	J													0.017	J						
Benzo(b)fluoranthene	205-99-2	ug/L	-	B											0.017	J							0.034	J						
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B					0.0096	J																				
Benzo(k)fluoranthene	207-08-9	ug/L	-	B											0.0055	J	0.0061	J					0.013	J						
Chrysene	218-01-9	ug/L	-	B	0.029	J	0.033	J	0.022	J			0.019	J	0.017	J														
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B																										
Fluoranthene	206-44-0	ug/L	0.04	B	0.12				0.46	J					0.03	J							0.1				0.11			
Fluorene	86-73-7	ug/L	3	B			0.09	J											0.6											
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B			0.0075	J									0.0052	J												
Naphthalene	91-20-3	ug/L	1.1	-	0.12		0.67				0.023	J	0.028	J	0.015	J	0.11													
Pentachlorophenol	87-86-5	ug/L	0.5	B					0.2	R	0.11	J									0.042	J	0.58	J						
Phenanthrene	85-01-8	ug/L	0.4	B	0.022	J	1.5	J	1.9		0.018	J					0.04	J	0.081	J			1.2	J			0.31			
Pyrene	129-00-0	ug/L	0.025	B	0.14																0.073	J					0.15			

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchma

1 - Duplicate samples were not included in the summary statisti

Table 6 - Semivolatile Organic Compounds (SVOCs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	3301-02		3302-00		3302-02		3302-04		3303-00		3303-02	
					9/10/2013		9/10/2013		9/10/2013		9/10/2013		9/10/2013		9/10/2013	
					Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,4-Dioxane	123-91-1	ug/L	-	-							0.15	J			0.23	J
2-Methylnaphthalene	91-57-6	ug/L	4.7	-												
4-Methylphenol	106-44-5	ug/L	543	-												
Acenaphthene	83-32-9	ug/L	5.8	B												
Acenaphthylene	208-96-8	ug/L	-	B												
Anthracene	120-12-7	ug/L	0.012	B												
Benzaldehyde	100-52-7	ug/L	-	-												
Benzo(a)anthracene	56-55-3	ug/L	0.018	B												
Benzo(a)pyrene	50-32-8	ug/L	0.015	B												
Benzo(b)fluoranthene	205-99-2	ug/L	-	B												
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B												
Benzo(k)fluoranthene	207-08-9	ug/L	-	B												
Chrysene	218-01-9	ug/L	-	B												
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B												
Fluoranthene	206-44-0	ug/L	0.04	B												
Fluorene	86-73-7	ug/L	3	B												
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B												
Naphthalene	91-20-3	ug/L	1.1	-												
Pentachlorophenol	87-86-5	ug/L	0.5	B												
Phenanthrene	85-01-8	ug/L	0.4	B												
Pyrene	129-00-0	ug/L	0.025	B												

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchma

1 - Duplicate samples were not included in the summary statisti

Table 7 -Polycyclic Aromatic Hydrocarbons (PAHs-SIM) Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

					Summary Statistics[(1)]			0301-00		0301-02		0301-02D		0302-00		0302-02	
					Maximum	Number of	Number of	9/9/2013		9/9/2013		9/9/2013		9/9/2013		9/9/2013	
Analyte	CAS #	Unit	BTAG	B	Detection	Detections	Exceedances	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-Methylnaphthalene	91-57-6	ug/L	4.7	-	0.035	14	0	0.017	J	0.01	J	0.012	J	0.012	J	0.035	J
Acenaphthene	83-32-9	ug/L	5.8	B	0.48	14	0	0.033	J	0.094	J	0.1		0.028	J	0.11	
Acenaphthylene	208-96-8	ug/L	-	B	0.021	10	0	0.012	J	0.021	J	0.024	J			0.018	J
Anthracene	120-12-7	ug/L	0.012	B	0.15	12	11	0.077	J	0.098		0.11		0.011	J	0.15	
Benzo(a)anthracene	56-55-3	ug/L	0.018	B	0.09	10	6			0.038	J					0.09	J
Benzo(a)pyrene	50-32-8	ug/L	0.015	B	0.052	5	5									0.035	J
Benzo(b)fluoranthene	205-99-2	ug/L	-	B	0.073	7	0									0.054	J
Benzo(g,h,i)perylene	191-24-2	ug/L	-	B	0.032	6	0									0.018	J
Benzo(k)fluoranthene	207-08-9	ug/L	-	B	0.024	6	0									0.021	J
Chrysene	218-01-9	ug/L	-	B	0.076	10	0			0.043	J					0.076	J
Dibenzo(a,h)anthracene	53-70-3	ug/L	-	B	0.0072	3	0										
Fluoranthene	206-44-0	ug/L	0.04	B	0.17	16	9	0.037	J	0.052	J	0.04	J	0.03	J	0.16	
Fluorene	86-73-7	ug/L	3	B	0.071	5	0	0.035	J							0.071	J
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	-	B	0.031	6	0									0.019	J
Naphthalene	91-20-3	ug/L	1.1	-	0.094	16	0	0.046	J	0.015	J	0.016	J	0.044	J	0.094	J
Pentachlorophenol	87-86-5	ug/L	0.5	B	0.13	4	0	0.11	J	0.2	R	0.2	R	0.041	J	0.2	R
Phenanthrene	85-01-8	ug/L	0.4	B	0.23	16	0	0.045	J	0.073	J	0.098		0.032	J	0.23	
Pyrene	129-00-0	ug/L	0.025	B	0.21	16	15	0.032	J	0.098		0.092	J	0.053	J	0.21	

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Highlighted values indicate their exceedances of BTAG benchmark.
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Table 7 -Polycyclic Aromatic Hydrocarbons (PAHs-SIM) Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

	0303-00		0303-02		1001-00		1001-02D		1003-00		1003-02		3301-00		3301-02		3302-00		3302-02	
	9/9/2013		9/9/2013		9/11/2013		9/11/2013		9/10/2013		9/10/2013		9/10/2013		9/10/2013		9/10/2013		9/10/2013	
Analyte	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2-Methylnaphthalene	0.0056	J	0.018	J	0.017	J	0.014	J			0.013	J			0.0072	J	0.0085	J	0.0052	J
Acenaphthene	0.01	J	0.11		0.031	J	0.088	J			0.062	J			0.022	J	0.026	J	0.13	
Acenaphthylene			0.011	J			0.028	J			0.0075	J					0.0051	J	0.01	J
Anthracene			0.091	J	0.018	J	0.07	J			0.036	J			0.023	J			0.028	J
Benzo(a)anthracene	0.018	J	0.086	J							0.04	J			0.013	J	0.0055	J	0.07	J
Benzo(a)pyrene			0.052	J							0.031	J							0.04	J
Benzo(b)fluoranthene	0.028	J	0.073	J							0.054	J			0.0095	J			0.055	J
Benzo(g,h,i)perylene	0.013	J	0.032	J							0.023	J							0.019	J
Benzo(k)fluoranthene	0.011	J	0.024	J							0.021	J							0.021	J
Chrysene	0.019	J	0.067	J							0.034	J			0.011	J	0.0057	J	0.056	J
Dibenzo(a,h)anthracene			0.0072	J															0.0063	J
Fluoranthene	0.047	J	0.17		0.027	J	0.044	J	0.021	J	0.12		0.021	J	0.061	J	0.029	J	0.11	
Fluorene			0.043	J	0.024	J	0.041	J			0.06	J								
Indeno(1,2,3-cd)pyrene	0.011	J	0.031	J							0.022	J							0.019	J
Naphthalene	0.022	J	0.065	J	0.034	J	0.017	J	0.022	J	0.058	J	0.018	J	0.028	J	0.036	J	0.02	J
Pentachlorophenol	0.2	R	0.2	R	0.064	J	0.2	R	0.2	R	0.13	J	0.2	R	0.2	R	0.2	R	0.2	R
Phenanthrene	0.018	J	0.18		0.033	J	0.1		0.019	J	0.073	J	0.014	J	0.047	J	0.028	J	0.034	J
Pyrene	0.043	J	0.21		0.045	J	0.034	J	0.051	J	0.12		0.049	J	0.076	J	0.024	J	0.16	

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Highlighted values indicate t
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Table 7 -Polycyclic Aromatic Hydrocarbons (PAHs-SIM) Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

	3302-04		3303-00		3303-02	
	9/10/2013		9/10/2013		9/10/2013	
Analyte	Result	Flag	Result	Flag	Result	Flag
2-Methylnaphthalene	0.016	J	0.0069	J	0.006	J
Acenaphthene	0.24		0.028	J	0.48	
Acenaphthylene	0.016	J	0.0058	J	0.012	J
Anthracene	0.041	J	0.02	J	0.064	J
Benzo(a)anthracene	0.08	J			0.0081	J
Benzo(a)pyrene	0.045	J				
Benzo(b)fluoranthene	0.066	J				
Benzo(g,h,i)perylene	0.026	J				
Benzo(k)fluoranthene	0.019	J				
Chrysene	0.063	J			0.0059	J
Dibenzo(a,h)anthracene	0.007	J				
Fluoranthene	0.12		0.035	J	0.055	J
Fluorene						
Indeno(1,2,3-cd)pyrene	0.026	J				
Naphthalene	0.032	J	0.014	J	0.016	J
Pentachlorophenol	0.2	R	0.2	R	0.2	R
Phenanthrene	0.089	J	0.015	J	0.09	J
Pyrene	0.18		0.03	J	0.093	J

BTAG = EPA Region III BTAG
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Highlighted values indicate t
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Table 8 - Pesticides Detected in Pore Water (September 2013)
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	0301-00 9/9/2013 Result	Flag	0301-02 9/9/2013 Result	Flag	0301-02DUP 9/9/2013 Result	Flag	0302-00 9/9/2013 Result	Flag	0302-02 9/9/2013 Result	Flag	0303-00 9/9/2013 Result	Flag	0303-02 9/9/2013 Result	Flag	1001-00 9/11/2013 Result	Flag	1001-02 9/11/2013 Result	Flag	1001-02DUP 9/11/2013 Result	Flag
4,4'-DDD	72-54-8	ug/L	0.011	B	0.0028	1	0																				
4,4'-DDE	72-55-9	ug/L	-	B	0.0034	7	0																				
4,4'-DDT	50-29-3	ug/L	0.0005	B	0.018	31	31							0.011		0.0026	J	0.0089	J	0.0022	J	0.0092	J				
Aldrin	309-00-2	ug/L	3	B	0.0042	4	0																				
alpha-BHC[2]	319-84-6	ug/L	0.01	B	0.0028	7	0																				
alpha-Chlordane	5103-71-9	ug/L	0.0022	-	0.0035	18	14							0.0019	J							0.0023	J	0.0022	J		
beta-BHC[2]	319-85-7	ug/L	0.01	B	0.011	9	1																	0.0039	J		
delta-BHC	319-86-8	ug/L	141	B	0.0066	9	0	0.001	J															0.005	J	0.0053	
Dieldrin	60-57-1	ug/L	0.056	B	0.02	36	0	0.0099		0.0057	J	0.0052	J	0.012		0.0094		0.0096		0.0047		0.013		0.0074	J	0.0079	J
Endosulfan I	959-98-8	ug/L	0.051	B	0.0043	11	0	0.001	J	0.001	J																
Endosulfan II	33213-65-9	ug/L	0.051	B	0.0048	25	0	0.0045	J					0.0037	J			0.0024	J	0.0031	J	0.0024	J				
Endrin	72-20-8	ug/L	0.036	B	0.003	6	0																				
Endrin aldehyde	7421-93-4	ug/L	-	-	0.0049	15	0	0.0013	J											0.0024	J						
Endrin ketone	53494-70-5	ug/L	-	-	0.0029	8	0																				
gamma-BHC (Lindane)	58-89-9	ug/L	0.01	B	0.0026	4	0																				
gamma-Chlordane	5103-74-2	ug/L	0.0022	-	0.007	19	10							0.0015	J	0.0016	J					0.0013	J				
Heptachlor	76-44-8	ug/L	0.0019	B	0.0063	10	5	0.001	J																		
Heptachlor epoxide	1024-57-3	ug/L	0.0019	B	0.0026	11	9							0.0022	J												
Methoxychlor	72-43-5	ug/L	0.019	B	0.0082	4	0																				

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B = Bioaccumulative
Highlighted values indicate their exceedances of BTAG benchmark.
1 - Duplicate samples were not included in the summary statistics.
2 - Used gamma-BHC benchmarlk as a surrogate.

Table 8 - Pesticides Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	1001-04 9/11/2013		1002-00 9/11/2013		1002-02 9/11/2013		1002-04 9/11/2013		1003-00 9/10/2013		1003-02 9/10/2013		1601-00 9/11/2013		1601-02 9/11/2013		1602-00 9/11/2013		1602-02 9/11/2013		1602-04 9/11/2013		1603-00 9/12/2013		1603-00DUP 9/12/2013	
					Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
4,4'-DDD	72-54-8	ug/L	0.011	B															0.0028	J										
4,4'-DDE	72-55-9	ug/L	-	B	0.0034	J					0.0012	J													0.0013	J	0.0011	J		
4,4'-DDT	50-29-3	ug/L	0.0005	B	0.002	J	0.013	J					0.01		0.011		0.015	J	0.0053	J	0.0097	J	0.003	J	0.0041	J	0.0067	J	0.0021	J
Aldrin	309-00-2	ug/L	3	B	0.0013	J					0.0021	J																		
alpha-BHC[(2)]	319-84-6	ug/L	0.01	B	0.0016	J													0.0015						0.0019	J				
alpha-Chlordane	5103-71-9	ug/L	0.0022	-			0.0023	J	0.0019	J			0.0021	J	0.002	J	0.0035	J			0.0024	J	0.0022	J	0.0027	J			0.0022	J
beta-BHC[(2)]	319-85-7	ug/L	0.01	B	0.0023	J					0.0035	J	0.0027						0.0031	J					0.0026	J				
delta-BHC	319-86-8	ug/L	141	B	0.0066	J					0.0042	J																		
Dieldrin	60-57-1	ug/L	0.056	B	0.0042	J	0.016		0.0097		0.0058	J	0.014		0.011		0.02		0.0034	J	0.017		0.0073				0.011		0.012	
Endosulfan I	959-98-8	ug/L	0.051	B	0.0017	J					0.0021	J					0.0013	J							0.0025	J				
Endosulfan II	33213-65-9	ug/L	0.051	B	0.0026	J	0.0036	J					0.0048	J			0.0047	J	0.0019	J	0.0027	J	0.0034	J			0.0022	J	0.0022	J
Endrin	72-20-8	ug/L	0.036	B							0.0021	J													0.0014	J				
Endrin aldehyde	7421-93-4	ug/L	-	-	0.0031	J			0.0019	J	0.0022	J													0.0049	J	0.0018	J	0.0012	J
Endrin ketone	53494-70-5	ug/L	-	-													0.0017	J			0.0028	J					0.0017	J	0.0021	J
gamma-BHC (Lindane)	58-89-9	ug/L	0.01	B	0.0015	J					0.0015	J													0.0015	J				
gamma-Chlordane	5103-74-2	ug/L	0.0022	-			0.0013	J			0.0018	J	0.0012	J	0.0014	J	0.0025	J	0.0041	J			0.0019	J	0.0023	J				
Heptachlor	76-44-8	ug/L	0.0019	B													0.0011	J	0.0036						0.0039					
Heptachlor epoxide	1024-57-3	ug/L	0.0019	B			0.0021						0.0021	J							0.0026	J							0.0018	J
Methoxychlor	72-43-5	ug/L	0.019	B															0.0061	J					0.0055	J				

BTAG = EPA Region III BTAG Fresh Water Screening Benc

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG b

1 - Duplicate samples were not included in the summary

2 - Used gamma-BHC benchmarlk as a surrogate.

Table 8 - Pesticides Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	1603-02 9/12/2013		1603-04 9/12/2013		1603-04DUP 9/12/2013		1802-00 9/13/2013		1802-02 9/13/2013		1803-00 9/13/2013		2501-00 9/12/2013		2501-02 9/12/2013		2502-00 9/12/2013		2502-02 9/12/2013		2503-00 9/12/2013		2503-02 9/12/2013		3301-00 9/10/2013	
					Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
4,4'-DDD	72-54-8	ug/L	0.011	B																										
4,4'-DDE	72-55-9	ug/L	-	B			0.0022	J											0.0013	J							0.0022	J		
4,4'-DDT	50-29-3	ug/L	0.0005	B	0.0073	J	0.018	J	0.012	J	0.0021	J	0.0016	J	0.0047	J	0.012	J	0.0051	J	0.013	J	0.0043	J	0.0084	J	0.0076		0.01	
Aldrin	309-00-2	ug/L	3	B															0.0031	J							0.0042	J		
alpha-BHC[(2)]	319-84-6	ug/L	0.01	B													0.0012	J	0.0028	J			0.0013	J			0.0011	J		
alpha-Chlordane	5103-71-9	ug/L	0.0022	-					0.0019	J	0.0027	J	0.0016	J	0.0024	J					0.0019	J			0.0018	J			0.002	J
beta-BHC[(2)]	319-85-7	ug/L	0.01	B			0.0043	J											0.0025	J			0.011	J						
delta-BHC	319-86-8	ug/L	141	B													0.0016	J	0.0018	J	0.001	J	0.0035	J			0.0019	J		
Dieldrin	60-57-1	ug/L	0.056	B	0.0052						0.014	J	0.0066		0.017	J	0.012	J	0.013	J	0.015		0.016		0.012		0.012		0.014	
Endosulfan I	959-98-8	ug/L	0.051	B			0.0011	J	0.0011	J							0.0022	J	0.0043	J			0.0038	J			0.0025	J		
Endosulfan II	33213-65-9	ug/L	0.051	B							0.0031	J	0.0019	J	0.0022	J	0.0028	J	0.0024	J	0.0036	J	0.0027	J	0.0026	J	0.0026	J	0.0043	J
Endrin	72-20-8	ug/L	0.036	B													0.0017	J					0.0018	J						
Endrin aldehyde	7421-93-4	ug/L	-	-	0.0014	J	0.0022	J							0.0012	J			0.0032	J	0.0015	J	0.0025	J			0.0023	J		
Endrin ketone	53494-70-5	ug/L	-	-							0.0019	J	0.0016	J	0.0029	J	0.0018	J							0.0016	J				
gamma-BHC (Lindane)	58-89-9	ug/L	0.01	B																							0.0026	J		
gamma-Chlordane	5103-74-2	ug/L	0.0022	-			0.007	J			0.0021	J					0.0028	J	0.0028	J			0.0055	J	0.0011	J	0.0068			
Heptachlor	76-44-8	ug/L	0.0019	B	0.0015		0.0063	J	0.004	J									0.0019	J			0.0032	J			0.0027	J		
Heptachlor epoxide	1024-57-3	ug/L	0.0019	B							0.0021				0.0023		0.0018	J			0.0021	J			0.0019	J	0.0026	J	0.002	J
Methoxychlor	72-43-5	ug/L	0.019	B													0.0055	J	0.0082	J										

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Highlighted values indicate their exceedances of BTAG b

1 - Duplicate samples were not included in the summary

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Table 8 - Pesticides Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	3301-02 9/10/2013		3302-00 9/10/2013		3302-02 9/10/2013		3302-04 9/10/2013		3303-00 9/10/2013		3303-02 9/10/2013	
					Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
4,4'-DDD	72-54-8	ug/L	0.011	B												
4,4'-DDE	72-55-9	ug/L	-	B												
4,4'-DDT	50-29-3	ug/L	0.0005	B	0.0014	J	0.0072	J			0.0016	J	0.0083	J		
Aldrin	309-00-2	ug/L	3	B												
alpha-BHC[(2)]	319-84-6	ug/L	0.01	B												
alpha-Chlordane	5103-71-9	ug/L	0.0022	-					0.0026	J						
beta-BHC[(2)]	319-85-7	ug/L	0.01	B												
delta-BHC	319-86-8	ug/L	141	B												
Dieldrin	60-57-1	ug/L	0.056	B	0.008		0.012	J	0.0094		0.0023	J	0.012		0.0045	
Endosulfan I	959-98-8	ug/L	0.051	B												
Endosulfan II	33213-65-9	ug/L	0.051	B			0.0025	J					0.0032	J		
Endrin	72-20-8	ug/L	0.036	B			0.0016	J					0.003	J		
Endrin aldehyde	7421-93-4	ug/L	-	-									0.0027	J		
Endrin ketone	53494-70-5	ug/L	-	-												
gamma-BHC (Lindane)	58-89-9	ug/L	0.01	B												
gamma-Chlordane	5103-74-2	ug/L	0.0022	-					0.0021	J						
Heptachlor	76-44-8	ug/L	0.0019	B							0.0012					
Heptachlor epoxide	1024-57-3	ug/L	0.0019	B												
Methoxychlor	72-43-5	ug/L	0.019	B												

BTAG = EPA Region III BTAG Fresh Water Screening Benc

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG b

1 - Duplicate samples were not included in the summary

2 - Used gamma-BHC benchmarlk as a surrogate.

Table 9 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	0301-00 9/9/2013 Result	Flag	0301-02 9/9/2013 Result	Flag	1001-00 9/11/2013 Result	Flag	1001-04 9/11/2013 Result	Flag	1601-00 9/11/2013 Result	Flag	1601-02 9/11/2013 Result	Flag
PCB-1	2051-60-7	pg/L	-	-	30700	11	NA	48.7		177		70.3		1140		205		558	
PCB-10	33146-45-1	pg/L	-	-	3910	9	NA			23.4		12.5	J	57.1		21.1		42	
PCB-103	60145-21-3	pg/L	-	-	214	4	NA			4.8	J			9.8	J			12.4	J
PCB-104	56558-16-8	pg/L	-	-	83	3	NA												
PCB-105	32598-14-4	pg/L	-	-	32100	11	NA	12.3	J	15.7	J	21.2		94.5		26.6		61.3	
PCB-107/124	70424-68-9/70424-70-3	pg/L	-	-	3210	4	NA												
PCB-109	74472-35-8	pg/L	-	-	3900	3	NA												
PCB-11	2050-67-1	pg/L	-	-	1210	11	NA	76		68.6		70.7		100		70.4		82	
PCB-110/115	38380-03-9/74472-38-1	pg/L	-	-	103000	10	NA	80.8		112		125		496		141		326	
PCB-114	74472-37-0	pg/L	-	-	1610	5	NA							3.7	J				
PCB-118	31508-00-6	pg/L	-	-	80900	11	NA	32.3		42.9		56		247		61.9		164	
PCB-12/13	2974-92-7/2974-90-5	pg/L	-	-	1220	7	NA			45.5				140				47.9	
PCB-123	65510-44-3	pg/L	-	-	494	4	NA									1.1	J		
PCB-126	57465-28-8	pg/L	-	-	53.1	4	NA												
PCB-128/166	38380-07-3/41411-63-6	pg/L	-	-	17700	11	NA	9.1	J	12.4	J	16.6	J	90.1		22.3	J	36.9	J
PCB-129/138/160/163	55215-18-4/35065-28-2/41411-62-5/74472-44-9	pg/L	-	-	98400	11	NA	83.3		109		164		729		193		291	
PCB-130	52663-66-8	pg/L	-	-	5350	9	NA			6	J	6.9	J	40.8		8	J	18.2	J
PCB-131	61798-70-7	pg/L	-	-	1410	1	NA												
PCB-132	38380-05-1	pg/L	-	-	31300	9	NA	34.6		37.7		52.5				61.5		113	
PCB-133	35694-04-3	pg/L	-	-	786	4	NA												
PCB-134/143	52704-70-8/68194-15-0	pg/L	-	-	4150	7	NA							18.3	J	8.7	J		
PCB-135/151/154	52744-13-5/52663-63-5/60145-22-4	pg/L	-	-	18100	11	NA	45.2	J	87.4		106		422		126		201	
PCB-136	38411-22-2	pg/L	-	-	8020	8	NA	17.2	J			29.7		90.4		35.3		61.1	
PCB-137	35694-06-5	pg/L	-	-	5950	3	NA												
PCB-139/140	56030-56-9/59291-64-4	pg/L	-	-	1710	1	NA												
PCB-141	52712-04-6	pg/L	-	-	12800	11	NA	21.7		23.4		32.9		128		42.4		49.8	
PCB-144	68194-14-9	pg/L	-	-	2430	5	NA			8.3	J								
PCB-145	74472-40-5	pg/L	-	-	6070	1	NA												
PCB-146	51908-16-8	pg/L	-	-	8560	10	NA	16.5	J	16.2	J	23.4		99.6		27.9		51.1	
PCB-147/149	68194-13-8/38380-04-0	pg/L	-	-	54400	10	NA	79.2				193		2520		210		767	
PCB-148	74472-41-6	pg/L	-	-	275	1	NA												
PCB-15	2050-68-2	pg/L	-	-	3410	11	NA	51.1		67.7		55.3		195		60.3		140	
PCB-150	68194-08-1	pg/L	-	-	104	2	NA												
PCB-152	68194-09-2	pg/L	-	-	84.9	2	NA												
PCB-153/168	35065-27-1/59291-65-5	pg/L	-	-	62000	11	NA	84.3		107		148		668		173		265	
PCB-155	33979-03-2	pg/L	-	-	6.2	1	NA												
PCB-156/157	38380-08-4/69782-90-7	pg/L	-	-	12200	6	NA							58.4					
PCB-158	74472-42-7	pg/L	-	-	10500	11	NA	6.7	J	9.6	J	13.5	J	67.1		16.2	J	26.8	
PCB-159	39635-35-3	pg/L	-	-	271	6	NA							6.9	J	2.1	J		

Table 9 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

					Summary Statistics[1]			0301-00		0301-02		1001-00		1001-04		1601-00		1601-02	
					Maximum	Number of	Number of	9/9/2013		9/9/2013		9/11/2013		9/11/2013		9/11/2013		9/11/2013	
Analyte	CAS #	Unit	BTAG	B	Detection	Detections	Exceedances	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
PCB-16	38444-78-9	pg/L	-	-	1700	8	NA	85		179		81.3		365		63.7		595	
PCB-161	74472-43-8	pg/L	-	-	4370	1	NA												
PCB-162	39635-34-2	pg/L	-	-	389	2	NA												
PCB-164	74472-45-0	pg/L	-	-	6160	9	NA	6.4	J	7.4	J	10.3	J	57.6		16.4	J		
PCB-167	52663-72-6	pg/L	-	-	3710	10	NA	4.1	J	3.2	J			21.3		5.2	J	8.3	J
PCB-169	32774-16-6	pg/L	-	-	39.7	1	NA												
PCB-17	37680-66-3	pg/L	-	-	6700	11	NA	71.8		221		109		597		76.3		583	
PCB-170	35065-30-6	pg/L	-	-	10200	11	NA	16.2	J	29.3		34.3		212		45.6		63.6	
PCB-171/173	52663-71-5/68194-16-1	pg/L	-	-	2870	9	NA					14.6	J	69.2		18.1	J	18.5	J
PCB-172	52663-74-8	pg/L	-	-	3930	8	NA							37.7		9.5	J	11.1	J
PCB-174	38411-25-5	pg/L	-	-	12200	10	NA	17.1	J	26.9		36.5		239		56.6			
PCB-175	40186-70-7	pg/L	-	-	303	1	NA												
PCB-176	52663-65-7	pg/L	-	-	1270	8	NA			4.7	J			28.8				8.8	J
PCB-177	52663-70-4	pg/L	-	-	6830	10	NA	13.3	J	17.4	J	21.9		138		29.1			
PCB-178	52663-67-9	pg/L	-	-	2080	8	NA							55.1		7.7	J	16.5	J
PCB-179	52663-64-6	pg/L	-	-	5560	7	NA							104		24.9		31.5	
PCB-18/30	37680-65-2/35693-92-6	pg/L	-	-	10300	11	NA	153		437		203		967		159		1220	
PCB-180/193	35065-29-3/69782-91-8	pg/L	-	-	25300	11	NA	41.5		74.6		88.8		487		125		168	
PCB-183/185	52663-69-1/52712-05-7	pg/L	-	-	9690	10	NA	15.4	J	23.9	J	30.2	J	154		37.4	J		
PCB-187	52663-68-0	pg/L	-	-	16900	11	NA	25.9		43.5		50.6		182		68.2		94.2	
PCB-189	39635-31-9	pg/L	-	-	380	6	NA									2.3	J		
PCB-19	38444-73-4	pg/L	-	-	21000	11	NA	93.2		214		76.8		430		110		399	
PCB-190	41411-64-7	pg/L	-	-	2140	11	NA	3.8	J	6.4	J	8	J	34.1		10.5	J	11.9	J
PCB-191	74472-50-7	pg/L	-	-	531	6	NA							9.1	J				
PCB-194	35694-08-7	pg/L	-	-	7590	11	NA	9.9	J	12.5	J	12.9	J	106		27.3		41.9	
PCB-195	52663-78-2	pg/L	-	-	3300	10	NA	3.8	J			7.1	J	49.1		11.3	J	14.8	J
PCB-196	42740-50-1	pg/L	-	-	4940	10	NA			10.1	J	8.9	J	78.6		18.1	J	38.3	
PCB-197/200	33091-17-7/52663-73-7	pg/L	-	-	1130	5	NA												
PCB-198/199	68194-17-2/52663-75-9	pg/L	-	-	7490	10	NA			21.5	J	13.5	J	107		31.1	J	45.8	
PCB-2	2051-61-8	pg/L	-	-	358	10	NA			7.3	J	4.7	J	63		4.7	J	23.6	
PCB-20/28	38444-84-7/7012-37-5	pg/L	-	-	7630	11	NA	136		282		213		1420		181		793	
PCB-201	40186-71-8	pg/L	-	-	871	5	NA							12.4	J				
PCB-202	2136-99-4	pg/L	-	-	1310	5	NA												
PCB-203	52663-76-0	pg/L	-	-	5560	11	NA	6.2	J	14.8	J	12.6	J	68.3		19	J	31.7	
PCB-205	74472-53-0	pg/L	-	-	337	6	NA							6.6	J				
PCB-206	40186-72-9	pg/L	-	-	3120	8	NA							49.8		12.3	J	28.5	
PCB-207	52663-79-3	pg/L	-	-	347	6	NA							4.3	J			2.8	J
PCB-208	52663-77-1	pg/L	-	-	830	6	NA											6.4	J
PCB-209	2051-24-3	pg/L	-	-	2320	8	NA	2.3	J					21.3				12.4	J
PCB-21/33	55702-46-0/38444-86-9	pg/L	-	-	2440	11	NA	47.9		75.3		93.7		157		55.4		304	
PCB-22	38444-85-8	pg/L	-	-	2280	11	NA	52.3		82.7		95.1		296		57.6		265	

Table 9 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

					Summary Statistics[1]			0301-00		0301-02		1001-00		1001-04		1601-00		1601-02	
					Maximum	Number of	Number of	9/9/2013		9/9/2013		9/11/2013		9/11/2013		9/11/2013		9/11/2013	
Analyte	CAS #	Unit	BTAG	B	Detection	Detections	Exceedances	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
PCB-24	55702-45-9	pg/L	-	-	1950	6	NA	46.5											
PCB-25	55712-37-3	pg/L	-	-	2170	11	NA	26.1		110		43.5		521		28		280	
PCB-26/29	38444-81-4/15862-07-4	pg/L	-	-	3180	11	NA	32	J	124		58.2		553		35.7	J	319	
PCB-27	38444-76-7	pg/L	-	-	6790	11	NA	24.3		85.7		33.8		88.3		46.9		283	
PCB-3	2051-62-9	pg/L	-	-	1390	10	NA			20.1		10.9	J	97.8		18.3	J	98.1	
PCB-31	16606-02-3	pg/L	-	-	5990	11	NA	115		243		243		999		130		700	
PCB-32	38444-77-8	pg/L	-	-	4290	11	NA	76		216		117		734		98.3		479	
PCB-34	37680-68-5	pg/L	-	-	72.7	3	NA												
PCB-35	37680-69-6	pg/L	-	-	76	2	NA												
PCB-37	38444-90-5	pg/L	-	-	1570	11	NA	25.8		28.7		41.1		97.8		30.7		87.9	
PCB-4	13029-08-8	pg/L	-	-	127000	11	NA	188		581		198		1810		440		848	
PCB-40/41/71	38444-93-8/52663-59-9/41464-46-4	pg/L	-	-	3980	11	NA	64.7		133		77.6		427		76		500	
PCB-42	36559-22-5	pg/L	-	-	2190	10	NA	24.1		75.9		53.1		172		51.4		230	
PCB-43	70362-46-8	pg/L	-	-	46.1	2	NA												
PCB-44/47/65	41464-39-5/2437-79-8/33284-54-7	pg/L	-	-	15700	11	NA	98.7		301		141		815		160		832	
PCB-45/51	70362-45-7/68194-04-7	pg/L	-	-	4660	11	NA	62.6		210		62.9		499		77.7		462	
PCB-46	41464-47-5	pg/L	-	-	693	9	NA	13	J	53.1				137		26.1		136	
PCB-48	70362-47-9	pg/L	-	-	155	10	NA	11.6	J	22.6		21.1		51.1		17.2	J	75.1	
PCB-49/69	41464-40-8/60233-24-1	pg/L	-	-	10500	11	NA	79.5		223		104		748		103		606	
PCB-50/53	62796-65-0/41464-41-9	pg/L	-	-	5230	11	NA	55		198		54		496		70.9		487	
PCB-52	35693-99-3	pg/L	-	-	31100	11	NA	124		295		165		795		221		855	
PCB-54	15968-05-5	pg/L	-	-	2070	7	NA			31				51.2				74.2	
PCB-55	74338-24-2	pg/L	-	-	5610	1	NA												
PCB-56	41464-43-1	pg/L	-	-	3380	9	NA	24.2		30		37.7		112		35.3			
PCB-57	70424-67-8	pg/L	-	-	77.4	1	NA												
PCB-58	41464-49-7	pg/L	-	-	1130	1	NA												
PCB-59/62/75	74472-33-6/54230-22-7/32598-12-2	pg/L	-	-	905	11	NA	12	J	16.9	J	12.3	J	72.3		14.8	J	31.4	J
PCB-6	25569-80-6	pg/L	-	-	5570	11	NA	37.8		196		60.7		1020		48.1		365	
PCB-60	33025-41-1	pg/L	-	-	2510	10	NA	6.8	J	8.6	J	16.3	J	42.3		14.8	J		
PCB-61/70/74/76	33284-53-6/32598-11-1/32690-93-0/70362-48-0	pg/L	-	-	38500	11	NA	78.4	J	104		128		361		108		443	
PCB-64	52663-58-8	pg/L	-	-	3560	11	NA	37.7		61.3		64		165		61.8		194	
PCB-66	32598-10-0	pg/L	-	-	6280	10	NA	36.8		58		59.9		228		55.7		223	
PCB-68	73575-52-7	pg/L	-	-	94	1	NA												
PCB-7	33284-50-3	pg/L	-	-	281	6	NA							56.2				35.6	
PCB-72	41464-42-0	pg/L	-	-	65.4	1	NA												
PCB-77	32598-13-3	pg/L	-	-	549	7	NA							23				15.6	J
PCB-8	34883-43-7	pg/L	-	-	5960	11	NA	84.8		263		161		1060		105		582	

Table 9 - Polychlorinated Biphenyls (PCBs) Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	0301-00 9/9/2013 Result	Flag	0301-02 9/9/2013 Result	Flag	1001-00 9/11/2013 Result	Flag	1001-04 9/11/2013 Result	Flag	1601-00 9/11/2013 Result	Flag	1601-02 9/11/2013 Result	Flag
PCB-80	33284-52-5	pg/L	-	-	262	1	NA												
PCB-81	70362-50-4	pg/L	-	-	369	1	NA												
PCB-82	52663-62-4	pg/L	-	-	8920	7	NA			9.5	J			42.7				30.1	
PCB-83/99	60145-20-2/38380-01-7	pg/L	-	-	40500	11	NA	24.9	J	50.3		49		201		55.7		247	
PCB-84	52663-60-2	pg/L	-	-	19300	11	NA	18.7	J	36.5		27.6		91.6		39		126	
PCB-85/116/117	65510-45-4/18259-05-7/68194-11-6	pg/L	-	-	29100	11	NA	8.2	J	15.1	J	16	J	35.5	J	18.2	J	69.8	
PCB-86/87/97/108/119/125	55312-69-1/38380-02-8/41464-51-1/70362-41-3/56558-17-9/74472-39-2	pg/L	-	-	61200	11	NA	32	J	54.3	J	61.8	J	214		67.5	J	215	
PCB-88/91	55215-17-3/68194-05-8	pg/L	-	-	3080	11	NA	8.8	J	17.9	J	14.5	J	68.1		17.5	J	80.3	
PCB-89	73575-57-2	pg/L	-	-	1.5	1	NA			1.5	J								
PCB-9	34883-39-1	pg/L	-	-	393	7	NA					14.8	J	79.9				49.2	
PCB-90/101/113	68194-07-0/37680-73-2/68194-10-5	pg/L	-	-	83800	11	NA	75.5		97.6		131		367		134		355	
PCB-92	52663-61-3	pg/L	-	-	3840	8	NA	14.1	J	24.3				76.2		23.8		83.3	
PCB-93/95/98/100/102	73575-56-1/38379-99-6/60233-25-2/39485-83-1/68194-06-9	pg/L	-	-	65900	10	NA	103		132				371		159		415	
PCB-94	73575-55-0	pg/L	-	-	265	4	NA			5.7	J			8.7	J			11.8	J
PCB-96	73575-54-9	pg/L	-	-	389	6	NA			3.5	J			8.4	J			12.4	J
Total DiCB	25512-42-9	pg/L	-	-	135000	11	NA	437		1250		572		4510		745		2190	
Total HpCB	28655-71-2	pg/L	-	-	99000	11	NA	133		227		285		1750		434		424	
Total HxCB	26601-64-9	pg/L	-	-	366000	11	NA	408		435		808		5020		962		1910	
Total MoCB	27323-18-8	pg/L	-	-	36100	11	NA	48.7		204		85.9		1310		228		679	
Total NoCB	53742-07-7	pg/L	-	-	4300	8	NA							54.1		12.3		37.7	
Total OcCB	55722-26-4	pg/L	-	-	32500	11	NA	19.9		58.9		55		428		107		173	
Total PCBs	1111-11-1	pg/L	74[2]	-	1320000	11	11	3170		6920		4710		27800		5390		19100	
Total PeCB	25429-29-2	pg/L	-	-	526000	11	NA	411		623		502		2330		746		2210	
Total TeCB	26914-33-0	pg/L	-	-	125000	11	NA	729		1820		997		5200		1090		5160	
Total TEQ	2222-22-2	pg/L	-	-	10.6	11	NA	0.0015		0.0019		0.0024		0.015		0.003		0.0085	
Total TrCB	25323-68-6	pg/L	-	-	58100	11	NA	985		2300		1410		7220		1070		6310	

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchmark.

1 - Duplicate samples were not included in the summary statistics.

2 - Total PCB value.

Table 10 - Dioxin/Furan Detected in Pore Water (September 2013)

Lower Darby Creek Area (LDCA) Site

Operable Unit 3 (OU-3) - Clearview Landfill Groundwater

Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS #	Unit	BTAG	B	Summary Statistics[1] Maximum Detection	Number of Detections	Number of Exceedances	0301-00 9/9/2013 Result	0301-02 9/9/2013 Result	1001-00 9/11/2013 Result	1001-04 9/11/2013 Result	1601-00 9/11/2013 Result	1601-02 9/11/2013 Result
OCDD	3268-87-9	pg/L	-	-	479	2	NA				239		479
Total TEQ Bird	2222-20-0	pg/L	-	-	0.0479	2	NA				0.0239		0.0479
Total TEQ Fish[2]	2222-21-0	pg/L	0.003	-	0.0479	2	2				0.0239		0.0479
Total TEQ Mammal	3333-30-0	pg/L	-	-	0.144	2	NA				0.0717		0.144

BTAG = EPA Region III BTAG Fresh Water Screening Benchmarks (7/2006)

B = Bioaccumulative

Highlighted values indicate their exceedances of BTAG benchmark.

1 - Duplicate samples were not included in the summary statistics.

2 - The BTAG value for 2,3,7,8-TCDD is used as the screening benchmark for fish.

Table 11 - Detections in Pore Water (May and September 2013) - Summary of Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Location	Construction Workers		Recreation Users	
	Cancer Risk	Hazard Index	Cancer Risk[(1)]	Hazard Index[(2)]
May 2013				
LD103	2E-11	2E-08	1E-08	3E-05
LD106	5E-11	1E-07	3E-08	1E-04
LD108	4E-11	5E-08	3E-08	8E-05
LD110	2E-09	1E-04	4E-06	1E-02
LD114	5E-10	7E-07	4E-07	1E-03
LD116	4E-11	2E-07	3E-08	2E-04
LD118	4E-10	6E-07	3E-07	8E-04
LD123	3E-10	4E-04	2E-07	6E-04
LD126	4E-08	1E-03	**5E-05**	**4E+00**
LD129	3E-09	1E-04	6E-06	2E-01
LD132	3E-07	9E-03	**4E-04**	**3E+01**
LD132DUP	8E-09	2E-04	8E-06	7E-01
LD136	9E-09	1E-03	**2E-05**	4E-01
LD136DUP	1E-09	4E-04	3E-07	9E-03
September 2013				
0301-00	1E-09	7E-05	3E-07	1E-02
0301-02	8E-10	3E-05	3E-07	2E-02
0301-02D	6E-10	3E-05	1E-07	9E-04
0302-00	1E-09	1E-04	2E-07	2E-03
0302-02	1E-09	5E-05	2E-07	2E-03
0303-00	1E-09	5E-05	2E-07	1E-03
0303-02	5E-10	3E-05	2E-07	9E-04
1001-00	2E-09	7E-05	5E-07	2E-02
1001-02	9E-10	4E-05	2E-07	1E-03
1001-02D	9E-10	4E-05	2E-07	1E-03
1001-04	2E-09	9E-05	1E-06	1E-01
1002-00	2E-09	1E-04	3E-07	3E-03
1002-02	1E-09	5E-05	2E-07	1E-03
1002-04	8E-10	6E-05	2E-07	1E-03
1003-00	2E-09	1E-04	3E-07	3E-03
1003-02	1E-09	6E-05	2E-07	2E-03
1601-00	3E-09	1E-04	7E-07	3E-02
1601-02	2E-09	1E-04	9E-07	6E-02
1602-00	2E-09	1E-04	3E-07	3E-03
1602-02	8E-10	4E-05	1E-07	1E-03
1602-04	2E-09	1E-04	5E-07	2E-03
1603-00	1E-09	5E-05	2E-07	2E-03
1603-00DUP	1E-09	1E-04	2E-07	2E-03
1603-02	8E-10	6E-05	2E-07	1E-03
1603-04	1E-09	1E-04	6E-07	2E-03
1603-04DUP	1E-09	8E-05	5E-07	2E-03
1802-00	2E-09	1E-04	3E-07	3E-03
1802-02	7E-10	3E-05	1E-07	9E-04
1803-00	2E-09	1E-04	3E-07	3E-03
2501-00	2E-09	1E-04	4E-07	3E-03

Table 11 - Detections in Pore Water (May and September 2013) - Summary of Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Location	Construction Workers		Recreation Users	
	Cancer Risk	Hazard Index	Cancer Risk[(1)]	Hazard Index[(2)]
2501-02	2E-09	1E-04	5E-07	3E-03
2502-00	2E-09	1E-04	4E-07	3E-03
2502-02	3E-09	1E-04	7E-07	3E-03
2503-00	1E-09	1E-04	2E-07	2E-03
2503-02	2E-09	2E-04	5E-07	3E-03
3301-00	2E-09	1E-04	3E-07	3E-03
3301-02	9E-10	4E-05	1E-07	1E-03
3302-00	1E-09	6E-05	2E-07	2E-03
3302-02	1E-09	5E-05	2E-07	1E-03
3302-04	4E-10	4E-05	1E-07	5E-04
3303-00	1E-09	6E-05	2E-07	2E-03
3303-02	5E-10	2E-05	8E-08	7E-04

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.

2 - Non-cancer RSLs are for child recreational user exposures.

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.

Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 12 - Detections in Pore Water (May 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	LD103 5/2/2013				LD106 5/2/2013				LD108 5/2/2013				LD110 5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																				
1,4-Dioxane	123-91-1	300,000	220,000,000	Liver, Kidney	4.9 J		1.6E-11	2.2E-08	14 J		4.7E-11	6.4E-08	12 J		4.0E-11	5.5E-08	63 J		2.1E-10	2.9E-07
2-Methylphenol	95-48-7	NA	140,000,000	Whole Body																
4-Methylphenol	106-44-5	NA	280,000	Liver																
Anthracene	120-12-7	NA	77,000,000	Whole Body																
Benzaldehyde	100-52-7	NA	700,000,000	Kidney																
Benzo(a)anthracene	56-55-3	67,000	NA	Cancer													5.1 J		7.6E-11	NA
Benzo(a)pyrene	50-32-8	6,700	NA	Cancer													4.3 J		6.4E-10	NA
Benzo(b)fluoranthene	205-99-2	67,000	NA	Cancer													4.5 J		6.7E-11	NA
Benzo(g,h,i)perylene	191-24-2	NA	65,000,000	Kidney													3.3 J		NA	5.1E-08
Benzo(k)fluoranthene	207-08-9	670,000	NA	Cancer													3.9 J		5.8E-12	NA
Bis(2-ethylhexyl)phthalate	117-81-7	3,500,000	70,000,000	Reproductive					2.6 J		7.4E-13	3.7E-08					6.9 J		2.0E-12	9.9E-08
Caprolactam	105-60-2	NA	350,000,000	Developmental																
Carbazole	86-74-8	NA	NA	Cancer																
Chrysene	218-01-9	6,700,000	NA	Cancer													6.3 J		9.4E-13	NA
Dibenzo(a,h)anthracene	53-70-3	6,700	NA	Cancer																
Di-n-butylphthalate	84-74-2	NA	700,000,000	Whole Body																
Fluoranthene	206-44-0	NA	70,000,000	Kidney													12 J		NA	1.7E-07
Indeno(1,2,3-cd)pyrene	193-39-5	67,000	NA	Cancer													3.2 J		4.8E-11	NA
N-Nitrosodiphenylamine	86-30-6	10,000,000	NA	Liver																
Phenanthrene	85-01-8	NA	430,000	Kidney													7.1 J		NA	1.7E-05
Pyrene	129-00-0	NA	270,000	Kidney													9.4 J		NA	3.5E-05
Pesticides (ug/L)																				
4,4'-DDD	72-54-8	120	NA	Cancer													0.057 J		4.8E-10	NA
4,4'-DDE	72-55-9	140,000	NA	Cancer													0.037 J		2.6E-13	NA
4,4'-DDT	50-29-3	140,000	350,000	Liver													0.12 J		8.6E-13	3.4E-07
alpha-Chlordane	5103-71-9	390	1,200	Liver													0.029 J		7.4E-11	2.4E-05
Dieldrin	60-57-1	9.4	210	Liver													0.008 J		8.7E-10	3.9E-05
Endosulfan II	33213-65-9	NA	4,200,000	Liver													0.01 J		NA	2.4E-09
Endrin aldehyde	7421-93-4	NA	1,400,000	Central Nervous System													0.036 J		NA	2.6E-08
Endrin ketone	53494-70-5	NA	6,000	Central Nervous System, Liver													0.017 J		NA	2.8E-06
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																
gamma-Chlordane	5103-74-2	140,000	420,000	Liver																
Heptachlor epoxide	1024-57-3	24	41	Liver																
PCBs (pg/L)																				
Total Dioxin-Like PCBs	--	380,000	14,000,000	Lymphoma																
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer																
Total Risk	--	--	--	--	--		1.6E-11	2.2E-08	--		4.7E-11	1.0E-07	--		4.0E-11	5.5E-08	--		2.5E-09	1.2E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 12 - Detections in Pore Water (May 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	LD114				LD116				LD118				LD123			
					5/3/2013				5/3/2013				5/3/2013				5/3/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																				
1,4-Dioxane	123-91-1	300,000	220,000,000	Liver, Kidney	150 J		5.0E-10	6.8E-07	11 J		3.7E-11	5.0E-08	130 J		4.3E-10	5.9E-07	69 J		2.3E-10	3.1E-07
2-Methylphenol	95-48-7	NA	140,000,000	Whole Body																
4-Methylphenol	106-44-5	NA	280,000	Liver																
Anthracene	120-12-7	NA	77,000,000	Whole Body																
Benzaldehyde	100-52-7	NA	700,000,000	Kidney																
Benzo(a)anthracene	56-55-3	67,000	NA	Cancer																
Benzo(a)pyrene	50-32-8	6,700	NA	Cancer																
Benzo(b)fluoranthene	205-99-2	67,000	NA	Cancer																
Benzo(g,h,i)perylene	191-24-2	NA	65,000,000	Kidney																
Benzo(k)fluoranthene	207-08-9	670,000	NA	Cancer																
Bis(2-ethylhexyl)phthalate	117-81-7	3,500,000	70,000,000	Reproductive	2.6 J		7.4E-13	3.7E-08	10 J		2.9E-12	1.4E-07								
Caprolactam	105-60-2	NA	350,000,000	Developmental																
Carbazole	86-74-8	NA	NA	Cancer																
Chrysene	218-01-9	6,700,000	NA	Cancer																
Dibenzo(a,h)anthracene	53-70-3	6,700	NA	Cancer																
Di-n-butylphthalate	84-74-2	NA	700,000,000	Whole Body																
Fluoranthene	206-44-0	NA	70,000,000	Kidney																
Indeno(1,2,3-cd)pyrene	193-39-5	67,000	NA	Cancer																
N-Nitrosodiphenylamine	86-30-6	10,000,000	NA	Liver	4.4 J		4.4E-13	NA												
Phenanthrene	85-01-8	NA	430,000	Kidney																
Pyrene	129-00-0	NA	270,000	Kidney																
Pesticides (ug/L)																				
4,4'-DDD	72-54-8	120	NA	Cancer																
4,4'-DDE	72-55-9	140,000	NA	Cancer													0.002 J		1.4E-14	NA
4,4'-DDT	50-29-3	140,000	350,000	Liver																
alpha-Chlordane	5103-71-9	390	1,200	Liver																
Dieldrin	60-57-1	9.4	210	Liver																
Endosulfan II	33213-65-9	NA	4,200,000	Liver																
Endrin aldehyde	7421-93-4	NA	1,400,000	Central Nervous System																
Endrin ketone	53494-70-5	NA	6,000	Central Nervous System, Liver																
gamma-BHC (Lindane)	58-89-9	340	54	Immune System													0.021 J		6.2E-11	3.9E-04
gamma-Chlordane	5103-74-2	140,000	420,000	Liver																
Heptachlor epoxide	1024-57-3	24	41	Liver																
PCBs (pg/L)																				
Total Dioxin-Like PCBs	--	380,000	14,000,000	Lymphoma																
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer																
Total Risk	--	--	--	--	--		5.0E-10	7.2E-07	--		4.0E-11	1.9E-07	--		4.3E-10	5.9E-07	--		2.9E-10	3.9E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 12 - Detections in Pore Water (May 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	LD126				LD129				LD132				LD132DUP			
					5/2/2013				5/2/2013				5/2/2013				5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																				
1,4-Dioxane	123-91-1	300,000	220,000,000	Liver, Kidney	110 J		3.7E-10	5.0E-07	170 J		5.7E-10	7.7E-07	25 J		8.3E-11	1.1E-07				
2-Methylphenol	95-48-7	NA	140,000,000	Whole Body																
4-Methylphenol	106-44-5	NA	280,000	Liver					9.3 J		NA	3.3E-05								
Anthracene	120-12-7	NA	77,000,000	Whole Body																
Benzaldehyde	100-52-7	NA	700,000,000	Kidney	5.8 J		NA	8.3E-09	7.6 J		NA	1.1E-08								
Benzo(a)anthracene	56-55-3	67,000	NA	Cancer					4.1 J		6.1E-11	NA								
Benzo(a)pyrene	50-32-8	6,700	NA	Cancer					4 J		6.0E-10	NA								
Benzo(b)fluoranthene	205-99-2	67,000	NA	Cancer					5.1 J		7.6E-11	NA								
Benzo(g,h,i)perylene	191-24-2	NA	65,000,000	Kidney					3.7 J		NA	5.7E-08								
Benzo(k)fluoranthene	207-08-9	670,000	NA	Cancer					3.7 J		5.5E-12	NA								
Bis(2-ethylhexyl)phthalate	117-81-7	3,500,000	70,000,000	Reproductive	2.8 J		8.0E-13	4.0E-08	6.3 J		1.8E-12	9.0E-08	13 J		3.7E-12	1.9E-07				
Caprolactam	105-60-2	NA	350,000,000	Developmental																
Carbazole	86-74-8	NA	NA	Cancer																
Chrysene	218-01-9	6,700,000	NA	Cancer					6.3 J		9.4E-13	NA								
Dibenzo(a,h)anthracene	53-70-3	6,700	NA	Cancer																
Di-n-butylphthalate	84-74-2	NA	700,000,000	Whole Body																
Fluoranthene	206-44-0	NA	70,000,000	Kidney	3.3 J		NA	4.7E-08	12 J		NA	1.7E-07								
Indeno(1,2,3-cd)pyrene	193-39-5	67,000	NA	Cancer					3.2 J		4.8E-11	NA								
N-Nitrosodiphenylamine	86-30-6	10,000,000	NA	Liver																
Phenanthrene	85-01-8	NA	430,000	Kidney					6.5 J		NA	1.5E-05								
Pyrene	129-00-0	NA	270,000	Kidney	2.6 J		NA	9.6E-06	8.8 J		NA	3.3E-05								
Pesticides (ug/L)																				
4,4'-DDD	72-54-8	120	NA	Cancer																
4,4'-DDE	72-55-9	140,000	NA	Cancer	0.013 J		9.3E-14	NA												
4,4'-DDT	50-29-3	140,000	350,000	Liver	0.016 J		1.1E-13	4.6E-08												
alpha-Chlordane	5103-71-9	390	1,200	Liver	0.063 J		1.6E-10	5.3E-05	0.005 J		1.3E-11	4.3E-06								
Dieldrin	60-57-1	9.4	210	Liver																
Endosulfan II	33213-65-9	NA	4,200,000	Liver																
Endrin aldehyde	7421-93-4	NA	1,400,000	Central Nervous System	0.003 J		NA	1.8E-09												
Endrin ketone	53494-70-5	NA	6,000	Central Nervous System, Liver																
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																
gamma-Chlordane	5103-74-2	140,000	420,000	Liver	0.031 J		2.2E-13	7.4E-08												
Heptachlor epoxide	1024-57-3	24	41	Liver	0.005 J		1.9E-10	1.1E-04												
PCBs (pg/L)																				
Total Dioxin-Like PCBs	--	380,000	14,000,000	Lymphoma	16794		4.4E-08	1.2E-03	701.9		1.8E-09	5.0E-05	1E+05		3.5E-07	9.4E-03	2884		7.6E-09	2.1E-04
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer	6E+05		4.6E-12	NA	58059		4.8E-13	NA	1E+06		9.9E-12	NA	2E+05		2.0E-12	NA
Total Risk	--	--	--	--	--		4.5E-08	1.4E-03	--		3.2E-09	1.4E-04	--		3.5E-07	9.4E-03	--		7.6E-09	2.1E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 12 - Detections in Pore Water (May 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	LD136 5/2/2013				LD136DUP 5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)												
1,4-Dioxane	123-91-1	300,000	220,000,000	Liver, Kidney								
2-Methylphenol	95-48-7	NA	140,000,000	Whole Body	17 J		NA	1.2E-07	8 J		NA	5.7E-08
4-Methylphenol	106-44-5	NA	280,000	Liver	71 J		NA	2.5E-04	2.9 J		NA	1.0E-05
Anthracene	120-12-7	NA	77,000,000	Whole Body	2.8 J		NA	3.6E-08				
Benzaldehyde	100-52-7	NA	700,000,000	Kidney	24 J		NA	3.4E-08	5.5 J		NA	7.9E-09
Benzo(a)anthracene	56-55-3	67,000	NA	Cancer	12 J		1.8E-10	NA				
Benzo(a)pyrene	50-32-8	6,700	NA	Cancer	11 J		1.6E-09	NA				
Benzo(b)fluoranthene	205-99-2	67,000	NA	Cancer	14 J		2.1E-10	NA				
Benzo(g,h,i)perylene	191-24-2	NA	65,000,000	Kidney	9.8 J		NA	1.5E-07				
Benzo(k)fluoranthene	207-08-9	670,000	NA	Cancer	11 J		1.6E-11	NA				
Bis(2-ethylhexyl)phthalate	117-81-7	3,500,000	70,000,000	Reproductive	11 J		3.1E-12	1.6E-07	5.4 J		1.5E-12	7.7E-08
Caprolactam	105-60-2	NA	350,000,000	Developmental	3.7 J		NA	1.1E-08	3.5 J		NA	1.0E-08
Carbazole	86-74-8	NA	NA	Cancer	4.4 J		NA	NA				
Chrysene	218-01-9	6,700,000	NA	Cancer	16 J		2.4E-12	NA	2.8 J		4.2E-13	NA
Dibenzo(a,h)anthracene	53-70-3	6,700	NA	Cancer	4.1 J		6.1E-10	NA				
Di-n-butylphthalate	84-74-2	NA	700,000,000	Whole Body	2.5 J		NA	3.6E-09				
Fluoranthene	206-44-0	NA	70,000,000	Kidney	29 J		NA	4.1E-07	5.3 J		NA	7.6E-08
Indeno(1,2,3-cd)pyrene	193-39-5	67,000	NA	Cancer	9.3 J		1.4E-10	NA				
N-Nitrosodiphenylamine	86-30-6	10,000,000	NA	Liver								
Phenanthrene	85-01-8	NA	430,000	Kidney	17 J		NA	4.0E-05	2.5 J		NA	5.8E-06
Pyrene	129-00-0	NA	270,000	Kidney	22 J		NA	8.1E-05	3.8 J		NA	1.4E-05
Pesticides (ug/L)												
4,4'-DDD	72-54-8	120	NA	Cancer	0.054 J		4.5E-10	NA	0.052 J		4.3E-10	NA
4,4'-DDE	72-55-9	140,000	NA	Cancer	0.031 J		2.2E-13	NA	0.05 J		3.6E-13	NA
4,4'-DDT	50-29-3	140,000	350,000	Liver	0.039 J		2.8E-13	1.1E-07	0.064 J		4.6E-13	1.8E-07
alpha-Chlordane	5103-71-9	390	1,200	Liver	0.39 J		1.0E-09	3.3E-04	0.4 J		1.0E-09	3.3E-04
Dieldrin	60-57-1	9.4	210	Liver								
Endosulfan II	33213-65-9	NA	4,200,000	Liver								
Endrin aldehyde	7421-93-4	NA	1,400,000	Central Nervous System	0.031 J		NA	2.2E-08	0.011 J		NA	7.9E-09
Endrin ketone	53494-70-5	NA	6,000	Central Nervous System, Liver								
gamma-BHC (Lindane)	58-89-9	340	54	Immune System								
gamma-Chlordane	5103-74-2	140,000	420,000	Liver	0.2 J		1.4E-12	4.8E-07	0.16 J		1.1E-12	3.8E-07
Heptachlor epoxide	1024-57-3	24	41	Liver	0.022 J		9.2E-10	5.4E-04				
PCBs (pg/L)												
Total Dioxin-Like PCBs	--	380,000	14,000,000	Lymphoma	1485		3.9E-09	1.1E-04				
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer	40162		3.3E-13	NA				
Total Risk	--	--	--	--	--		9.1E-09	1.3E-03	--		1.5E-09	3.6E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 13 - Detections in Pore Water (September 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	0301-00				0301-02				0301-02D				0302-00				0302-02				0303-00				0303-02			
					9/9/2013				9/9/2013				9/9/2013				9/9/2013				9/9/2013				9/9/2013				9/9/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	300000	2.2E+08	Liver, Kidney	0.59 J		2.0E-12	2.7E-09	8.9		3.0E-11	4.0E-08	9.6		3.2E-11	4.4E-08					7.8		2.6E-11	3.5E-08					4.5		1.5E-11	2.0E-08
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory																												
4-Methylphenol	106-44-5	NA	280000	Liver																												
Acenaphthene	83-32-9	NA	550000	Liver																												
Acenaphthylene	208-96-8	NA	290000	None Reported																												
Anthracene	120-12-7	NA	77000000	Whole Body																												
Benzaldehyde	100-52-7	NA	7E+08	Kidney																												
Benzo(a)anthracene	56-55-3	67000	NA	Cancer																												
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																												
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney																												
Fluorene	86-73-7	NA	2.8E+08	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																												
Naphthalene	91-20-3	NA	3700000	Body Weight																												
Pentachlorophenol	87-86-5	120000	700000	Reproductive																												
Phenanthrene	85-01-8	NA	430000	Kidney																												
Pyrene	129-00-0	NA	270000	Kidney																												
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory	0.017 J		NA	1.5E-06	0.01 J		NA	9.1E-07	0.012 J		NA	1.1E-06	0.012 J		NA	1.1E-06	0.035 J		NA	3.2E-06	0.006 J		NA	5.1E-07	0.018 J		NA	1.6E-06
Acenaphthene	83-32-9	NA	550000	Liver	0.033 J		NA	6.0E-08	0.094 J		NA	1.7E-07	0.1		NA	1.8E-07	0.028 J		NA	5.1E-08	0.11		NA	2.0E-07	0.01 J		NA	1.8E-08	0.11		NA	2.0E-07
Acenaphthylene	208-96-8	NA	290000	None Reported	0.012 J		NA	4.1E-08	0.021 J		NA	7.2E-08	0.024 J		NA	8.3E-08					0.018 J		NA	6.2E-08					0.011 J		NA	3.8E-08
Anthracene	120-12-7	NA	77000000	Whole Body	0.077 J		NA	1.0E-09	0.098		NA	1.3E-09	0.11		NA	1.4E-09	0.011 J		NA	1.4E-10	0.15		NA	1.9E-09					0.091 J		NA	1.2E-09
Benzo(a)anthracene	56-55-3	67000	NA	Cancer					0.038 J		5.7E-13	NA									0.09 J		1.3E-12	NA	0.018 J		2.7E-13	NA	0.086 J		1.3E-12	NA
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																	0.035 J		5.2E-12	NA					0.052 J		7.8E-12	NA
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																	0.054 J		8.1E-13	NA	0.028 J		4.2E-13	NA	0.073 J		1.1E-12	NA
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																	0.018 J		NA	2.8E-10	0.013 J		NA	2.0E-10	0.032 J		NA	4.9E-10
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																	0.021 J		3.1E-14	NA	0.011 J		1.6E-14	NA	0.024 J		3.6E-14	NA
Chrysene	218-01-9	6700000	NA	Cancer					0.043 J		6.4E-15	NA									0.076 J		1.1E-14	NA	0.019 J		2.8E-15	NA	0.067 J		1.0E-14	NA
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																									0.007 J		1.1E-12	NA
Fluoranthene	206-44-0	NA	70000000	Kidney	0.037 J		NA	5.3E-10	0.052 J		NA	7.4E-10	0.04 J		NA	5.7E-10	0.03 J		NA	4.3E-10	0.16		NA	2.3E-09	0.047 J		NA	6.7E-10	0.17		NA	2.4E-09
Fluorene	86-73-7	NA	2.8E+08	Blood	0.035 J		NA	1.3E-10													0.071 J		NA	2.5E-10					0.043 J		NA	1.5E-10
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																	0.019 J		2.8E-13	NA	0.011 J		1.6E-13	NA	0.031 J		4.6E-13	NA
Naphthalene	91-20-3	NA	3700000	Body Weight	0.046 J		NA	1.2E-08	0.015 J		NA	4.1E-09	0.016 J		NA	4.3E-09	0.044 J		NA	1.2E-08	0.094 J		NA	2.5E-08	0.022 J		NA	5.9E-09	0.065 J		NA	1.8E-08
Pentachlorophenol	87-86-5	120000	700000	Reproductive	0.11 J		9.2E-13	1.6E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.041 J		3.4E-13	5.9E-08	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07
Phenanthrene	85-01-8	NA	430000	Kidney	0.045 J		NA	1.0E-07	0.073 J		NA	1.7E-07	0.098		NA	2.3E-07	0.032 J		NA	7.4E-08	0.23		NA	5.3E-07	0.018 J		NA	4.2E-08	0.18		NA	4.2E-07
Pyrene	129-00-0	NA	270000	Kidney	0.032 J		NA	1.2E-07	0.098		NA	3.6E-07	0.092 J		NA	3.4E-07	0.053 J		NA	2.0E-07	0.21		NA	7.8E-07	0.043 J		NA	1.6E-07	0.21		NA	7.8E-07
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	120	NA	Cancer																												
4,4'-DDE	72-55-9	140000	NA	Cancer																												
4,4'-DDT	50-29-3	140000	350000	Liver													0.011		7.9E-14	3.1E-08	0.003 J		1.9E-14	7.4E-09	0.009 J		6.4E-14	2.5E-08	0.002 J		1.6E-14	6.3E-09
Aldrin	309-00-2	2900	28000	Liver																												
alpha-BHC	319-84-6	60	43000	Liver																												
alpha-Chlordane	5103-71-9	390	1200	Liver													0.002 J		4.9E-12	1.6E-06												
beta-BHC	319-85-7	210	3200	Cancer																												
delta-BHC	319-86-8	60	43000	Liver	0.001 J		1.7E-11	2.3E-08																								
Dieldrin	60-57-1	9.4	210	Liver	0.0099		1.1E-09	4.7E-05	0.0057 J		6.1E-10	2.7E-05	0.005 J		5.5E-10	2.5E-05	0.012		1.3E-09	5.7E-05	0.009		1.0E-09	4.5E-05	0.01		1.0E-09	4.6E-05	0.005		5.0E-10	2.2E-05
Endosulfan I	959-98-8	NA	4200000	Body Weight	0.001 J		NA	2.4E-10	0.001 J		NA	2.4E-10																				
Endosulfan II	33213-65-9	NA	4200000	Liver	0.0045 J		NA	1.1E-09									0.004 J		NA	8.8E-10					0.002 J		NA	5.7E-10	0.003 J		NA	7.4E-10
Endrin	72-20-8	NA	1400000	Central Nervous System																												
Endrin aldehyde	7421-93-4	NA	1400000	Central Nervous System	0.0013 J		NA	9.3E-10																					0.002 J		NA	1.7E-09
Endrin ketone	53494-70-5	NA	6000	Central Nervous System, Liver																												
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																												
gamma-Chlordane	5103-74-2	140000	420000	Liver													0.002 J		1.1E-14	3.6E-09	0.002 J		1.1E-14	3.8E-09								
Heptachlor	76-44-8	8	52	Reproductive	0.001 J		1.3E-10	1.9E-05																								
Heptachlor epoxide	1024-57-3	24	41	Liver													0.002 J		9.2E-11	5.4E-05												
Methoxychlor	72-43-5	NA	3500000	Central Nervous System																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	380000	14000000	Lymphoma	48.7		1.3E-10	3.5E-06	61.8		1.6E-10	4.4E-06																				
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer	3126		2.6E-14	NA	6844.4		5.7E-14	NA																				
Dioxins (pg/L)																																
Total TEQ	3333-30-0	380000	14000000	Lymphoma																												
Total Risk/Hazard Index	--	--	--	--	--		1.3E-09	7.2E-05	--		8.0E-10	3.4E-05	--		5.9E-10	2.7E-05	--		1.4E-09	1.1E-04	--		1.0E-09	5.0E-05	--		1.0E-09	4.7E-05	--		5.3E-10	2.6E-05

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 13 - Detections in Pore Water (September 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	1001-00				1001-02				1001-02D				1001-04				1002-00				1002-02				1002-04			
					9/11/2013				9/11/2013				9/11/2013				9/11/2013				9/11/2013				9/11/2013				9/11/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	300000	2.2E+08	Liver, Kidney	0.54 J		1.8E-12	2.5E-09	11		3.7E-11	5.0E-08	5.2 J		1.7E-11	2.4E-08	51		1.7E-10	2.3E-07					2.1 J		7.0E-12	9.5E-09	37		1.2E-10	1.7E-07
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory					0.024 J		NA	2.2E-06					0.074 J		NA	6.7E-06									0.047 J		NA	4.3E-06
4-Methylphenol	106-44-5	NA	280000	Liver																												
Acenaphthene	83-32-9	NA	550000	Liver					0.1		NA	1.8E-07					0.21 J		NA	3.8E-07	0.029 J		NA	5.3E-08	0.066 J		NA	1.2E-07	0.23		NA	4.2E-07
Acenaphthylene	208-96-8	NA	290000	None Reported					0.04 J		NA	1.4E-07													0.013 J		NA	4.5E-08				
Anthracene	120-12-7	NA	77000000	Whole Body					0.079 J		NA	1.0E-09									0.021 J		NA	2.7E-10								
Benzaldehyde	100-52-7	NA	7E+08	Kidney																												
Benzo(a)anthracene	56-55-3	67000	NA	Cancer													0.069 J		1.0E-12	NA	0.0068 J		1.0E-13	NA	0.016 J		2.4E-13	NA				
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																									0.0065 J		NA	1.0E-10
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer					0.032 J		4.8E-15	NA									0.0065 J		9.7E-16	NA					0.018 J		2.7E-15	NA
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer					0.0095 J		1.4E-12	NA																				
Fluoranthene	206-44-0	NA	70000000	Kidney													0.12		NA	1.7E-09												
Fluorene	86-73-7	NA	2.8E+08	Blood													0.23 J		NA	8.2E-10									0.19		NA	6.8E-10
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer					0.0079 J		1.2E-13	NA																	0.0071 J		1.1E-13	NA
Naphthalene	91-20-3	NA	3700000	Body Weight																												
Pentachlorophenol	87-86-5	120000	700000	Reproductive																					0.2 R		1.7E-12	2.9E-07	0.056 J		4.7E-13	8.0E-08
Phenanthrene	85-01-8	NA	430000	Kidney																					0.045 J		NA	1.0E-07				
Pyrene	129-00-0	NA	270000	Kidney					0.071 J		NA	2.6E-07					0.23		NA	8.5E-07	0.061 J		NA	2.3E-07	0.044 J		NA	1.6E-07				
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory	0.017 J		NA	1.5E-06					0.014 J		NA	1.3E-06																
Acenaphthene	83-32-9	NA	550000	Liver	0.031 J		NA	5.6E-08					0.088 J		NA	1.6E-07																
Acenaphthylene	208-96-8	NA	290000	None Reported									0.028 J		NA	9.7E-08																
Anthracene	120-12-7	NA	77000000	Whole Body	0.018 J		NA	2.3E-10					0.07 J		NA	9.1E-10																
Benzo(a)anthracene	56-55-3	67000	NA	Cancer																												
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																												
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney	0.027 J		NA	3.9E-10					0.044 J		NA	6.3E-10																
Fluorene	86-73-7	NA	2.8E+08	Blood	0.024 J		NA	8.6E-11					0.041 J		NA	1.5E-10																
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																												
Naphthalene	91-20-3	NA	3700000	Body Weight	0.034 J		NA	9.2E-09					0.017 J		NA	4.6E-09																
Pentachlorophenol	87-86-5	120000	700000	Reproductive	0.064 J		5.3E-13	9.1E-08					0.2 R		1.7E-12	2.9E-07																
Phenanthrene	85-01-8	NA	430000	Kidney	0.033 J		NA	7.7E-08					0.1		NA	2.3E-07																
Pyrene	129-00-0	NA	270000	Kidney	0.045 J		NA	1.7E-07					0.034 J		NA	1.3E-07																
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	120	NA	Cancer																												
4,4'-DDE	72-55-9	140000	NA	Cancer													0.003 J		2.4E-14	NA									0.0012 J		8.6E-15	NA
4,4'-DDT	50-29-3	140000	350000	Liver	0.009 J		6.6E-14	2.6E-08									0.002 J		1.4E-14	5.7E-09	0.013 J		9.3E-14	3.7E-08								
Aldrin	309-00-2	2900	28000	Liver													0.001 J		4.5E-13	4.6E-08									0.0021 J		7.2E-13	7.5E-08
alpha-BHC	319-84-6	60	43000	Liver													0.002 J		2.7E-11	3.7E-08												
alpha-Chlordane	5103-71-9	390	1200	Liver	0.002 J		5.9E-12	1.9E-06	0.0022 J		5.6E-12	1.8E-06									0.0023 J		5.9E-12	1.9E-06	0.002 J		4.9E-12	1.6E-06				
beta-BHC	319-85-7	210	3200	Cancer					0.0039 J		1.9E-11	1.2E-06					0.002 J		1.1E-11	7.2E-07									0.0035 J		1.7E-11	1.1E-06
delta-BHC	319-86-8	60	43000	Liver					0.005 J		8.3E-11	1.2E-07	0.005		8.8E-11	1.2E-07	0.007 J		1.1E-10	1.5E-07									0.0042 J		7.0E-11	9.8E-08
Dieldrin	60-57-1	9.4	210	Liver	0.013		1.4E-09	6.2E-05	0.0074 J		7.9E-10	3.5E-05	0.008 J		8.4E-10	3.8E-05	0.004 J		4.5E-10	2.0E-05	0.016		1.7E-09	7.6E-05	0.01		1.0E-09	4.6E-05	0.0058 J		6.2E-10	2.8E-05
Endosulfan I	959-98-8	NA	4200000	Body Weight													0.002 J		NA	4.0E-10									0.0021 J		NA	5.0E-10
Endosulfan II	33213-65-9	NA	4200000	Liver	0.002 J		NA	5.7E-10									0.003 J		NA	6.2E-10	0.0036 J		NA	8.6E-10								
Endrin	72-20-8	NA	1400000	Central Nervous System																									0.0021 J		NA	1.5E-09
Endrin aldehyde	7421-93-4	NA	1400000	Central Nervous System													0.003 J		NA	2.2E-09					0.002 J		NA	1.4E-09	0.0022 J		NA	1.6E-09
Endrin ketone	53494-70-5	NA	6000	Central Nervous System, Liver																												
gamma-BHC (Lindane)	58-89-9	340	54	Immune System													0.002 J		4.4E-12	2.8E-05									0.0015 J		4.4E-12	2.8E-05
gamma-Chlordane	5103-74-2	140000	420000	Liver	0.001 J		9.3E-15	3.1E-09													0.0013 J		9.3E-15	3.1E-09					0.0018 J		1.3E-14	4.3E-09
Heptachlor	76-44-8	8	52	Reproductive																												
Heptachlor epoxide	1024-57-3	24	41	Liver																	0.0021		8.8E-11	5.1E-05								
Methoxychlor	72-43-5	NA	3500000	Central Nervous System																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	380000	14000000	Lymphoma	77.2		2.0E-10	5.5E-06									447.9		1.2E-09	3.2E-05												
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer	4626		3.9E-14	NA									27397		2.3E-13	NA												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	380000	14000000	Lymphoma													0.072		1.9E-13	5.1E-09												
Total Risk/Hazard Index	--	--	--	--	--		1.6E-09	7.1E-05	--		9.3E-10	4.1E-05	--		9.5E-10	4.0E-05	--		1.9E-09	8.9E-05	--		1.8E-09	1.3E-04	--		1.0E-09	4.9E-05	--		8.3E-10	6.2E-05

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 13 - Detections in Pore Water (September 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	1003-00 9/10/2013				1003-02 9/10/2013				1601-00 9/11/2013				1601-02 9/11/2013				1602-00 9/11/2013				1602-02 9/11/2013				1602-04 9/11/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	300000	2.2E+08	Liver, Kidney													20		6.7E-11	9.1E-08									170		5.7E-10	7.7E-07
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory									0.0068	J	NA	6.2E-07	0.079	J	NA	7.2E-06									0.24		NA	2.2E-05
4-Methylphenol	106-44-5	NA	280000	Liver																												
Acenaphthene	83-32-9	NA	550000	Liver									0.056	J	NA	1.0E-07									0.059	J	NA	1.1E-07				
Acenaphthylene	208-96-8	NA	290000	None Reported									0.0078	J	NA	2.7E-08													0.084	J	NA	2.9E-07
Anthracene	120-12-7	NA	77000000	Whole Body																									2.5	J	NA	3.2E-08
Benzaldehyde	100-52-7	NA	7E+08	Kidney																												
Benzo(a)anthracene	56-55-3	67000	NA	Cancer													0.052	J	7.8E-13	NA					0.026	J	3.9E-13	NA				
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney									0.0075	J	NA	1.2E-10																
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer									0.015	J	2.2E-15	NA	0.025	J	3.7E-15	NA					0.019	J	2.8E-15	NA	0.059	J	8.8E-15	NA
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																									5	R	7.5E-10	NA
Fluoranthene	206-44-0	NA	70000000	Kidney													0.078	J	NA	1.1E-09	0.011	J	NA	1.6E-10	0.086	J	NA	1.2E-09				
Fluorene	86-73-7	NA	2.8E+08	Blood																									0.12	J	NA	4.3E-10
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																												
Naphthalene	91-20-3	NA	3700000	Body Weight																									0.88		NA	2.4E-07
Pentachlorophenol	87-86-5	120000	700000	Reproductive									0.2	R	1.7E-12	2.9E-07	0.2	R	1.7E-12	2.9E-07												
Phenanthrene	85-01-8	NA	430000	Kidney																	0.0073	J	NA	1.7E-08								
Pyrene	129-00-0	NA	270000	Kidney									0.084	J	NA	3.1E-07	0.095	J	NA	3.5E-07					0.11		NA	4.1E-07	0.45		NA	1.7E-06
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory					0.013	J	NA	1.2E-06																				
Acenaphthene	83-32-9	NA	550000	Liver					0.062	J	NA	1.1E-07																				
Acenaphthylene	208-96-8	NA	290000	None Reported					0.0075	J	NA	2.6E-08																				
Anthracene	120-12-7	NA	77000000	Whole Body					0.036	J	NA	4.7E-10																				
Benzo(a)anthracene	56-55-3	67000	NA	Cancer					0.04	J	6.0E-13	NA																				
Benzo(a)pyrene	50-32-8	6700	NA	Cancer					0.031	J	4.6E-12	NA																				
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer					0.054	J	8.1E-13	NA																				
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney					0.023	J	NA	3.5E-10																				
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer					0.021	J	3.1E-14	NA																				
Chrysene	218-01-9	6700000	NA	Cancer					0.034	J	5.1E-15	NA																				
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney	0.021	J	NA	3.0E-10	0.12		NA	1.7E-09																				
Fluorene	86-73-7	NA	2.8E+08	Blood					0.06	J	NA	2.1E-10																				
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer					0.022	J	3.3E-13	NA																				
Naphthalene	91-20-3	NA	3700000	Body Weight	0.022	J	NA	5.9E-09	0.058	J	NA	1.6E-08																				
Pentachlorophenol	87-86-5	120000	700000	Reproductive	0.2	R	1.7E-12	2.9E-07	0.13	J	1.1E-12	1.9E-07																				
Phenanthrene	85-01-8	NA	430000	Kidney	0.019	J	NA	4.4E-08	0.073	J	NA	1.7E-07																				
Pyrene	129-00-0	NA	270000	Kidney	0.051	J	NA	1.9E-07	0.12		NA	4.4E-07																				
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	120	NA	Cancer													0.003	J	2.3E-11	NA												
4,4'-DDE	72-55-9	140000	NA	Cancer																									0.001	J	9.3E-15	NA
4,4'-DDT	50-29-3	140000	350000	Liver	0.01		7.1E-14	2.9E-08	0.011		7.9E-14	3.1E-08	0.015	J	1.1E-13	4.3E-08	0.005	J	3.8E-14	1.5E-08	0.0097	J	6.9E-14	2.8E-08	0.003	J	2.1E-14	8.6E-09	0.004	J	2.9E-14	1.2E-08
Aldrin	309-00-2	2900	28000	Liver																												
alpha-BHC	319-84-6	60	43000	Liver													0.002		2.5E-11	3.5E-08									0.002	J	3.2E-11	4.4E-08
alpha-Chlordane	5103-71-9	390	1200	Liver	0.002	J	5.4E-12	1.8E-06	0.002	J	5.1E-12	1.7E-06	0.0035	J	9.0E-12	2.9E-06					0.0024	J	6.2E-12	2.0E-06	0.002	J	5.6E-12	1.8E-06	0.003	J	6.9E-12	2.3E-06
beta-BHC	319-85-7	210	3200	Cancer	0.003		1.3E-11	8.4E-07									0.003	J	1.5E-11	9.7E-07									0.003	J	1.2E-11	8.1E-07
delta-BHC	319-86-8	60	43000	Liver																												
Dieldrin	60-57-1	9.4	210	Liver	0.014		1.5E-09	6.7E-05	0.011		1.2E-09	5.2E-05	0.02		2.1E-09	9.5E-05	0.003	J	3.6E-10	1.6E-05	0.017		1.8E-09	8.1E-05	0.007		7.8E-10	3.5E-05				
Endosulfan I	959-98-8	NA	4200000	Body Weight									0.0013	J	NA	3.1E-10													0.003	J	NA	6.0E-10
Endosulfan II	33213-65-9	NA	4200000	Liver	0.005	J	NA	1.1E-09					0.0047	J	NA	1.1E-09	0.002	J	NA	4.5E-10	0.0027	J	NA	6.4E-10	0.003	J	NA	8.1E-10				
Endrin	72-20-8	NA	1400000	Central Nervous System																									0.001	J	NA	1.0E-09
Endrin aldehyde	7421-93-4	NA	1400000	Central Nervous System																									0.005	J	NA	3.5E-09
Endrin ketone	53494-70-5	NA	6000	Central Nervous System, Liver									0.0017	J	NA	2.8E-07					0.0028	J	NA	4.7E-07								
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																									0.002	J	4.4E-12	2.8E-05
gamma-Chlordane	5103-74-2	140000	420000	Liver	0.001	J	8.6E-15	2.9E-09	0.0014	J	1.0E-14	3.3E-09	0.0025	J	1.8E-14	6.0E-09	0.004	J	2.9E-14	9.8E-09					0.002	J	1.4E-14	4.5E-09	0.002	J	1.6E-14	5.5E-09
Heptachlor	76-44-8	8	52	Reproductive									0.0011	J	1.4E-10	2.1E-05	0.004		4.5E-10	6.9E-05									0.004		4.9E-10	7.5E-05
Heptachlor epoxide	1024-57-3	24	41	Liver	0.002	J	8.8E-11	5.1E-05													0.0026	J	1.1E-10	6.3E-05								
Methoxychlor	72-43-5	NA	3500000	Central Nervous System													0.006	J	NA	1.7E-09									0.006	J	NA	1.6E-09
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	380000	14000000	Lymphoma									97.1		2.6E-10	6.9E-06	249.2		6.6E-10	1.8E-05												
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer									5289.4		4.4E-14	NA	18840		1.6E-13	NA												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	380000	14000000	Lymphoma													0.144		3.8E-13	1.0E-08												
Total Risk/Hazard Index	--	--	--	--	--		1.6E-09	1.2E-04	--		1.2E-09	5.6E-05	--		2.5E-09	1.3E-04	--		1.6E-09	1.1E-04	--		1.9E-09	1.5E-04	--		7.8E-10	3.7E-05	--		1.9E-09	1.3E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 13 - Detections in Pore Water (September 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	1603-00				1603-00DUP				1603-02				1603-04				1603-04DUP				1802-00				1802-02			
					9/12/2013				9/12/2013				9/12/2013				9/12/2013				9/12/2013				9/13/2013				9/13/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	300000	2.2E+08	Liver, Kidney									32		1.1E-10	1.5E-07	180		6.0E-10	8.2E-07	160		5.3E-10	7.3E-07								
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory									0.055 J		NA	5.0E-06									0.0069 J		NA	6.3E-07	0.0081 J		NA	7.4E-07
4-Methylphenol	106-44-5	NA	280000	Liver																												
Acenaphthene	83-32-9	NA	550000	Liver													0.1 J		NA	1.8E-07	0.11 J		NA	2.0E-07								
Acenaphthylene	208-96-8	NA	290000	None Reported									0.035 J		NA	1.2E-07																
Anthracene	120-12-7	NA	77000000	Whole Body									0.36		NA	4.7E-09	2.5 J		NA	3.2E-08	2.4 J		NA	3.1E-08					0.021 J		NA	2.7E-10
Benzaldehyde	100-52-7	NA	7E+08	Kidney													3 J		NA	4.3E-09	2.1 J		NA	3.0E-09								
Benzo(a)anthracene	56-55-3	67000	NA	Cancer									0.084 J		1.3E-12	NA									0.012 J		1.8E-13	NA	0.017 J		2.5E-13	NA
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																	0.041 J		6.1E-12	NA								
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																	0.0096 J		NA	1.5E-10								
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer									0.029 J		4.3E-15	NA	0.033 J		4.9E-15	NA	0.022 J		3.3E-15	NA					0.019 J		2.8E-15	NA
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney	0.027 J		NA	3.9E-10					0.12		NA	1.7E-09					0.46 J		NA	6.6E-09								
Fluorene	86-73-7	NA	2.8E+08	Blood													0.09 J		NA	3.2E-10												
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer													0.0075 J		1.1E-13	NA												
Naphthalene	91-20-3	NA	3700000	Body Weight									0.12		NA	3.2E-08	0.67		NA	1.8E-07					0.023 J		NA	6.2E-09	0.028 J		NA	7.6E-09
Pentachlorophenol	87-86-5	120000	700000	Reproductive	0.2 R		1.7E-12	2.9E-07													0.2 R		1.7E-12	2.9E-07	0.11 J		9.2E-13	1.6E-07				
Phenanthrene	85-01-8	NA	430000	Kidney	0.0081 J		NA	1.9E-08					0.022 J		NA	5.1E-08	1.5 J		NA	3.5E-06	1.9		NA	4.4E-06	0.018 J		NA	4.2E-08				
Pyrene	129-00-0	NA	270000	Kidney	0.056 J		NA	2.1E-07	0.029 J		NA	1.1E-07	0.14		NA	5.2E-07																
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory																												
Acenaphthene	83-32-9	NA	550000	Liver																												
Acenaphthylene	208-96-8	NA	290000	None Reported																												
Anthracene	120-12-7	NA	77000000	Whole Body																												
Benzo(a)anthracene	56-55-3	67000	NA	Cancer																												
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																												
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney																												
Fluorene	86-73-7	NA	2.8E+08	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																												
Naphthalene	91-20-3	NA	3700000	Body Weight																												
Pentachlorophenol	87-86-5	120000	700000	Reproductive																												
Phenanthrene	85-01-8	NA	430000	Kidney																												
Pyrene	129-00-0	NA	270000	Kidney																												
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	120	NA	Cancer																												
4,4'-DDE	72-55-9	140000	NA	Cancer	0.0011 J		7.9E-15	NA									0.0022 J		1.6E-14	NA												
4,4'-DDT	50-29-3	140000	350000	Liver	0.0067 J		4.8E-14	1.9E-08	0.002 J		1.5E-14	6.0E-09	0.007 J		5.2E-14	2.1E-08	0.018 J		1.3E-13	5.1E-08	0.012 J		8.6E-14	3.4E-08	0.0021 J		1.5E-14	6.0E-09	0.0016 J		1.1E-14	4.6E-09
Aldrin	309-00-2	2900	28000	Liver																												
alpha-BHC	319-84-6	60	43000	Liver																												
alpha-Chlordane	5103-71-9	390	1200	Liver					0.002 J		5.6E-12	1.8E-06									0.0019 J		4.9E-12	1.6E-06	0.0027 J		6.9E-12	2.3E-06	0.0016 J		4.1E-12	1.3E-06
beta-BHC	319-85-7	210	3200	Cancer													0.0043 J		2.0E-11	1.3E-06												
delta-BHC	319-86-8	60	43000	Liver																												
Dieldrin	60-57-1	9.4	210	Liver	0.011		1.2E-09	5.2E-05	0.012		1.3E-09	5.7E-05	0.005		5.5E-10	2.5E-05									0.014 J		1.5E-09	6.7E-05	0.0066		7.0E-10	3.1E-05
Endosulfan I	959-98-8	NA	4200000	Body Weight													0.0011 J		NA	2.6E-10	0.0011 J		NA	2.6E-10								
Endosulfan II	33213-65-9	NA	4200000	Liver	0.0022 J		NA	5.2E-10	0.002 J		NA	5.2E-10													0.0031 J		NA	7.4E-10	0.0019 J		NA	4.5E-10
Endrin	72-20-8	NA	1400000	Central Nervous System																												
Endrin aldehyde	7421-93-4	NA	1400000	Central Nervous System	0.0018 J		NA	1.3E-09	0.001 J		NA	8.6E-10	0.001 J		NA	1.0E-09	0.0022 J		NA	1.6E-09												
Endrin ketone	53494-70-5	NA	6000	Central Nervous System, Liver	0.0017 J		NA	2.8E-07	0.002 J		NA	3.5E-07													0.0019 J		NA	3.2E-07	0.0016 J		NA	2.7E-07
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																												
gamma-Chlordane	5103-74-2	140000	420000	Liver													0.007 J		5.0E-14	1.7E-08					0.0021 J		1.5E-14	5.0E-09				
Heptachlor	76-44-8	8	52	Reproductive									0.002		1.9E-10	2.9E-05	0.0063 J		7.9E-10	1.2E-04	0.004 J		5.0E-10	7.7E-05								
Heptachlor epoxide	1024-57-3	24	41	Liver					0.002 J		7.5E-11	4.4E-05													0.0021		8.8E-11	5.1E-05				
Methoxychlor	72-43-5	NA	3500000	Central Nervous System																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	380000	14000000	Lymphoma																												
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer																												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	380000	14000000	Lymphoma																												
Total Risk/Hazard Index	--	--	--	--	--		1.2E-09	5.3E-05	--		1.4E-09	1.0E-04	--		8.5E-10	6.0E-05	--		1.4E-09	1.3E-04	--		1.0E-09	8.4E-05	--		1.6E-09	1.2E-04	--		7.1E-10	3.4E-05

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 13 - Detections in Pore Water (September 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	1803-00 9/13/2013				2501-00 9/12/2013				2501-02 9/12/2013				2502-00 9/12/2013				2502-02 9/12/2013				2503-00 9/12/2013				2503-02 9/12/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	300000	2.2E+08	Liver, Kidney					70		2.3E-10	3.2E-07	89		3.0E-10	4.0E-07	31		1.0E-10	1.4E-07	100		3.3E-10	4.5E-07	3.4		1.1E-11	1.5E-08	63		2.1E-10	2.9E-07
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory	0.01 J		NA	9.1E-07	0.062 J		NA	5.6E-06	0.048 J		NA	4.4E-06	0.058 J		NA	5.3E-06									0.065 J		NA	5.9E-06
4-Methylphenol	106-44-5	NA	280000	Liver													1.3 J		NA	4.6E-06												
Acenaphthene	83-32-9	NA	550000	Liver									0.18		NA	3.3E-07	0.047 J		NA	8.5E-08					0.018 J		NA	3.3E-08	0.15		NA	2.7E-07
Acenaphthylene	208-96-8	NA	290000	None Reported													0.058 J		NA	2.0E-07					0.0087 J		NA	3.0E-08	0.12		NA	4.1E-07
Anthracene	120-12-7	NA	77000000	Whole Body					0.45		NA	5.8E-09	0.55		NA	7.1E-09	0.16		NA	2.1E-09	0.7		NA	9.1E-09					1.8 J		NA	2.3E-08
Benzaldehyde	100-52-7	NA	7E+08	Kidney									2.6 J		NA	3.7E-09					1.9 J		NA	2.7E-09								
Benzo(a)anthracene	56-55-3	67000	NA	Cancer	0.01 J		1.5E-13	NA	0.1		1.5E-12	NA	0.11		1.6E-12	NA					0.2		3.0E-12	NA								
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																	0.017 J		2.5E-12	NA								
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer	0.017 J		2.5E-13	NA													0.034 J		5.1E-13	NA								
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																												
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer	0.0055 J		8.2E-15	NA	0.0061 J		9.1E-15	NA									0.013 J		1.9E-14	NA								
Chrysene	218-01-9	6700000	NA	Cancer	0.017 J		2.5E-15	NA																								
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney	0.03 J		NA	4.3E-10													0.1		NA	1.4E-09					0.11		NA	1.6E-09
Fluorene	86-73-7	NA	2.8E+08	Blood									0.6		NA	2.1E-09																
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer					0.0052 J		7.8E-14	NA																				
Naphthalene	91-20-3	NA	3700000	Body Weight	0.015 J		NA	4.1E-09	0.11		NA	3.0E-08																				
Pentachlorophenol	87-86-5	120000	700000	Reproductive													0.042 J		3.5E-13	6.0E-08	0.58 J		4.8E-12	8.3E-07								
Phenanthrene	85-01-8	NA	430000	Kidney					0.04 J		NA	9.3E-08	0.081 J		NA	1.9E-07					1.2 J		NA	2.8E-06					0.31		NA	7.2E-07
Pyrene	129-00-0	NA	270000	Kidney													0.073 J		NA	2.7E-07									0.15		NA	5.6E-07
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory																												
Acenaphthene	83-32-9	NA	550000	Liver																												
Acenaphthylene	208-96-8	NA	290000	None Reported																												
Anthracene	120-12-7	NA	77000000	Whole Body																												
Benzo(a)anthracene	56-55-3	67000	NA	Cancer																												
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																												
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney																												
Fluorene	86-73-7	NA	2.8E+08	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																												
Naphthalene	91-20-3	NA	3700000	Body Weight																												
Pentachlorophenol	87-86-5	120000	700000	Reproductive																												
Phenanthrene	85-01-8	NA	430000	Kidney																												
Pyrene	129-00-0	NA	270000	Kidney																												
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	120	NA	Cancer																												
4,4'-DDE	72-55-9	140000	NA	Cancer									0.001 J		9.3E-15	NA													0.002 J		1.6E-14	NA
4,4'-DDT	50-29-3	140000	350000	Liver	0.0047 J		3.4E-14	1.3E-08	0.012 J		8.6E-14	3.4E-08	0.005 J		3.6E-14	1.5E-08	0.013 J		9.3E-14	3.7E-08	0.004 J		3.1E-14	1.2E-08	0.0084 J		6.0E-14	2.4E-08	0.008		5.4E-14	2.2E-08
Aldrin	309-00-2	2900	28000	Liver									0.003 J		1.1E-12	1.1E-07													0.004 J		1.4E-12	1.5E-07
alpha-BHC	319-84-6	60	43000	Liver					0.0012 J		2.0E-11	2.8E-08	0.003 J		4.7E-11	6.5E-08					0.001 J		2.2E-11	3.0E-08					0.001 J		1.8E-11	2.6E-08
alpha-Chlordane	5103-71-9	390	1200	Liver	0.0024 J		6.2E-12	2.0E-06									0.002 J		4.9E-12	1.6E-06					0.0018 J		4.6E-12	1.5E-06				
beta-BHC	319-85-7	210	3200	Cancer									0.003 J		1.2E-11	7.8E-07					0.011 J		5.2E-11	3.4E-06								
delta-BHC	319-86-8	60	43000	Liver					0.0016 J		2.7E-11	3.7E-08	0.002 J		3.0E-11	4.2E-08	0.001 J		1.7E-11	2.3E-08	0.004 J		5.8E-11	8.1E-08					0.002 J		3.2E-11	4.4E-08
Dieldrin	60-57-1	9.4	210	Liver	0.017 J		1.8E-09	8.1E-05	0.012 J		1.3E-09	5.7E-05	0.013 J		1.4E-09	6.2E-05	0.015		1.6E-09	7.1E-05	0.016		1.7E-09	7.6E-05	0.012		1.3E-09	5.7E-05	0.012		1.3E-09	5.7E-05
Endosulfan I	959-98-8	NA	4200000	Body Weight					0.0022 J		NA	5.2E-10	0.004 J		NA	1.0E-09					0.004 J		NA	9.0E-10					0.003 J		NA	6.0E-10
Endosulfan II	33213-65-9	NA	4200000	Liver	0.0022 J		NA	5.2E-10	0.0028 J		NA	6.7E-10	0.002 J		NA	5.7E-10	0.004 J		NA	8.6E-10	0.003 J		NA	6.4E-10	0.0026 J		NA	6.2E-10	0.003 J		NA	6.2E-10
Endrin	72-20-8	NA	1400000	Central Nervous System					0.0017 J		NA	1.2E-09									0.002 J		NA	1.3E-09								
Endrin aldehyde	7421-93-4	NA	1400000	Central Nervous System	0.0012 J		NA	8.6E-10					0.003 J		NA	2.3E-09	0.002 J		NA	1.1E-09	0.003 J		NA	1.8E-09					0.002 J		NA	1.6E-09
Endrin ketone	53494-70-5	NA	6000	Central Nervous System, Liver	0.0029 J		NA	4.8E-07	0.0018 J		NA	3.0E-07													0.0016 J		NA	2.7E-07				
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																									0.003 J		7.6E-12	4.8E-05
gamma-Chlordane	5103-74-2	140000	420000	Liver					0.0028 J		2.0E-14	6.7E-09	0.003 J		2.0E-14	6.7E-09					0.006 J		3.9E-14	1.3E-08	0.0011 J		7.9E-15	2.6E-09	0.007		4.9E-14	1.6E-08
Heptachlor	76-44-8	8	52	Reproductive									0.002 J		2.4E-10	3.7E-05					0.003 J		4.0E-10	6.2E-05					0.003 J		3.4E-10	5.2E-05
Heptachlor epoxide	1024-57-3	24	41	Liver	0.0023		9.6E-11	5.6E-05	0.0018 J		7.5E-11	4.4E-05					0.002 J		8.8E-11	5.1E-05					0.0019 J		7.9E-11	4.6E-05	0.003 J		1.1E-10	6.3E-05
Methoxychlor	72-43-5	NA	3500000	Central Nervous System					0.0055 J		NA	1.6E-09	0.008 J		NA	2.3E-09																
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	380000	14000000	Lymphoma																												
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer																												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	380000	14000000	Lymphoma																												
Total Risk/Hazard Index	--	--	--	--	--		1.9E-09	1.4E-04	--		1.6E-09	1.1E-04	--		2.0E-09	1.0E-04	--		1.8E-09	1.3E-04	--		2.6E-09	1.5E-04	--		1.4E-09	1.1E-04	--		2.0E-09	2.3E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 13 - Detections in Pore Water (September 2013) - Construction Worker Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer	RSL - Non-cancer	Target Organ	3301-00 9/10/2013				3301-02 9/10/2013				3302-00 9/10/2013				3302-02 9/10/2013				3302-04 9/10/2013				3303-00 9/10/2013				3303-02 9/10/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	300000	2.2E+08	Liver, Kidney																	0.15 J		5.0E-13	6.8E-10					0.23 J		7.7E-13	1.0E-09
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory																												
4-Methylphenol	106-44-5	NA	280000	Liver																												
Acenaphthene	83-32-9	NA	550000	Liver																												
Acenaphthylene	208-96-8	NA	290000	None Reported																												
Anthracene	120-12-7	NA	77000000	Whole Body																												
Benzaldehyde	100-52-7	NA	7E+08	Kidney																												
Benzo(a)anthracene	56-55-3	67000	NA	Cancer																												
Benzo(a)pyrene	50-32-8	6700	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney																												
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer																												
Chrysene	218-01-9	6700000	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer																												
Fluoranthene	206-44-0	NA	70000000	Kidney																												
Fluorene	86-73-7	NA	2.8E+08	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer																												
Naphthalene	91-20-3	NA	3700000	Body Weight																												
Pentachlorophenol	87-86-5	120000	700000	Reproductive																												
Phenanthrene	85-01-8	NA	430000	Kidney																												
Pyrene	129-00-0	NA	270000	Kidney																												
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	11000	Respiratory					0.007 J		NA	6.5E-07	0.009 J		NA	7.7E-07	0.005 J		NA	4.7E-07	0.016 J		NA	1.5E-06	0.007 J		NA	6.3E-07	0.006 J		NA	5.5E-07
Acenaphthene	83-32-9	NA	550000	Liver					0.022 J		NA	4.0E-08	0.026 J		NA	4.7E-08	0.13		NA	2.4E-07	0.24		NA	4.4E-07	0.028 J		NA	5.1E-08	0.48		NA	8.7E-07
Acenaphthylene	208-96-8	NA	290000	None Reported									0.005 J		NA	1.8E-08	0.01 J		NA	3.4E-08	0.016 J		NA	5.5E-08	0.006 J		NA	2.0E-08	0.012 J		NA	4.1E-08
Anthracene	120-12-7	NA	77000000	Whole Body					0.023 J		NA	3.0E-10					0.028 J		NA	3.6E-10	0.041 J		NA	5.3E-10	0.02 J		NA	2.6E-10	0.064 J		NA	8.3E-10
Benzo(a)anthracene	56-55-3	67000	NA	Cancer					0.013 J		1.9E-13	NA	0.006 J		8.2E-14	NA	0.07 J		1.0E-12	NA	0.08 J		1.2E-12	NA					0.008 J		1.2E-13	NA
Benzo(a)pyrene	50-32-8	6700	NA	Cancer													0.04 J		6.0E-12	NA	0.045 J		6.7E-12	NA								
Benzo(b)fluoranthene	205-99-2	67000	NA	Cancer					0.01 J		1.4E-13	NA					0.055 J		8.2E-13	NA	0.066 J		9.9E-13	NA								
Benzo(g,h,i)perylene	191-24-2	NA	65000000	Kidney													0.019 J		NA	2.9E-10	0.026 J		NA	4.0E-10								
Benzo(k)fluoranthene	207-08-9	670000	NA	Cancer													0.021 J		3.1E-14	NA	0.019 J		2.8E-14	NA								
Chrysene	218-01-9	6700000	NA	Cancer					0.011 J		1.6E-15	NA	0.006 J		8.5E-16	NA	0.056 J		8.4E-15	NA	0.063 J		9.4E-15	NA					0.006 J		8.8E-16	NA
Dibenzo(a,h)anthracene	53-70-3	6700	NA	Cancer													0.006 J		9.4E-13	NA	0.007 J		1.0E-12	NA								
Fluoranthene	206-44-0	NA	70000000	Kidney	0.021 J		NA	3.0E-10	0.061 J		NA	8.7E-10	0.029 J		NA	4.1E-10	0.11		NA	1.6E-09	0.12		NA	1.7E-09	0.035 J		NA	5.0E-10	0.055 J		NA	7.9E-10
Fluorene	86-73-7	NA	2.8E+08	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	67000	NA	Cancer													0.019 J		2.8E-13	NA	0.026 J		3.9E-13	NA								
Naphthalene	91-20-3	NA	3700000	Body Weight	0.018 J		NA	4.9E-09	0.028 J		NA	7.6E-09	0.036 J		NA	9.7E-09	0.02 J		NA	5.4E-09	0.032 J		NA	8.6E-09	0.014 J		NA	3.8E-09	0.016 J		NA	4.3E-09
Pentachlorophenol	87-86-5	120000	700000	Reproductive	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07	0.2 R		1.7E-12	2.9E-07
Phenanthrene	85-01-8	NA	430000	Kidney	0.014 J		NA	3.3E-08	0.047 J		NA	1.1E-07	0.028 J		NA	6.5E-08	0.034 J		NA	7.9E-08	0.089 J		NA	2.1E-07	0.015 J		NA	3.5E-08	0.09 J		NA	2.1E-07
Pyrene	129-00-0	NA	270000	Kidney	0.049 J		NA	1.8E-07	0.076 J		NA	2.8E-07	0.024 J		NA	8.9E-08	0.16		NA	5.9E-07	0.18		NA	6.7E-07	0.03 J		NA	1.1E-07	0.093 J		NA	3.4E-07
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	120	NA	Cancer																												
4,4'-DDE	72-55-9	140000	NA	Cancer																												
4,4'-DDT	50-29-3	140000	350000	Liver	0.01		7.1E-14	2.9E-08	0.001 J		1.0E-14	4.0E-09	0.007 J		5.1E-14	2.1E-08					0.002 J		1.1E-14	4.6E-09	0.008 J		5.9E-14	2.4E-08				
Aldrin	309-00-2	2900	28000	Liver																												
alpha-BHC	319-84-6	60	43000	Liver																												
alpha-Chlordane	5103-71-9	390	1200	Liver	0.002 J		5.1E-12	1.7E-06									0.003 J		6.7E-12	2.2E-06												
beta-BHC	319-85-7	210	3200	Cancer																												
delta-BHC	319-86-8	60	43000	Liver																												
Dieldrin	60-57-1	9.4	210	Liver	0.014		1.5E-09	6.7E-05	0.008		8.5E-10	3.8E-05	0.012 J		1.3E-09	5.7E-05	0.009		1.0E-09	4.5E-05	0.002 J		2.4E-10	1.1E-05	0.012		1.3E-09	5.7E-05	0.005		4.8E-10	2.1E-05
Endosulfan I	959-98-8	NA	4200000	Body Weight																												
Endosulfan II	33213-65-9	NA	4200000	Liver	0.004 J		NA	1.0E-09					0.003 J		NA	6.0E-10									0.003 J		NA	7.6E-10				
Endrin	72-20-8	NA	1400000	Central Nervous System									0.002 J		NA	1.1E-09									0.003 J		NA	2.1E-09				
Endrin aldehyde	7421-93-4	NA	1400000	Central Nervous System																					0.003 J		NA	1.9E-09				
Endrin ketone	53494-70-5	NA	6000	Central Nervous System, Liver																												
gamma-BHC (Lindane)	58-89-9	340	54	Immune System																												
gamma-Chlordane	5103-74-2	140000	420000	Liver													0.002 J		1.5E-14	5.0E-09												
Heptachlor	76-44-8	8	52	Reproductive																	0.001		1.5E-10	2.3E-05								
Heptachlor epoxide	1024-57-3	24	41	Liver	0.002 J		8.3E-11	4.9E-05																								
Methoxychlor	72-43-5	NA	3500000	Central Nervous System																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	380000	14000000	Lymphoma																												
Total Non-Dioxin-Like PCBs	--	1.2E+11	NA	Cancer																												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	380000	14000000	Lymphoma																												
Total Risk/Hazard Index	--	--	--	--	--		1.6E-09	1.2E-04	--		8.5E-10	3.9E-05	--		1.3E-09	5.8E-05	--		1.0E-09	4.9E-05	--		4.1E-10	3.7E-05	--		1.3E-09	5.8E-05	--		4.8E-10	2.4E-05

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

Table 14 - Detections in Pore Water (May 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	LD103 5/2/2013				LD106 5/2/2013				LD108 5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney	4.9 J		1.2E-08	3.1E-05	14 J		3.3E-08	8.8E-05	12 J		2.9E-08	7.5E-05
2-Methylphenol	95-48-7	NA	280000	Body Weight, Central Nervous System												
4-Methylphenol	106-44-5	NA	570000	Respiratory												
Anthracene	120-12-7	NA	31000	None Reported												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney												
Benzo(a)anthracene	56-55-3	14	NA	Cancer												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer												
Bis(2-ethylhexyl)phthalate	117-81-7	3400	110000	Liver					2.6 J		7.6E-10	2.4E-05				
Caprolactam	105-60-2	NA	2200000	Body Weight												
Carbazole	86-74-8	NA	NA	NA												
Chrysene	218-01-9	1400	NA	Cancer												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer												
Di-n-butylphthalate	84-74-2	NA	570000	Developmental												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer												
N-Nitrosodiphenylamine	86-30-6	9600	NA	Cancer												
Phenanthrene	85-01-8	NA	3100	Kidney												
Pyrene	129-00-0	NA	1900	Kidney												
Pesticides (ug/L)																
4,4'-DDD	72-54-8	0.72	NA	Cancer												
4,4'-DDE	72-55-9	140	NA	Cancer												
4,4'-DDT	50-29-3	140	2800	Liver												
alpha-Chlordane	5103-71-9	2.3	70	Liver												
Dieldrin	60-57-1	0.055	7.6	Liver												
Endosulfan II	33213-65-9	NA	34000	Body Weight												
Endrin aldehyde	7421-93-4	NA	1700	Liver												
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver												
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney												
gamma-Chlordane	5103-74-2	130	2800	Liver												
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver												
PCBs (pg/L)																
Total Dioxin-Like PCBs	--	360	4000	Reproductive												
Total Non-Dioxin-Like PCBs	--	120000000	NA	Cancer												
Total Risk	--	--	--	--	--		1.2E-08	3.1E-05	--		3.4E-08	1.1E-04	--		2.9E-08	7.5E-05

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 14 - Detections in Pore Water (May 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	LD110 5/2/2013				LD114 5/3/2013				LD116 5/3/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney	63 J		1.5E-07	3.9E-04	150 J		3.6E-07	9.4E-04	11 J		2.6E-08	6.9E-05
2-Methylphenol	95-48-7	NA	280000	Body Weight, Central Nervous System												
4-Methylphenol	106-44-5	NA	570000	Respiratory												
Anthracene	120-12-7	NA	31000	None Reported												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney												
Benzo(a)anthracene	56-55-3	14	NA	Cancer	5.1 J		3.6E-07	NA								
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer	4.3 J		3.1E-06	NA								
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer	4.5 J		3.2E-07	NA								
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney	3.3 J		NA	1.9E-05								
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer	3.9 J		2.8E-08	NA								
Bis(2-ethylhexyl)phthalate	117-81-7	3400	110000	Liver	6.9 J		2.0E-09	6.3E-05	2.6 J		7.6E-10	2.4E-05	10 J		2.9E-09	9.1E-05
Caprolactam	105-60-2	NA	2200000	Body Weight												
Carbazole	86-74-8	NA	NA	NA												
Chrysene	218-01-9	1400	NA	Cancer	6.3 J		4.5E-09	NA								
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer												
Di-n-butylphthalate	84-74-2	NA	570000	Developmental												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	12 J		NA	5.2E-05								
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer	3.2 J		2.3E-07	NA								
N-Nitrosodiphenylamine	86-30-6	9600	NA	Cancer					4.4 J		4.6E-10	NA				
Phenanthrene	85-01-8	NA	3100	Kidney	7.1 J		NA	2.3E-03								
Pyrene	129-00-0	NA	1900	Kidney	9.4 J		NA	4.9E-03								
Pesticides (ug/L)																
4,4'-DDD	72-54-8	0.72	NA	Cancer	0.057 J		7.9E-08	NA								
4,4'-DDE	72-55-9	140	NA	Cancer	0.037 J		2.6E-10	NA								
4,4'-DDT	50-29-3	140	2800	Liver	0.12 J		8.6E-10	4.3E-05								
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.029 J		1.3E-08	4.1E-04								
Dieldrin	60-57-1	0.055	7.6	Liver	0.0082 J		1.5E-07	1.1E-03								
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.01 J		NA	2.9E-07								
Endrin aldehyde	7421-93-4	NA	1700	Liver	0.036 J		NA	2.1E-05								
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver	0.017 J		NA	2.7E-04								
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney												
gamma-Chlordane	5103-74-2	130	2800	Liver												
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver												
PCBs (pg/L)																
Total Dioxin-Like PCBs	--	360	4000	Reproductive												
Total Non-Dioxin-Like PCBs	--	120000000	NA	Cancer												
Total Risk	--	--	--	--	--		4.4E-06	9.6E-03	--		3.6E-07	9.6E-04	--		2.9E-08	1.6E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 14 - Detections in Pore Water (May 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	LD118 5/3/2013				LD123 5/3/2013				LD126 5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney	130 J		3.1E-07	8.1E-04	69 J		1.6E-07	4.3E-04	110 J		2.6E-07	6.9E-04
2-Methylphenol	95-48-7	NA	280000	Body Weight, Central Nervous System												
4-Methylphenol	106-44-5	NA	570000	Respiratory												
Anthracene	120-12-7	NA	31000	None Reported												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney									5.8 J		NA	2.1E-05
Benzo(a)anthracene	56-55-3	14	NA	Cancer												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer												
Bis(2-ethylhexyl)phthalate	117-81-7	3400	110000	Liver									2.8 J		8.2E-10	2.5E-05
Caprolactam	105-60-2	NA	2200000	Body Weight												
Carbazole	86-74-8	NA	NA	NA												
Chrysene	218-01-9	1400	NA	Cancer												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer												
Di-n-butylphthalate	84-74-2	NA	570000	Developmental												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood									3.3 J		NA	1.4E-05
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer												
N-Nitrosodiphenylamine	86-30-6	9600	NA	Cancer												
Phenanthrene	85-01-8	NA	3100	Kidney												
Pyrene	129-00-0	NA	1900	Kidney									2.6 J		NA	1.4E-03
Pesticides (ug/L)																
4,4'-DDD	72-54-8	0.72	NA	Cancer												
4,4'-DDE	72-55-9	140	NA	Cancer					0.0019 J		1.4E-11	NA	0.013 J		9.3E-11	NA
4,4'-DDT	50-29-3	140	2800	Liver									0.016 J		1.1E-10	5.7E-06
alpha-Chlordane	5103-71-9	2.3	70	Liver									0.063 J		2.7E-08	9.0E-04
Dieldrin	60-57-1	0.055	7.6	Liver												
Endosulfan II	33213-65-9	NA	34000	Body Weight												
Endrin aldehyde	7421-93-4	NA	1700	Liver									0.0025 J		NA	1.5E-06
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver												
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney					0.021 J		1.1E-08	1.9E-04				
gamma-Chlordane	5103-74-2	130	2800	Liver									0.031 J		2.4E-10	1.1E-05
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver									0.0045 J		3.2E-08	1.6E-03
PCBs (pg/L)																
Total Dioxin-Like PCBs	--	360	4000	Reproductive									16794.2		**4.7E-05**	**4.2E+00**
Total Non-Dioxin-Like PCBs	--	120000000	NA	Cancer									557327.7		4.6E-09	NA
Total Risk	--	--	--	--	--		3.1E-07	8.1E-04	--		1.7E-07	6.2E-04	--		**4.7E-05**	**4.2E+00**

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

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Table 14 - Detections in Pore Water (May 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	LD129 5/2/2013				LD132 5/2/2013				LD132DUP 5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney	170 J		4.0E-07	1.1E-03	25 J		6.0E-08	1.6E-04				
2-Methylphenol	95-48-7	NA	280000	Body Weight, Central Nervous System												
4-Methylphenol	106-44-5	NA	570000	Respiratory	9.3 J		NA	1.6E-05								
Anthracene	120-12-7	NA	31000	None Reported												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney	7.6 J		NA	2.7E-05								
Benzo(a)anthracene	56-55-3	14	NA	Cancer	4.1 J		2.9E-07	NA								
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer	4 J		2.9E-06	NA								
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer	5.1 J		3.6E-07	NA								
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney	3.7 J		NA	2.2E-05								
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer	3.7 J		2.6E-08	NA								
Bis(2-ethylhexyl)phthalate	117-81-7	3400	110000	Liver	6.3 J		1.9E-09	5.7E-05	13 J		3.8E-09	1.2E-04				
Caprolactam	105-60-2	NA	2200000	Body Weight												
Carbazole	86-74-8	NA	NA	NA												
Chrysene	218-01-9	1400	NA	Cancer	6.3 J		4.5E-09	NA								
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer												
Di-n-butylphthalate	84-74-2	NA	570000	Developmental												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	12 J		NA	5.2E-05								
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer	3.2 J		2.3E-07	NA								
N-Nitrosodiphenylamine	86-30-6	9600	NA	Cancer												
Phenanthrene	85-01-8	NA	3100	Kidney	6.5 J		NA	2.1E-03								
Pyrene	129-00-0	NA	1900	Kidney	8.8 J		NA	4.6E-03								
Pesticides (ug/L)																
4,4'-DDD	72-54-8	0.72	NA	Cancer												
4,4'-DDE	72-55-9	140	NA	Cancer												
4,4'-DDT	50-29-3	140	2800	Liver												
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.0052 J		2.3E-09	7.4E-05								
Dieldrin	60-57-1	0.055	7.6	Liver												
Endosulfan II	33213-65-9	NA	34000	Body Weight												
Endrin aldehyde	7421-93-4	NA	1700	Liver												
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver												
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney												
gamma-Chlordane	5103-74-2	130	2800	Liver												
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver												
PCBs (pg/L)																
Total Dioxin-Like PCBs	--	360	4000	Reproductive	701.9		1.9E-06	1.8E-01	1E+05		**3.7E-04**	**3.3E+01**	2884		8.0E-06	7.2E-01
Total Non-Dioxin-Like PCBs	--	120000000	NA	Cancer	58059		4.8E-10	NA	1E+06		9.9E-09	NA	2E+05		2.0E-09	NA
Total Risk	--	--	--	--	--		6.1E-06	1.8E-01	--		**3.7E-04**	**3.3E+01**	--		8.0E-06	7.2E-01

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 14 - Detections in Pore Water (May 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	LD136 5/2/2013				LD136DUP 5/2/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)												
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney								
2-Methylphenol	95-48-7	NA	280000	Body Weight, Central Nervous System	17	J	NA	6.1E-05	8	J	NA	2.9E-05
4-Methylphenol	106-44-5	NA	570000	Respiratory	71	J	NA	1.2E-04	2.9	J	NA	5.1E-06
Anthracene	120-12-7	NA	31000	None Reported	2.8	J	NA	9.0E-05				
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney	24	J	NA	8.6E-05	5.5	J	NA	2.0E-05
Benzo(a)anthracene	56-55-3	14	NA	Cancer	12	J	8.6E-07	NA				
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer	11	J	7.9E-06	NA				
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer	14	J	1.0E-06	NA				
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney	9.8	J	NA	5.8E-05				
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer	11	J	7.9E-08	NA				
Bis(2-ethylhexyl)phthalate	117-81-7	3400	110000	Liver	11	J	3.2E-09	1.0E-04	5.4	J	1.6E-09	4.9E-05
Caprolactam	105-60-2	NA	2200000	Body Weight	3.7	J	NA	1.7E-06	3.5	J	NA	1.6E-06
Carbazole	86-74-8	NA	NA	NA	4.4	J	NA	NA				
Chrysene	218-01-9	1400	NA	Cancer	16	J	1.1E-08	NA	2.8	J	2.0E-09	NA
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer	4.1	J	2.9E-06	NA				
Di-n-butylphthalate	84-74-2	NA	570000	Developmental	2.5	J	NA	4.4E-06				
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	29	J	NA	1.3E-04	5.3	J	NA	2.3E-05
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer	9.3	J	6.6E-07	NA				
N-Nitrosodiphenylamine	86-30-6	9600	NA	Cancer								
Phenanthrene	85-01-8	NA	3100	Kidney	17	J	NA	5.5E-03	2.5	J	NA	8.1E-04
Pyrene	129-00-0	NA	1900	Kidney	22	J	NA	1.2E-02	3.8	J	NA	2.0E-03
Pesticides (ug/L)												
4,4'-DDD	72-54-8	0.72	NA	Cancer	0.054	J	7.5E-08	NA	0.052	J	7.2E-08	NA
4,4'-DDE	72-55-9	140	NA	Cancer	0.031	J	2.2E-10	NA	0.05	J	3.6E-10	NA
4,4'-DDT	50-29-3	140	2800	Liver	0.039	J	2.8E-10	1.4E-05	0.064	J	4.6E-10	2.3E-05
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.39	J	1.7E-07	5.6E-03	0.4	J	1.7E-07	5.7E-03
Dieldrin	60-57-1	0.055	7.6	Liver								
Endosulfan II	33213-65-9	NA	34000	Body Weight								
Endrin aldehyde	7421-93-4	NA	1700	Liver	0.031	J	NA	1.8E-05	0.011	J	NA	6.5E-06
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver								
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney								
gamma-Chlordane	5103-74-2	130	2800	Liver	0.2	J	1.5E-09	7.1E-05	0.16	J	1.2E-09	5.7E-05
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver	0.022	J	1.6E-07	7.6E-03				
PCBs (pg/L)												
Total Dioxin-Like PCBs	--	360	4000	Reproductive	1485		4.1E-06	3.7E-01				
Total Non-Dioxin-Like PCBs	--	120000000	NA	Cancer	40162		3.3E-10	NA				
Total Risk	--	--	--	--	--		**1.8E-05**	4.0E-01	--		2.5E-07	8.7E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 15 - Detections in Pore Water (September 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	0301-00				0301-02				0301-02D				0302-00				0302-02				0303-00				0303-02			
					9/9/2013				9/9/2013				9/9/2013				9/9/2013				9/9/2013				9/9/2013				9/9/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney	0.59 J		1.4E-09	3.7E-06	8.9		2.1E-08	5.6E-05	9.6		2.3E-08	6.0E-05					7.8		1.9E-08	4.9E-05					4.5		1.1E-08	2.8E-05
2-Methylnaphthalene	91-57-6	NA	780	Respiratory																												
4-Methylphenol	106-44-5	NA	570000	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver																												
Acenaphthylene	208-96-8	NA	11000	Liver																												
Anthracene	120-12-7	NA	31000	None Reported																												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney																												
Benzo(a)anthracene	56-55-3	14	NA	Cancer																												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood																												
Fluorene	86-73-7	NA	230000	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																												
Naphthalene	91-20-3	NA	8100	Body Weight																												
Pentachlorophenol	87-86-5	120	28000	Liver																												
Phenanthrene	85-01-8	NA	3100	Kidney																												
Pyrene	129-00-0	NA	1900	Kidney																												
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	780	Respiratory	0.017 J	NA		2.2E-05	0.01 J	NA		1.3E-05	0.012 J	NA		1.5E-05	0.012 J	NA		1.5E-05	0.035 J	NA		4.5E-05	0.006 J	NA		7.2E-06	0.018 J	NA		2.3E-05
Acenaphthene	83-32-9	NA	11000	Liver	0.033 J	NA		3.0E-06	0.094 J	NA		8.5E-06	0.1	NA		9.1E-06	0.028 J	NA		2.5E-06	0.11	NA		1.0E-05	0.01 J	NA		9.1E-07	0.11	NA		1.0E-05
Acenaphthylene	208-96-8	NA	11000	Liver	0.012 J	NA		1.1E-06	0.021 J	NA		1.9E-06	0.024 J	NA		2.2E-06					0.018 J	NA		1.6E-06					0.011 J	NA		1.0E-06
Anthracene	120-12-7	NA	31000	None Reported	0.077 J	NA		2.5E-06	0.098	NA		3.2E-06	0.11	NA		3.5E-06	0.011 J	NA		3.5E-07	0.15	NA		4.8E-06					0.091 J	NA		2.9E-06
Benzo(a)anthracene	56-55-3	14	NA	Cancer					0.038 J	2.7E-09		NA									0.09 J	6.4E-09		NA	0.018 J	1.3E-09		NA	0.086 J	6.1E-09		NA
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																	0.035 J	2.5E-08		NA					0.052 J	3.7E-08		NA
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																	0.054 J	3.9E-09		NA	0.028 J	2.0E-09		NA	0.073 J	5.2E-09		NA
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																	0.018 J	NA		1.1E-07	0.013 J	NA		7.6E-08	0.032 J	NA		1.9E-07
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																	0.021 J	1.5E-10		NA	0.011 J	7.9E-11		NA	0.024 J	1.7E-10		NA
Chrysene	218-01-9	1400	NA	Cancer					0.043 J	3.1E-11		NA									0.076 J	5.4E-11		NA	0.019 J	1.4E-11		NA	0.067 J	4.8E-11		NA
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																									0.007 J	5.1E-09		NA
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	0.037 J	NA		1.6E-07	0.052 J	NA		2.3E-07	0.04 J	NA		1.7E-07	0.03 J	NA		1.3E-07	0.16	NA		7.0E-07	0.047 J	NA		2.0E-07	0.17	NA		7.4E-07
Fluorene	86-73-7	NA	230000	Blood	0.035 J	NA		1.5E-07													0.071 J	NA		3.1E-07					0.043 J	NA		1.9E-07
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																	0.019 J	1.4E-09	NA	0.011 J	7.9E-10	NA	0.031 J	2.2E-09	NA			
Naphthalene	91-20-3	NA	8100	Body Weight	0.046 J	NA		5.7E-06	0.015 J	NA		1.9E-06	0.016 J	NA		2.0E-06	0.044 J	NA		5.4E-06	0.094 J	NA		1.2E-05	0.022 J	NA		2.7E-06	0.065 J	NA		8.0E-06
Pentachlorophenol	87-86-5	120	28000	Liver	0.11 J	9.2E-10		3.9E-06	0.2 R	1.7E-09		7.1E-06	0.2 R	1.7E-09		7.1E-06	0.041 J	3.4E-10		1.5E-06	0.2 R	1.7E-09		7.1E-06	0.2 R	1.7E-09		7.1E-06	0.2 R	1.7E-09		7.1E-06
Phenanthrene	85-01-8	NA	3100	Kidney	0.045 J	NA		1.5E-05	0.073 J	NA		2.4E-05	0.098	NA		3.2E-05	0.032 J	NA		1.0E-05	0.23	NA		7.4E-05	0.018 J	NA		5.8E-06	0.18	NA		5.8E-05
Pyrene	129-00-0	NA	1900	Kidney	0.032 J	NA		1.7E-05	0.098	NA		5.2E-05	0.092 J	NA		4.8E-05	0.053 J	NA		2.8E-05	0.21	NA		1.1E-04	0.043 J	NA		2.3E-05	0.21	NA		1.1E-04
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	0.72	NA	Cancer																												
4,4'-DDE	72-55-9	140	NA	Cancer																												
4,4'-DDT	50-29-3	140	2800	Liver													0.011	7.9E-11		3.9E-06	0.003 J	1.9E-11		9.3E-07	0.009 J	6.4E-11		3.2E-06	0.002 J	1.6E-11		7.9E-07
Aldrin	309-00-2	2.8	170	Liver																												
alpha-BHC	319-84-6	0.34	2900	Liver																												
alpha-Chlordane	5103-71-9	2.3	70	Liver													0.002 J	8.3E-10		2.7E-05												
beta-BHC	319-85-7	1.2	NA	Cancer																												
delta-BHC	319-86-8	0.34	2900	Liver	0.001 J	2.9E-09		3.4E-07																								
Dieldrin	60-57-1	0.055	7.6	Liver	0.0099	1.8E-07		1.3E-03	0.0057 J	1.0E-07		7.5E-04	0.005 J	9.5E-08		6.8E-04	0.012	2.2E-07		1.6E-03	0.009	1.7E-07		1.2E-03	0.01	1.7E-07		1.3E-03	0.005	8.5E-08		6.2E-04
Endosulfan I	959-98-8	NA	34000	Body Weight	0.001 J	NA		2.9E-08	0.001 J	NA		2.9E-08																				
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.0045 J	NA		1.3E-07									0.004 J	NA		1.1E-07					0.002 J	NA		7.1E-08	0.003 J	NA		9.1E-08
Endrin	72-20-8	NA	1700	Liver																												
Endrin aldehyde	7421-93-4	NA	1700	Liver	0.0013 J	NA		7.6E-07																					0.002 J	NA		1.4E-06
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver																												
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney																												
gamma-Chlordane	5103-74-2	130	2800	Liver													0.002 J	1.2E-11		5.4E-07	0.002 J	1.2E-11		5.7E-07								
Heptachlor	76-44-8	0.048	19	Liver	0.001 J	2.1E-08		5.3E-05																								
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver													0.002 J	1.6E-08		7.6E-04												
Methoxychlor	72-43-5	NA	28000	Reproductive																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	360	4000	Reproductive	48.7	1.4E-07		1.2E-02	61.8	1.7E-07		1.5E-02																				
Total Non-Dioxin-Like PCBs	--	1.2E+08	NA	Cancer	3126	2.6E-11		NA	6844.4	5.7E-11		NA																				
Dioxins (pg/L)																																
Total TEQ	3333-30-0	360	4000	Reproductive																												
Total Risk/Hazard Index	--	--	--	--	--	3.4E-07		1.4E-02	--	3.0E-07		1.6E-02	--	1.2E-07		8.6E-04	--	2.4E-07		2.4E-03	--	2.3E-07		1.6E-03	--	1.8E-07		1.3E-03	--	1.5E-07		8.7E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 15 - Detections in Pore Water (September 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	1001-00 9/11/2013				1001-02 9/11/2013				1001-02D 9/11/2013				1001-04 9/11/2013				1002-00 9/11/2013				1002-02 9/11/2013				1002-04 9/11/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney	0.54 J		1.3E-09	3.4E-06	11		2.6E-08	6.9E-05	5.2 J		1.2E-08	3.3E-05	51		1.2E-07	3.2E-04					2.1 J		5.0E-09	1.3E-05	37		8.8E-08	2.3E-04
2-Methylnaphthalene	91-57-6	NA	780	Respiratory					0.024 J		NA	3.1E-05					0.074 J		NA	9.5E-05									0.047 J		NA	6.0E-05
4-Methylphenol	106-44-5	NA	570000	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver					0.1		NA	9.1E-06					0.21 J		NA	1.9E-05	0.029 J		NA	2.6E-06	0.066 J		NA	6.0E-06	0.23		NA	2.1E-05
Acenaphthylene	208-96-8	NA	11000	Liver					0.04 J		NA	3.6E-06													0.013 J		NA	1.2E-06				
Anthracene	120-12-7	NA	31000	None Reported					0.079 J		NA	2.5E-06									0.021 J		NA	6.8E-07								
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney																												
Benzo(a)anthracene	56-55-3	14	NA	Cancer													0.069 J		4.9E-09	NA	0.0068 J		4.9E-10	NA	0.016 J		1.1E-09	NA				
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																									0.0065 J		NA	3.8E-08
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer					0.032 J		2.3E-11	NA									0.0065 J		4.6E-12	NA					0.018 J		1.3E-11	NA
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer					0.0095 J		6.8E-09	NA																				
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood													0.12		NA	5.2E-07												
Fluorene	86-73-7	NA	230000	Blood													0.23 J		NA	1.0E-06									0.19		NA	8.3E-07
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer					0.0079 J		5.6E-10	NA																	0.0071 J		5.1E-10	NA
Naphthalene	91-20-3	NA	8100	Body Weight																												
Pentachlorophenol	87-86-5	120	28000	Liver																					0.2 R		1.7E-09	7.1E-06	0.056 J		4.7E-10	2.0E-06
Phenanthrene	85-01-8	NA	3100	Kidney																					0.045 J		NA	1.5E-05				
Pyrene	129-00-0	NA	1900	Kidney					0.071 J		NA	3.7E-05					0.23		NA	1.2E-04	0.061 J		NA	3.2E-05	0.044 J		NA	2.3E-05				
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	780	Respiratory	0.017 J		NA	2.2E-05					0.014 J		NA	1.8E-05																
Acenaphthene	83-32-9	NA	11000	Liver	0.031 J		NA	2.8E-06					0.088 J		NA	8.0E-06																
Acenaphthylene	208-96-8	NA	11000	Liver									0.028 J		NA	2.5E-06																
Anthracene	120-12-7	NA	31000	None Reported	0.018 J		NA	5.8E-07					0.07 J		NA	2.3E-06																
Benzo(a)anthracene	56-55-3	14	NA	Cancer																												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	0.027 J		NA	1.2E-07					0.044 J		NA	1.9E-07																
Fluorene	86-73-7	NA	230000	Blood	0.024 J		NA	1.0E-07					0.041 J		NA	1.8E-07																
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																												
Naphthalene	91-20-3	NA	8100	Body Weight	0.034 J		NA	4.2E-06					0.017 J		NA	2.1E-06																
Pentachlorophenol	87-86-5	120	28000	Liver	0.064 J		5.3E-10	2.3E-06					0.2 R		1.7E-09	7.1E-06																
Phenanthrene	85-01-8	NA	3100	Kidney	0.033 J		NA	1.1E-05					0.1		NA	3.2E-05																
Pyrene	129-00-0	NA	1900	Kidney	0.045 J		NA	2.4E-05					0.034 J		NA	1.8E-05																
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	0.72	NA	Cancer																												
4,4'-DDE	72-55-9	140	NA	Cancer													0.003 J		2.4E-11	NA									0.0012 J		8.6E-12	NA
4,4'-DDT	50-29-3	140	2800	Liver	0.009 J		6.6E-11	3.3E-06									0.002 J		1.4E-11	7.1E-07	0.013 J		9.3E-11	4.6E-06								
Aldrin	309-00-2	2.8	170	Liver													0.001 J		4.6E-10	7.6E-06									0.0021 J		7.5E-10	1.2E-05
alpha-BHC	319-84-6	0.34	2900	Liver													0.002 J		4.7E-09	5.5E-07												
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.002 J		1.0E-09	3.3E-05	0.0022 J		9.6E-10	3.1E-05									0.0023 J		1.0E-09	3.3E-05	0.002 J		8.3E-10	2.7E-05				
beta-BHC	319-85-7	1.2	NA	Cancer					0.0039 J		3.3E-09	NA					0.002 J		1.9E-09	NA									0.0035 J		2.9E-09	NA
delta-BHC	319-86-8	0.34	2900	Liver					0.005 J		1.5E-08	1.7E-06	0.005		1.6E-08	1.8E-06	0.007 J		1.9E-08	2.3E-06									0.0042 J		1.2E-08	1.4E-06
Dieldrin	60-57-1	0.055	7.6	Liver	0.013		2.4E-07	1.7E-03	0.0074 J		1.3E-07	9.7E-04	0.008 J		1.4E-07	1.0E-03	0.004 J		7.6E-08	5.5E-04	0.016		2.9E-07	2.1E-03	0.01		1.8E-07	1.3E-03	0.0058 J		1.1E-07	7.6E-04
Endosulfan I	959-98-8	NA	34000	Body Weight													0.002 J		NA	5.0E-08									0.0021 J		NA	6.2E-08
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.002 J		NA	7.1E-08									0.003 J		NA	7.6E-08	0.0036 J		NA	1.1E-07								
Endrin	72-20-8	NA	1700	Liver																									0.0021 J		NA	1.2E-06
Endrin aldehyde	7421-93-4	NA	1700	Liver													0.003 J		NA	1.8E-06					0.002 J		NA	1.1E-06	0.0022 J		NA	1.3E-06
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver																												
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney													0.002 J		7.5E-10	1.4E-05									0.0015 J		7.5E-10	1.4E-05
gamma-Chlordane	5103-74-2	130	2800	Liver	0.001 J		1.0E-11	4.6E-07													0.0013 J		1.0E-11	4.6E-07					0.0018 J		1.4E-11	6.4E-07
Heptachlor	76-44-8	0.048	19	Liver																												
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver																	0.0021		1.5E-08	7.2E-04								
Methoxychlor	72-43-5	NA	28000	Reproductive																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	360	4000	Reproductive	77.2		2.1E-07	1.9E-02									447.9		1.2E-06	1.1E-01												
Total Non-Dioxin-Like PCBs	--	1.2E+08	NA	Cancer	4626		3.9E-11	NA									27397		2.3E-10	NA												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	360	4000	Reproductive													0.072		2.0E-10	1.8E-05												
Total Risk/Hazard Index	--	--	--	--	--		4.5E-07	2.1E-02	--		1.9E-07	1.2E-03	--		1.7E-07	1.2E-03	--		1.5E-06	1.1E-01	--		3.1E-07	2.9E-03	--		1.8E-07	1.4E-03	--		2.1E-07	1.1E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 15 - Detections in Pore Water (September 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	1003-00 9/10/2013				1003-02 9/10/2013				1601-00 9/11/2013				1601-02 9/11/2013				1602-00 9/11/2013				1602-02 9/11/2013				1602-04 9/11/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney													20		4.8E-08	1.3E-04									170		4.0E-07	1.1E-03
2-Methylnaphthalene	91-57-6	NA	780	Respiratory									0.0068 J		NA	8.7E-06	0.079 J		NA	1.0E-04									0.24		NA	3.1E-04
4-Methylphenol	106-44-5	NA	570000	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver									0.056 J		NA	5.1E-06																
Acenaphthylene	208-96-8	NA	11000	Liver									0.0078 J		NA	7.1E-07																
Anthracene	120-12-7	NA	31000	None Reported																												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney																												
Benzo(a)anthracene	56-55-3	14	NA	Cancer													0.052 J		3.7E-09	NA												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney									0.0075 J		NA	4.4E-08																
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer									0.015 J		1.1E-11	NA	0.025 J		1.8E-11	NA									0.059 J		4.2E-11	NA
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																									5 R		3.6E-06	NA
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood													0.078 J		NA	3.4E-07	0.011 J		NA	4.8E-08	0.086 J		NA	3.7E-07				
Fluorene	86-73-7	NA	230000	Blood																									0.12 J		NA	5.2E-07
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																												
Naphthalene	91-20-3	NA	8100	Body Weight																									0.88		NA	1.1E-04
Pentachlorophenol	87-86-5	120	28000	Liver									0.2 R		1.7E-09	7.1E-06	0.2 R		1.7E-09	7.1E-06												
Phenanthrene	85-01-8	NA	3100	Kidney																	0.0073 J		NA	2.4E-06								
Pyrene	129-00-0	NA	1900	Kidney									0.084 J		NA	4.4E-05	0.095 J		NA	5.0E-05					0.11		NA	5.8E-05	0.45		NA	2.4E-04
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	780	Respiratory					0.013 J		NA	1.7E-05																				
Acenaphthene	83-32-9	NA	11000	Liver					0.062 J		NA	5.6E-06																				
Acenaphthylene	208-96-8	NA	11000	Liver					0.0075 J		NA	6.8E-07																				
Anthracene	120-12-7	NA	31000	None Reported					0.036 J		NA	1.2E-06																				
Benzo(a)anthracene	56-55-3	14	NA	Cancer					0.04 J		2.9E-09	NA																				
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer					0.031 J		2.2E-08	NA																				
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer					0.054 J		3.9E-09	NA																				
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney					0.023 J		NA	1.4E-07																				
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer					0.021 J		1.5E-10	NA																				
Chrysene	218-01-9	1400	NA	Cancer					0.034 J		2.4E-11	NA																				
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	0.021 J		NA	9.1E-08	0.12		NA	5.2E-07																				
Fluorene	86-73-7	NA	230000	Blood					0.06 J		NA	2.6E-07																				
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer					0.022 J		1.6E-09	NA																				
Naphthalene	91-20-3	NA	8100	Body Weight	0.022 J		NA	2.7E-06	0.058 J		NA	7.2E-06																				
Pentachlorophenol	87-86-5	120	28000	Liver	0.2 R		1.7E-09	7.1E-06	0.13 J		1.1E-09	4.6E-06																				
Phenanthrene	85-01-8	NA	3100	Kidney	0.019 J		NA	6.1E-06	0.073 J		NA	2.4E-05																				
Pyrene	129-00-0	NA	1900	Kidney	0.051 J		NA	2.7E-05	0.12		NA	6.3E-05																				
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	0.72	NA	Cancer													0.003 J		3.9E-09	NA												
4,4'-DDE	72-55-9	140	NA	Cancer																									0.001 J		9.3E-12	NA
4,4'-DDT	50-29-3	140	2800	Liver	0.01		7.1E-11	3.6E-06	0.011		7.9E-11	3.9E-06	0.015 J		1.1E-10	5.4E-06	0.005 J		3.8E-11	1.9E-06	0.0097 J		6.9E-11	3.5E-06	0.003 J		2.1E-11	1.1E-06	0.004 J		2.9E-11	1.5E-06
Aldrin	309-00-2	2.8	170	Liver																												
alpha-BHC	319-84-6	0.34	2900	Liver													0.002		4.4E-09	5.2E-07									0.002 J		5.6E-09	6.6E-07
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.002 J		9.1E-10	3.0E-05	0.002 J		8.7E-10	2.9E-05	0.0035 J		1.5E-09	5.0E-05					0.0024 J		1.0E-09	3.4E-05	0.002 J		9.6E-10	3.1E-05	0.003 J		1.2E-09	3.9E-05
beta-BHC	319-85-7	1.2	NA	Cancer	0.003		2.3E-09	NA									0.003 J		2.6E-09	NA									0.003 J		2.2E-09	NA
delta-BHC	319-86-8	0.34	2900	Liver																												
Dieldrin	60-57-1	0.055	7.6	Liver	0.014		2.5E-07	1.8E-03	0.011		2.0E-07	1.4E-03	0.02		3.6E-07	2.6E-03	0.003 J		6.2E-08	4.5E-04	0.017		3.1E-07	2.2E-03	0.007		1.3E-07	9.6E-04				
Endosulfan I	959-98-8	NA	34000	Body Weight									0.0013 J		NA	3.8E-08													0.003 J		NA	7.4E-08
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.005 J		NA	1.4E-07					0.0047 J		NA	1.4E-07	0.002 J		NA	5.6E-08	0.0027 J		NA	7.9E-08	0.003 J		NA	1.0E-07				
Endrin	72-20-8	NA	1700	Liver																									0.001 J		NA	8.2E-07
Endrin aldehyde	7421-93-4	NA	1700	Liver																									0.005 J		NA	2.9E-06
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver									0.0017 J		NA	2.7E-05					0.0028 J		NA	4.4E-05								
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney																									0.002 J		7.5E-10	1.4E-05
gamma-Chlordane	5103-74-2	130	2800	Liver	0.001 J		9.2E-12	4.3E-07	0.0014 J		1.1E-11	5.0E-07	0.0025 J		1.9E-11	8.9E-07	0.004 J		3.2E-11	1.5E-06					0.002 J		1.5E-11	6.8E-07	0.002 J		1.8E-11	8.2E-07
Heptachlor	76-44-8	0.048	19	Liver									0.0011 J		2.3E-08	5.8E-05	0.004		7.5E-08	1.9E-04									0.004		8.1E-08	2.1E-04
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver	0.002 J		1.5E-08	7.2E-04													0.0026 J		1.9E-08	9.0E-04								
Methoxychlor	72-43-5	NA	28000	Reproductive													0.006 J		NA	2.2E-07									0.006 J		NA	2.0E-07
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	360	4000	Reproductive									97.1		2.7E-07	2.4E-02	249.2		6.9E-07	6.2E-02												
Total Non-Dioxin-Like PCBs	--	1.2E+08	NA	Cancer									5289.4		4.4E-11	NA	18840		1.6E-10	NA												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	360	4000	Reproductive													0.144		4.0E-10	3.6E-05												
Total Risk/Hazard Index	--	--	--	--	--		2.7E-07	2.6E-03	--		2.3E-07	1.6E-03	--		6.6E-07	2.7E-02	--		8.9E-07	6.3E-02	--		3.3E-07	3.2E-03	--		1.4E-07	1.1E-03	--		4.1E-06	2.1E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 15 - Detections in Pore Water (September 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	1603-00				1603-00DUP				1603-02				1603-04				1603-04DUP				1802-00				1802-02			
					9/12/2013				9/12/2013				9/12/2013				9/12/2013				9/12/2013				9/13/2013				9/13/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney									32		7.6E-08	2.0E-04	180		4.3E-07	1.1E-03	160		3.8E-07	1.0E-03								
2-Methylnaphthalene	91-57-6	NA	780	Respiratory									0.055 J		NA	7.1E-05									0.0069 J		NA	8.8E-06	0.0081 J		NA	1.0E-05
4-Methylphenol	106-44-5	NA	570000	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver													0.1 J		NA	9.1E-06	0.11 J		NA	1.0E-05								
Acenaphthylene	208-96-8	NA	11000	Liver									0.035 J		NA	3.2E-06																
Anthracene	120-12-7	NA	31000	None Reported									0.36		NA	1.2E-05	2.5 J		NA	8.1E-05	2.4 J		NA	7.7E-05					0.021 J		NA	6.8E-07
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney													3 J		NA	1.1E-05	2.1 J		NA	7.5E-06								
Benzo(a)anthracene	56-55-3	14	NA	Cancer									0.084 J		6.0E-09	NA									0.012 J		8.6E-10	NA	0.017 J		1.2E-09	NA
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																	0.041 J		2.9E-08	NA								
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																	0.0096 J		NA	5.6E-08								
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer									0.029 J		2.1E-11	NA	0.033 J		2.4E-11	NA	0.022 J		1.6E-11	NA					0.019 J		1.4E-11	NA
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	0.027 J		NA	1.2E-07					0.12		NA	5.2E-07					0.46 J		NA	2.0E-06								
Fluorene	86-73-7	NA	230000	Blood													0.09 J		NA	3.9E-07												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer													0.0075 J		5.4E-10	NA												
Naphthalene	91-20-3	NA	8100	Body Weight									0.12		NA	1.5E-05	0.67		NA	8.3E-05					0.023 J		NA	2.8E-06	0.028 J		NA	3.5E-06
Pentachlorophenol	87-86-5	120	28000	Liver	0.2 R		1.7E-09	7.1E-06													0.2 R		1.7E-09	7.1E-06	0.11 J		9.2E-10	3.9E-06				
Phenanthrene	85-01-8	NA	3100	Kidney	0.0081 J		NA	2.6E-06					0.022 J		NA	7.1E-06	1.5 J		NA	4.8E-04	1.9		NA	6.1E-04	0.018 J		NA	5.8E-06				
Pyrene	129-00-0	NA	1900	Kidney	0.056 J		NA	2.9E-05	0.029 J		NA	1.5E-05	0.14		NA	7.4E-05																
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	780	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver																												
Acenaphthylene	208-96-8	NA	11000	Liver																												
Anthracene	120-12-7	NA	31000	None Reported																												
Benzo(a)anthracene	56-55-3	14	NA	Cancer																												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood																												
Fluorene	86-73-7	NA	230000	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																												
Naphthalene	91-20-3	NA	8100	Body Weight																												
Pentachlorophenol	87-86-5	120	28000	Liver																												
Phenanthrene	85-01-8	NA	3100	Kidney																												
Pyrene	129-00-0	NA	1900	Kidney																												
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	0.72	NA	Cancer																												
4,4'-DDE	72-55-9	140	NA	Cancer	0.0011 J		7.9E-12	NA									0.0022 J		1.6E-11	NA												
4,4'-DDT	50-29-3	140	2800	Liver	0.0067 J		4.8E-11	2.4E-06	0.002 J		1.5E-11	7.5E-07	0.007 J		5.2E-11	2.6E-06	0.018 J		1.3E-10	6.4E-06	0.012 J		8.6E-11	4.3E-06	0.0021 J		1.5E-11	7.5E-07	0.0016 J		1.1E-11	5.7E-07
Aldrin	309-00-2	2.8	170	Liver																												
alpha-BHC	319-84-6	0.34	2900	Liver																												
alpha-Chlordane	5103-71-9	2.3	70	Liver					0.002 J		9.6E-10	3.1E-05									0.0019 J		8.3E-10	2.7E-05	0.0027 J		1.2E-09	3.9E-05	0.0016 J		7.0E-10	2.3E-05
beta-BHC	319-85-7	1.2	NA	Cancer													0.0043 J		3.6E-09	NA												
delta-BHC	319-86-8	0.34	2900	Liver																												
Dieldrin	60-57-1	0.055	7.6	Liver	0.011		2.0E-07	1.4E-03	0.012		2.2E-07	1.6E-03	0.005		9.5E-08	6.8E-04									0.014 J		2.5E-07	1.8E-03	0.0066		1.2E-07	8.7E-04
Endosulfan I	959-98-8	NA	34000	Body Weight													0.0011 J		NA	3.2E-08	0.0011 J		NA	3.2E-08								
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.0022 J		NA	6.5E-08	0.002 J		NA	6.5E-08													0.0031 J		NA	9.1E-08	0.0019 J		NA	5.6E-08
Endrin	72-20-8	NA	1700	Liver																												
Endrin aldehyde	7421-93-4	NA	1700	Liver	0.0018 J		NA	1.1E-06	0.001 J		NA	7.1E-07	0.001 J		NA	8.2E-07	0.0022 J		NA	1.3E-06												
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver	0.0017 J		NA	2.7E-05	0.002 J		NA	3.3E-05													0.0019 J		NA	3.0E-05	0.0016 J		NA	2.5E-05
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney																												
gamma-Chlordane	5103-74-2	130	2800	Liver													0.007 J		5.4E-11	2.5E-06					0.0021 J		1.6E-11	7.5E-07				
Heptachlor	76-44-8	0.048	19	Liver									0.002		3.1E-08	7.9E-05	0.0063 J		1.3E-07	3.3E-04	0.004 J		8.3E-08	2.1E-04								
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver					0.002 J		1.3E-08	6.2E-04													0.0021		1.5E-08	7.2E-04				
Methoxychlor	72-43-5	NA	28000	Reproductive																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	360	4000	Reproductive																												
Total Non-Dioxin-Like PCBs	--	1.2E+08	NA	Cancer																												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	360	4000	Reproductive																												
Total Risk/Hazard Index	--	--	--	--	--		2.0E-07	1.5E-03	--		2.3E-07	2.3E-03	--		2.1E-07	1.1E-03	--		5.6E-07	2.1E-03	--		5.0E-07	2.0E-03	--		2.7E-07	2.7E-03	--		1.2E-07	9.3E-04

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 15 - Detections in Pore Water (September 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	1803-00				2501-00				2501-02				2502-00				2502-02				2503-00				2503-02			
					9/13/2013				9/12/2013				9/12/2013				9/12/2013				9/12/2013				9/12/2013				9/12/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney					70		1.7E-07	4.4E-04	89		2.1E-07	5.6E-04	31		7.4E-08	1.9E-04	100		2.4E-07	6.3E-04	3.4		8.1E-09	2.1E-05	63		1.5E-07	3.9E-04
2-Methylnaphthalene	91-57-6	NA	780	Respiratory	0.01 J		NA	1.3E-05	0.062 J		NA	7.9E-05	0.048 J		NA	6.2E-05	0.058 J		NA	7.4E-05									0.065 J		NA	8.3E-05
4-Methylphenol	106-44-5	NA	570000	Respiratory													1.3 J		NA	2.3E-06												
Acenaphthene	83-32-9	NA	11000	Liver									0.18		NA	1.6E-05	0.047 J		NA	4.3E-06					0.018 J		NA	1.6E-06	0.15		NA	1.4E-05
Acenaphthylene	208-96-8	NA	11000	Liver													0.058 J		NA	5.3E-06					0.0087 J		NA	7.9E-07	0.12		NA	1.1E-05
Anthracene	120-12-7	NA	31000	None Reported					0.45		NA	1.5E-05	0.55		NA	1.8E-05	0.16		NA	5.2E-06	0.7		NA	2.3E-05					1.8 J		NA	5.8E-05
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney									2.6 J		NA	9.3E-06					1.9 J		NA	6.8E-06								
Benzo(a)anthracene	56-55-3	14	NA	Cancer	0.01 J		7.1E-10	NA	0.1		7.1E-09	NA	0.11		7.9E-09	NA					0.2		1.4E-08	NA								
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																	0.017 J		1.2E-08	NA								
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer	0.017 J		1.2E-09	NA													0.034 J		2.4E-09	NA								
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer	0.0055 J		3.9E-11	NA	0.0061 J		4.4E-11	NA									0.013 J		9.3E-11	NA								
Chrysene	218-01-9	1400	NA	Cancer	0.017 J		1.2E-11	NA																								
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	0.03 J		NA	1.3E-07													0.1		NA	4.3E-07					0.11		NA	4.8E-07
Fluorene	86-73-7	NA	230000	Blood									0.6		NA	2.6E-06																
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer					0.0052 J		3.7E-10	NA																				
Naphthalene	91-20-3	NA	8100	Body Weight	0.015 J		NA	1.9E-06	0.11		NA	1.4E-05																				
Pentachlorophenol	87-86-5	120	28000	Liver													0.042 J		3.5E-10	1.5E-06	0.58 J		4.8E-09	2.1E-05								
Phenanthrene	85-01-8	NA	3100	Kidney					0.04 J		NA	1.3E-05	0.081 J		NA	2.6E-05					1.2 J		NA	3.9E-04					0.31		NA	1.0E-04
Pyrene	129-00-0	NA	1900	Kidney													0.073 J		NA	3.8E-05									0.15		NA	7.9E-05
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	780	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver																												
Acenaphthylene	208-96-8	NA	11000	Liver																												
Anthracene	120-12-7	NA	31000	None Reported																												
Benzo(a)anthracene	56-55-3	14	NA	Cancer																												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood																												
Fluorene	86-73-7	NA	230000	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																												
Naphthalene	91-20-3	NA	8100	Body Weight																												
Pentachlorophenol	87-86-5	120	28000	Liver																												
Phenanthrene	85-01-8	NA	3100	Kidney																												
Pyrene	129-00-0	NA	1900	Kidney																												
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	0.72	NA	Cancer																												
4,4'-DDE	72-55-9	140	NA	Cancer									0.001 J		9.3E-12	NA													0.002 J		1.6E-11	NA
4,4'-DDT	50-29-3	140	2800	Liver	0.0047 J		3.4E-11	1.7E-06	0.012 J		8.6E-11	4.3E-06	0.005 J		3.6E-11	1.8E-06	0.013 J		9.3E-11	4.6E-06	0.004 J		3.1E-11	1.5E-06	0.0084 J		6.0E-11	3.0E-06	0.008		5.4E-11	2.7E-06
Aldrin	309-00-2	2.8	170	Liver									0.003 J		1.1E-09	1.8E-05													0.004 J		1.5E-09	2.5E-05
alpha-BHC	319-84-6	0.34	2900	Liver					0.0012 J		3.5E-09	4.1E-07	0.003 J		8.2E-09	9.7E-07					0.001 J		3.8E-09	4.5E-07					0.001 J		3.2E-09	3.8E-07
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.0024 J		1.0E-09	3.4E-05									0.002 J		8.3E-10	2.7E-05					0.0018 J		7.8E-10	2.6E-05				
beta-BHC	319-85-7	1.2	NA	Cancer									0.003 J		2.1E-09	NA					0.011 J		9.2E-09	NA								
delta-BHC	319-86-8	0.34	2900	Liver					0.0016 J		4.7E-09	5.5E-07	0.002 J		5.3E-09	6.2E-07	0.001 J		2.9E-09	3.4E-07	0.004 J		1.0E-08	1.2E-06					0.002 J		5.6E-09	6.6E-07
Dieldrin	60-57-1	0.055	7.6	Liver	0.017 J		3.1E-07	2.2E-03	0.012 J		2.2E-07	1.6E-03	0.013 J		2.4E-07	1.7E-03	0.015		2.7E-07	2.0E-03	0.016		2.9E-07	2.1E-03	0.012		2.2E-07	1.6E-03	0.012		2.2E-07	1.6E-03
Endosulfan I	959-98-8	NA	34000	Body Weight					0.0022 J		NA	6.5E-08	0.004 J		NA	1.3E-07					0.004 J		NA	1.1E-07					0.003 J		NA	7.4E-08
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.0022 J		NA	6.5E-08	0.0028 J		NA	8.2E-08	0.002 J		NA	7.1E-08	0.004 J		NA	1.1E-07	0.003 J		NA	7.9E-08	0.0026 J		NA	7.6E-08	0.003 J		NA	7.6E-08
Endrin	72-20-8	NA	1700	Liver					0.0017 J		NA	1.0E-06									0.002 J		NA	1.1E-06								
Endrin aldehyde	7421-93-4	NA	1700	Liver	0.0012 J		NA	7.1E-07					0.003 J		NA	1.9E-06	0.002 J		NA	8.8E-07	0.003 J		NA	1.5E-06					0.002 J		NA	1.4E-06
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver	0.0029 J		NA	4.6E-05	0.0018 J		NA	2.9E-05													0.0016 J		NA	2.5E-05				
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney																									0.003 J		1.3E-09	2.4E-05
gamma-Chlordane	5103-74-2	130	2800	Liver					0.0028 J		2.2E-11	1.0E-06	0.003 J		2.2E-11	1.0E-06					0.006 J		4.2E-11	2.0E-06	0.0011 J		8.5E-12	3.9E-07	0.007		5.2E-11	2.4E-06
Heptachlor	76-44-8	0.048	19	Liver									0.002 J		4.0E-08	1.0E-04					0.003 J		6.7E-08	1.7E-04					0.003 J		5.6E-08	1.4E-04
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver	0.0023		1.6E-08	7.9E-04	0.0018 J		1.3E-08	6.2E-04					0.002 J		1.5E-08	7.2E-04					0.0019 J		1.4E-08	6.6E-04	0.003 J		1.9E-08	9.0E-04
Methoxychlor	72-43-5	NA	28000	Reproductive					0.0055 J		NA	2.0E-07	0.008 J		NA	2.9E-07																
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	360	4000	Reproductive																												
Total Non-Dioxin-Like PCBs	--	1.2E+08	NA	Cancer																												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	360	4000	Reproductive																												
Total Risk/Hazard Index	--	--	--	--	--		3.3E-07	3.1E-03	--		4.1E-07	2.8E-03	--		5.1E-07	2.5E-03	--		3.7E-07	3.1E-03	--		6.5E-07	3.3E-03	--		2.4E-07	2.3E-03	--		4.5E-07	3.4E-03

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

Table 15 - Detections in Pore Water (September 2013) - Recreational User Risk Estimates
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

Analyte	CAS Number	RSL - Cancer[1]	RSL - Non-cancer[2]	Target Organ	3301-00 9/10/2013				3301-02 9/10/2013				3302-00 9/10/2013				3302-02 9/10/2013				3302-04 9/10/2013				3303-00 9/10/2013				3303-02 9/10/2013			
					Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index	Result	Flag	Cancer Risk	Hazard Index
SVOCs (ug/L)																																
1,4-Dioxane	123-91-1	420	160000	Liver, Kidney																	0.15 J		3.6E-10	9.4E-07					0.23 J		5.5E-10	1.4E-06
2-Methylnaphthalene	91-57-6	NA	780	Respiratory																												
4-Methylphenol	106-44-5	NA	570000	Respiratory																												
Acenaphthene	83-32-9	NA	11000	Liver																												
Acenaphthylene	208-96-8	NA	11000	Liver																												
Anthracene	120-12-7	NA	31000	None Reported																												
Benzaldehyde	100-52-7	NA	280000	Gastrointestinal, Kidney																												
Benzo(a)anthracene	56-55-3	14	NA	Cancer																												
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer																												
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer																												
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney																												
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer																												
Chrysene	218-01-9	1400	NA	Cancer																												
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer																												
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood																												
Fluorene	86-73-7	NA	230000	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer																												
Naphthalene	91-20-3	NA	8100	Body Weight																												
Pentachlorophenol	87-86-5	120	28000	Liver																												
Phenanthrene	85-01-8	NA	3100	Kidney																												
Pyrene	129-00-0	NA	1900	Kidney																												
PAHs SIM (ug/L)																																
2-Methylnaphthalene	91-57-6	NA	780	Respiratory					0.007 J	NA	9.2E-06		0.009 J	NA	1.1E-05		0.005 J	NA	6.7E-06		0.016 J	NA	2.1E-05		0.007 J	NA	8.8E-06		0.006 J	NA	7.7E-06	
Acenaphthene	83-32-9	NA	11000	Liver					0.022 J	NA	2.0E-06		0.026 J	NA	2.4E-06		0.13	NA	1.2E-05		0.24	NA	2.2E-05		0.028 J	NA	2.5E-06		0.48	NA	4.4E-05	
Acenaphthylene	208-96-8	NA	11000	Liver									0.005 J	NA	4.6E-07		0.01 J	NA	9.1E-07		0.016 J	NA	1.5E-06		0.006 J	NA	5.3E-07		0.012 J	NA	1.1E-06	
Anthracene	120-12-7	NA	31000	None Reported					0.023 J	NA	7.4E-07						0.028 J	NA	9.0E-07		0.041 J	NA	1.3E-06		0.02 J	NA	6.5E-07		0.064 J	NA	2.1E-06	
Benzo(a)anthracene	56-55-3	14	NA	Cancer					0.013 J	9.3E-10	NA		0.006 J	3.9E-10	NA		0.07 J	5.0E-09	NA		0.08 J	5.7E-09	NA						0.008 J	5.8E-10	NA	
Benzo(a)pyrene	50-32-8	1.4	NA	Cancer													0.04 J	2.9E-08	NA		0.045 J	3.2E-08	NA									
Benzo(b)fluoranthene	205-99-2	14	NA	Cancer					0.01 J	6.8E-10	NA						0.055 J	3.9E-09	NA		0.066 J	4.7E-09	NA									
Benzo(g,h,i)perylene	191-24-2	NA	170000	Kidney													0.019 J	NA	1.1E-07		0.026 J	NA	1.5E-07									
Benzo(k)fluoranthene	207-08-9	140	NA	Cancer													0.021 J	1.5E-10	NA		0.019 J	1.4E-10	NA									
Chrysene	218-01-9	1400	NA	Cancer					0.011 J	7.9E-12	NA		0.006 J	4.1E-12	NA		0.056 J	4.0E-11	NA		0.063 J	4.5E-11	NA						0.006 J	4.2E-12	NA	
Dibenzo(a,h)anthracene	53-70-3	1.4	NA	Cancer													0.006 J	4.5E-09	NA		0.007 J	5.0E-09	NA									
Fluoranthene	206-44-0	NA	230000	Liver, Kidney, Blood	0.021 J	NA	9.1E-08		0.061 J	NA	2.7E-07		0.029 J	NA	1.3E-07		0.11	NA	4.8E-07		0.12	NA	5.2E-07		0.035 J	NA	1.5E-07		0.055 J	NA	2.4E-07	
Fluorene	86-73-7	NA	230000	Blood																												
Indeno(1,2,3-cd)pyrene	193-39-5	14	NA	Cancer													0.019 J	1.4E-09	NA		0.026 J	1.9E-09	NA									
Naphthalene	91-20-3	NA	8100	Body Weight	0.018 J	NA	2.2E-06		0.028 J	NA	3.5E-06		0.036 J	NA	4.4E-06		0.02 J	NA	2.5E-06		0.032 J	NA	4.0E-06		0.014 J	NA	1.7E-06		0.016 J	NA	2.0E-06	
Pentachlorophenol	87-86-5	120	28000	Liver	0.2 R	1.7E-09	7.1E-06		0.2 R	1.7E-09	7.1E-06		0.2 R	1.7E-09	7.1E-06		0.2 R	1.7E-09	7.1E-06		0.2 R	1.7E-09	7.1E-06		0.2 R	1.7E-09	7.1E-06		0.2 R	1.7E-09	7.1E-06	
Phenanthrene	85-01-8	NA	3100	Kidney	0.014 J	NA	4.5E-06		0.047 J	NA	1.5E-05		0.028 J	NA	9.0E-06		0.034 J	NA	1.1E-05		0.089 J	NA	2.9E-05		0.015 J	NA	4.8E-06		0.09 J	NA	2.9E-05	
Pyrene	129-00-0	NA	1900	Kidney	0.049 J	NA	2.6E-05		0.076 J	NA	4.0E-05		0.024 J	NA	1.3E-05		0.16	NA	8.4E-05		0.18	NA	9.5E-05		0.03 J	NA	1.6E-05		0.093 J	NA	4.9E-05	
Pesticides (ug/L)																																
4,4'-DDD	72-54-8	0.72	NA	Cancer																												
4,4'-DDE	72-55-9	140	NA	Cancer																												
4,4'-DDT	50-29-3	140	2800	Liver	0.01	7.1E-11	3.6E-06		0.001 J	1.0E-11	5.0E-07		0.007 J	5.1E-11	2.6E-06						0.002 J	1.1E-11	5.7E-07		0.008 J	5.9E-11	3.0E-06					
Aldrin	309-00-2	2.8	170	Liver																												
alpha-BHC	319-84-6	0.34	2900	Liver																												
alpha-Chlordane	5103-71-9	2.3	70	Liver	0.002 J	8.7E-10	2.9E-05										0.003 J	1.1E-09	3.7E-05													
beta-BHC	319-85-7	1.2	NA	Cancer																												
delta-BHC	319-86-8	0.34	2900	Liver																												
Dieldrin	60-57-1	0.055	7.6	Liver	0.014	2.5E-07	1.8E-03		0.008	1.5E-07	1.1E-03		0.012 J	2.2E-07	1.6E-03		0.009	1.7E-07	1.2E-03		0.002 J	4.2E-08	3.0E-04		0.012	2.2E-07	1.6E-03		0.005	8.2E-08	5.9E-04	
Endosulfan I	959-98-8	NA	34000	Body Weight																												
Endosulfan II	33213-65-9	NA	34000	Body Weight	0.004 J	NA	1.3E-07						0.003 J	NA	7.4E-08										0.003 J	NA	9.4E-08					
Endrin	72-20-8	NA	1700	Liver									0.002 J	NA	9.4E-07										0.003 J	NA	1.8E-06					
Endrin aldehyde	7421-93-4	NA	1700	Liver																					0.003 J	NA	1.6E-06					
Endrin ketone	53494-70-5	NA	63	Central Nervous System, Liver																												
gamma-BHC (Lindane)	58-89-9	2	110	Liver, Kidney																												
gamma-Chlordane	5103-74-2	130	2800	Liver													0.002 J	1.6E-11	7.5E-07													
Heptachlor	76-44-8	0.048	19	Liver																	0.001	2.5E-08	6.3E-05									
Heptachlor epoxide	1024-57-3	0.14	2.9	Liver	0.002 J	1.4E-08	6.9E-04																									
Methoxychlor	72-43-5	NA	28000	Reproductive																												
PCBs (pg/L)																																
Total Dioxin-Like PCBs	--	360	4000	Reproductive																												
Total Non-Dioxin-Like PCBs	--	1.2E+08	NA	Cancer																												
Dioxins (pg/L)																																
Total TEQ	3333-30-0	360	4000	Reproductive																												
Total Risk/Hazard Index	--	--	--	--	--	2.7E-07	2.6E-03		--	1.5E-07	1.1E-03		--	2.2E-07	1.6E-03		--	2.2E-07	1.4E-03		--	1.2E-07	5.5E-04		--	2.2E-07	1.6E-03		--	8.5E-08	7.4E-04	

Cancer risks greater than 1E-05 and less than or equal to 1E-04 are shaded gray with bold black font.
Cancer risks greater than 1E-4 or hazard indices greater than 1 are shaded black with bold white font.

1 - Cancer RSLs are for combined (child + adult) recreational user exposures.
2 - Non-cancer RSLs are for child recreational user exposures.

APPENDIX H-2

EVALUATION OF PREVIOUS BERA

Technical Evaluation – Evaluation of Previous Investigations to Determine Ecological Risks from Pore Water Data
Lower Darby Creek Area Site
Operable Unit 3 (OU-3) - Clearview Landfill Groundwater
Delaware and Philadelphia Counties, Pennsylvania

This document presents a brief evaluation of the previous investigations conducted in the Lower Darby Creek Area site to determine whether the chemical concentrations in the pore water samples collected from Darby Creek are likely to impact ecological receptors. The evaluation of ecological risks to the pore water sample was previously presented in the Technical Evaluation – Ecological and Human Health Evaluation of Pore Water Data Lower Darby Creek Area Site. Numerous inorganic and organic chemicals in the pore water samples were detected at concentrations that exceeded their respective United States Environmental Protection Agency (EPA) Region 3 Biological Technical Assistance Group (BTAG) Freshwater Surface Water Screening Benchmarks, indicating that potential impacts to sediment invertebrates exposed to these chemicals in pore water are possible.

A screening level risk assessment (SLERA) was conducted in 2006 and based on the finding of potential ecological risks, a baseline ecological risk assessment (BERA) was conducted in 2008 for Clearview Landfill. In addition, Remedial Investigation (RI) is currently being conducted for Folcroft Landfill. Ecological data from both the BERA for Clearview Landfill and the RI for Folcroft Landfill are discussed below to determine whether any of these data can be used to further evaluate the pore water data.

Baseline Ecological Risk Assessment for Clearview Landfill

The BERA for Clearview Landfill/Lower Darby Creek Area Site was conducted for EPA by Lockheed Martin in 2008. As part of the BERA, aquatic toxicity tests were conducted in site seep and surface water samples, and sediment toxicity tests were conducted on sediment samples. The following sections summarize the results of those tests and whether they can be used to evaluate the pore water data.

Aquatic Toxicity Tests

96-hour static renewal acute toxicity tests using the fathead minnow (*Pimephales promelas*) were conducted on two seep leachate sample locations (LS-LC02 and LS-LC05) and one Darby Creek surface water station (SW22) situated just downstream of the seep discharge points to assess if seep water was causing acute toxicity. The leachate samples were collected because they had the highest COPC concentration observed during the RI; the surface water sample was collected as a reference sample. The following describes each of the sample locations:

- LS-LC02 was located half-way down the Clearview Landfill footprint, south of Location LS-LC05
- LS-LC05 was located half-way down the Clearview Landfill footprint
- SW22 was located half-way down the Clearview Landfill footprint, north of Hood Road

The endpoints of the test were survival, appearance, and behavior of the minnows. The results of the toxicity test are presented in the following table:

Fathead Minnow (*Pimephales promelas*) 96-Hour Static Renewal Toxicity Test Results

	Sampling Stations		
	LC02	**LC05**	**SW22**
Test Concentrations	96-Hour Percent Survival		
Control	90	90	90
25%	95	90	90
50%	85	90	95
100%	95	95	85
	96-Hour LC_{50}		
	>100%	>100%	>100%

96-Hour LC_{50} - Lethal Concentration Causing 50% Mortality

Table 1 presents the metals results for all of the surface water, leachate, and seep samples for the samples collected for the Remedial Investigation. Only the metals results are shown because most of the other results were non-detects. The three sample locations that were selected for the aquatic toxicity test are highlighted. As can be seen from the table, the total metals results in the leachate samples from these locations are very high for several metals, including aluminum, copper, iron, lead, and zinc. However, the dissolved metals results for these metals were mostly non-detect. This indicates that there was probably a lot of suspended solids in the sample which is supported by the fact that the turbidity in the samples was greater than 1,000 NTU. Note that these particular water samples were not used for the aquatic toxicity tests; however, because they were collected in 2002 and the toxicity tests were conducted in 2006. The water samples used for the aquatic toxicity tests were not analyzed chemical parameters so there is uncertainty in using the results of the 2002 surface water data to evaluate the toxicity test data. This is actually stated as an uncertainty in the BERA which says: "Uncertainties associated with the use of historical data include the possibility that site conditions have changed since the data were collected; and the uncertainty as to whether samples collected for laboratory bioaccumulation studies are collocated with environmental media samples collected earlier."

Although the metals concentrations were very high in the leachate samples, the samples were not acutely toxic to the minnows. There could be at least two reasons for this. The concentrations of dissolved metals may have been very low, and it is the dissolved portion that is bioavailable and therefore toxic to aquatic

organisms. Also, it is possible that the metals concentrations in the samples used for the aquatic toxicity tests in 2006 were much lower than the concentrations in the samples collected in 2002. Nevertheless, the results show that the leachate samples were not acutely toxic to fish.

The metals concentrations in the leachate samples collected from the same locations that were sampled for the toxicity tests were much greater than the concentrations in any of the 2013 pore water samples. However, as discussed above, the actual concentrations of metals in the samples that were tested is not known. Assuming that the concentrations of metals in the leachate used for the toxicity tests were similar to the concentrations in the 2002 samples, the pore water should not be acutely toxic to aquatic organisms. Although these is uncertainty in this assumption, because the leachate was not acutely toxic to fish it is not likely that the pore water would be acutely toxic to fish or other aquatic organisms. This is because the leachate likely contains greater concentrations of metals than the pore water, since the pore water consists of a mixture of groundwater and overlying surface water.

Sediment Toxicity Test

As part of the BERA, toxicity tests were also conducted from six station locations in Lower Darby Creek. Three of the stations (SD-19, SD-22, and SD-24) were situated adjacent to the Clearview Landfill and three stations (SD-25, SD-28, and SD-30) were situated downstream of the site. One background sample was also collected, but the exact location was not noted in the BERA report. The following tables present the results of the sediment toxicity tests.

***Hyalella Azteca* (42-Day) Chronic Sediment Toxicity Results**

	Percent Survival			Growth Mean Dry Weight (mg)		Reproduction Mean # Young/ Female
Sample ID	28-day	35-day	42-day	28-day	42-day	35 and 42-day
Control	95	95	92.5	0.393	0.547	6.55
SD-Background	83.3	80	76.3	0.348	0.6	5.86
SD-19	90	88.8	83.8	0.286	0.502	5.62
SD-22	63.6*	66.3*	62.5*	NA	NA	NA
SD-24	80.8*	81.3	78.8	0.414	0.546	5.51
SD-25	90	77.5	75	0.354	0.547	5.32
SD-28	70.8*	68.8*	62.5*	NA	NA	NA
SD-30	85.8*	83.8*	81.3*	NA	NA	NA

***Chironomus Tentans* (Life Cycle) Chronic Sediment Toxicity Results**

Sample ID	Percent Survival** Day 20	Growth Mean Dry Weight (mg) *** Day 20	Total Emergence of Adults	Reproduction Total # of Eggs / Female
Control	81.3	1.41	67	965
SD-Background	58.3*	NA	NA	NA
SD-19	95.8	1.36	77	918
SD-22	91.7	1.54	76	945
SD-24	85.4	1.3	67	742*
SD-25	85.4	1.37	74	662*
SD-28	83.3	1.4	73	901
SD-30	89.6	1.86	76	1012

* Significantly different when compared with control
** Final Live Count includes larvae, pupae, and emerged adults
*** Only surviving larvae were used for dry weight data
NA - not applicable due to reduced survival results
mg - milligrams

The conclusions from the BERA were that adverse effects in the *Hyalella* study were evident from a decline in survival of the *Hyalella* for three of the sediments collected at SD-22, SD-28, and SD-30. Neither growth nor reproduction could be determined for these three sediment samples because of the reduced survival results. The authors also found adverse effects in the *Chironomus* study was limited to a slight depression of reproduction (total number of eggs produced per female) compared with the control group reproduction. The same issues surrounding the uncertainty with the surface water toxicity tests apply to the sediment toxicity tests. Primarily, the samples for chemical analysis were collected several years before the samples for toxicity tests were collected, so there is uncertainty regarding the chemical concentrations in the samples that underwent toxicity testing. Also, the BERA did not correlate the toxicity test results with the chemical concentrations to develop site-specific risk levels. Therefore, the results of the sediment toxicity testing cannot be used to evaluate whether the chemical concentrations in the pore water sample are impacting invertebrates living in the sediment. Although sediment at several locations was toxic to sediment invertebrates in several of the toxicity test samples, it is not known whether the source of the toxicity was chemicals in sediment, chemicals in pore water, a combination of both, or some other reason.

Folcroft Landfill RI

As part of the Folcroft RI, Lower Darby Creek, and the surrounding marshes was divided into 35 decision units (DUs) varying in size. One of the DUs, DU23, which was the most upstream DU, was located adjacent to Clearview Landfill. In each of the DUs, one incremental sample, each consisting of 50 increments, was

collected for chemical analysis in 2012. The top 3 inches of sediment/hydric soil (O and A horizon) below accumulated leaf litter was collected from each increment.

In addition to the incremental samples, sediment core samples using a vibracore were collected from 25 locations in 2012. Due to laboratory analytical data quality issues associated with a portion of the samples collected during the 2012 field effort, the EPA Region III requested that EA re-collect vibracore sediment samples at 15 of the original 25 sampling locations for chemical analysis to confirm the presence or absence of site-specific COPCs in sediment; A total of 12 locations were ultimately re-sampled. One of the vibracore locations, LDC-VIB-25, was collected adjacent to Clearview Landfill. This location was also resampled in 2014 because of the laboratory issues.

As part of the 2012 and 2014 sampling events, sediment toxicity tests were conducted on select samples. The results of the 2012 testing was presented in the Revised Draft Field Report for Remedial Investigation/Feasibility Study (RI/FS) Oversight, Lower Darby Creek Area Superfund Site, Operable Unit 2, Folcroft Landfill. None of the samples selected for toxicity testing were located in DU23. Therefore, the toxicity testing that was conducted as part of the Folcroft RI cannot be used to determine whether benthic invertebrates adjacent to Clearview Landfill are being impacted from chemicals in the pore water.

Summary and Recommendations

In summary, based on the results of the aquatic toxicity tests conducted as part of the BERA for Clearview Landfill/Lower Darby Creek, it is not likely that the pore water samples would be acutely toxic to fish and other aquatic organisms represented by the fish toxicity test. There is some uncertainty in this, however, because the concentrations of metals in the toxicity test samples is not known. The sediment toxicity tests from the BERA indicated that the sediment was toxic to benthic invertebrates, but the source of the toxicity is not known as no correlations were made between toxicity and chemical concentrations in sediment. Finally, although sediment toxicity tests were conducted as part of the Folcroft RI, none of the toxicity tests were conducted in the area adjacent to Clearview Landfill.

Based on the above, the following is recommended to determine whether the pore water is toxic to aquatic organisms:

- The pore water samples were not filtered so the metals results are total concentrations, not dissolved concentrations. Because of this, potential impacts from metals are likely overestimated because generally only the dissolved portion of metals in surface/pore water is bioavailable to aquatic organisms, and dissolved concentrations is typically much lower than the total

concentrations. The detection of the numerous PCBs and PAHs in the pore water samples indicates that the samples likely had suspended solids because PCBs and PAHs generally any not very water soluble. Therefore, pore water should be re-sampled and analyzed for dissolved metals to see whether concentrations are less than screening levels. If dissolved metals concentrations are similar to or less than screening levels, it is not likely that metals in pore water would impact aquatic organisms.

- The BTAG values for organic chemicals should be reviewed to determine whether there are updated values that are more appropriate for use as screening levels.
- If dissolved metals concentrations are still elevated in the pore water samples compared to screening benchmarks, aquatic invertebrate chronic toxicity tests (i.e., using *Ceriodaphnia dubia*) could be conducted on the pore water to determine whether the pore water is toxic, or whole sediment toxicity tests (i.e., using H*yalella azteca*) could be conducted to determine whether the sediment is toxic.

Table 1
Surface Water and Leachate Substances Detected
Lower Darby Creek Area
Page 1 of 2

			Tinicum Marsh											Darby Creek (adjacent to Landfill)										
	Analyte	Units	SW35	SW34	SW31	SW37	SW38	SW33	SW30	SW32	SW36	SW29	SW28	SW27	SW26	SW25	SW24	SW23	SW22	LS02	LS01	LS04	SW21	LS05	LS03	LD-SEEP2	LD-SEEP4
DISSOLVED METALS	aluminum	ug/L	58.5	0 B	0 B	0 UL	0	0	0 B	0	0	0 UL	0 UL	0 UL	0	0 B	0	0	**0 UL**	**0**	95.3	0	0 UL	**0**	0	73 J	35900 L
	antimony	ug/L	0	2.2	0	0	2.1	0	0	0	0	0	0	0	0	0	0	0	**0**	**0 B**	4	0	0	**0**	0	0 UL	4.8 J
	arsenic	ug/L	0	0 B	0 B	0	0 B	0 B	0	0 B	0 B	0 B	0 B	0 B	0 UL	0 UL	0 UL	0 UL	**0 UL**	**0**	0	0	2.5 L	**0**	2.8 J	18.9 L
	barium	ug/L	26.2	29.9	41.3	32.2	39.4	37.6	34.3	36.6	34.5	38.9	60.2	65.4	63.7	64.2	70	69.5	**71.3**	**122**	0 B	0 B	74.5	**0 B**	0	218 L	1270 L
	beryllium	ug/L	0 B	0 B	0 B	0 UL	0	0	0 B	0	0	0 UL	0 UL	0 UL	0	0	0	0	**0**	**0**	0	0 B	0	**0 B**	0	0 UL	2 J
	cadmium	ug/L	0	0	0	0	0	0	0	0	0	0	0	3.7	21.9	0	0	0	**0**	**0**	0	0	0	**0**	0	0 UL	4.7 J
	calcium	ug/L	15500	15800	18700	16400	24400	25000	18000	25500	25100	18100	26900	29700	29300	30000	31500	31700	**33200**	**38000**	34500	32400	35400	**31200**	32400	155000 L	141000 L
	chromium, total	ug/L	0	0	0	0	1 K	0	0	2.1 K	0	0	0	0	0	0	0	0	**0**	**4.8**	0 B	0 B	0	**0 B**	0	28 L	135 L
	cobalt	ug/L	0	0 B	0	0	0	0	0	0	0	0	0	0	0	0 B	0	0	**0**	**2.6**	0 B	0	0	**0**	0	13.7 J	35.6 J
	copper	ug/L	0 UL	0 UL	0 UL	0 UL	0 B	0 B	0 UL	0	0 B	0 B	0	0 B	0 B	0	0	0 B	**0**	**0 B**	0 B	0 B	0	**0 B**	0	2.4 J	199 L
	iron	ug/L	63.5	250	160	68.1	217	201	157	195	172	105	73.5	245	484	151	94	68.6	**81.1**	**555**	265	124	88.4	**156**	101	1090 L	72400 L
	lead	ug/L	0	0	0	0	0 UL	0 UL	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	**0 UL**	**0 B**	0 B	0 B	0 UL	**0 B**	0	0 UL	537 L
	magnesium	ug/L	5410	5560	7220	6110	10300	10600	6600	10600	10500	7360	11700	12900	12900	13100	13800	14000	**14200**	**31100**	14400	13800	15100	**13200**	13400	102000 L	75000 L
	manganese	ug/L	62.9	112	151	129	150	78.4	133	69.7	36.7	123	78.6	80.4	92.1	93.3	70	48	**64.1**	**206**	72.7	66	57.3	**77.2**	52.7	450 L	1420 L
	mercury	ug/L	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0	0	0	0	0	0	0	**0**	**0**	0	0	0	**0**	0	0 UL	4.3 L
	nickel	ug/L	1.5	1.7	2.2	0	1.2 K	1.4 K	2	2 K	1.3 K	2.4	1.3	1.4	2	1.9	1.5	1.6	**0 B**	**3.1**	2.3	1.4	0 B	**0.97**	1.4	15.4 J	53.4 L
	potassium	ug/L	1970	2390	3220	1830	2450	2500	2720	2340	2540	3000	3910	3810	3440	3440	3640	3550	**3470**	**35900 J**	6180 J	4840 J	3520	**4210 J**	4290	119000 L	95400 L
	selenium	ug/L	0	0	0	0	0 UL	0 UL	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	**0 UL**	**0**	0	0	0 UL	**0**	0	0 UL	6.3 J
	silver	ug/L	0	1.3	0	1.4	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**	0	0	0	**0**	0	0 UL	0 UL
	sodium	ug/L	12600	12000	13200	13100 J	44400	46700	13100	43200	45700	14300 J	19800 J	21000 J	21200 J	21000 J	22600 J	22300 J	**22200 J**	**135000**	32800	26000	23400 J	**23000**	24100	672000 L	437000 L
	thallium	ug/L	0 UL	0 UL	0 UL	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 B	0	0 B	0 B	0	0	0	**0 B**	**0**	0	0	0	**0**	0	0 UL	0 UL
	vanadium	ug/L	1.3	2.7	1.6	1.1	2.8	3	1.3	3.2	5	1.2	0	0	0	0	0	0	**0**	**4.4**	4.6	0 B	0	**0 B**	0	9.9 J	114 L
	zinc	ug/L	0 B	0 B	0 B	0 UL	0 B	0 B	0 B	0 B	0 B	0 UL	71.6	0 UL	0 UL	0 UL	0 UL	0 UL	**2.2**	**0 B**	0 B	0 B	0	**0 B**	0	0 B	654 L
TOTAL METALS	aluminum	ug/L	816 J	638 J	1340 J	206	1250 J	797 J	0 B	1110 J	1820 J	207	0 B	0 B	0 B	0 B	0 B	0 B	**93.3**	**95800 L**	72300	34600	0 B	**403000**	43900	3150 L	0 B
	antimony	ug/L	0	2.2	0	0	0	0	0	0	0	0	0	0	0	2.3	0	0	**0**	**3.7 L**	1.7 L	3 L	0	**0 UL**	2.1	0 UL	0 UL
	arsenic	ug/L	2.4	2.9	2.1	0 UL	9.4	9	2.2	6.9	7.7	0 UL	0 UL	0 UL	4.4 L	0 UL	0 UL	0 UL	**0 UL**	**53.2 L**	18.8	18.7	0 UL	**57.9**	0	8.8 J	3.7 J
	barium	ug/L	34.9	39.1	51	36.1	70.5	68.4	38.7	65	70.4	41.8	62.3	66.5	75	73.9	75.3	74.6	**77.3**	**6280 L**	1400	1060	72.1	**8030**	10200	526 L	228 L
	beryllium	ug/L	0 B	0	0 B	0 UL	0	0	0 B	0 B	0	0 B	0 UL	0 UL	0 UL	0	0 UL	0 UL	**0**	**6.3 L**	3.5	2.4	0	**15.1**	4.4	0 UL	0 UL
	cadmium	ug/L	0	0	0	0	0	0	0	0	0	1.9	0	0	0	0	0	0	**0**	**24.5 L**	4	8.8	0	**19.9**	11	0 UL	0 UL
	calcium	ug/L	16900	16900	18400	16300	27700	29200	18100	28400	27500	18100	26500	28500	32400	32500	32700	31700	**34600**	**213000 L**	69400	76100	32700	**257000**	428000	153000 L	127000 L
	chromium, total	ug/L	3 K	2.7 K	3.7 K	1.1	3.1 K	2.5 K	1.4 K	2.9 K	4.3 K	1.1	0	0	0	0	0	0	**0**	**290 L**	229	102	0	**723**	145	43.9 L	21.1 L
	cobalt	ug/L	0	0	0	0	0	0	0	2.7 K	0	0	0	0	2.1	0	2.1	0	**0**	**48.3 L**	34.8	28.2	0	**139**	42.7	18.3 J	11.6 J
	copper	ug/L	0 B	0 B	0 B	0	0 B	0 B	0 UL	0 UL	0 B	0	0 B	0 B	0 B	0 B	0 B	0 B	**1.5**	**1350 J**	412 J	548 J	0	**3040 J**	437	45.1 L	3.1 J
	cyanide	ug/L																								14.2 L	16 L
	iron	ug/L	1330	1400	2290	639	3730	3230	912	3420	4220	777	500	420	541	554	479	393	**453**	**139000 L**	95200	75400	280	**396000**	104000	24100 L	910 L
	lead	ug/L	1 K	2.3 L	6.6	0 UL	15.1	11.7	0	12.7	14.6	0 UL	0 UL	0 UL	0 UL	1.2 L	0 UL	0 UL	**0 UL**	**7270 L**	836	1160	0 UL	**2400**	530	45.6 L	2.8 J
	magnesium	ug/L	5990	6240	7150	6250	11800	12300	6710	11700	11800	7480	11700	12500	14400	14300	14300	14300	**14700**	**205000 L**	47400	46700	14200	**144000**	158000	97000 L	69800 L
	manganese	ug/L	105	169	197	137	596	585	144	503	544	129	84.3	80.6	114	113	83.1	53.2	**76.3**	**2220 L**	1070	1360	56.5	**7000**	5100	501 L	450 L
	mercury	ug/L	0 UL	0 UL	0 UL	0	0 UL	0 UL	0 UL	0 UL	0 UL	0	0	0	0	0	0	0	**0**	**14.4 L**	2.2 L	1.4 L	0	**54.4 L**	7.6	0 B	0 B
	nickel	ug/L	3.2	2.9 K	3.6	0 B	4.8 K	4.4 K	2.3	4.3	5.5 K	1.9	1.7	1.7	1.6	1.7	2.2	1.4	**0 B**	**148 J**	89.1 J	79 J	0 B	**249 J**	81.8	22.4 J	13.3 J
	potassium	ug/L	2200	2720	3290	2130	3300	3590	2730	3600	3460	2800	3920	4070	3950	3830	3750	3820	**3460**	**192000 J**	54300 J	31700 J	3440	**216000 J**	224000	116000 L	100000 L
	selenium	ug/L	0	0 UL	0	0 UL	0 UL	0 UL	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	**0 UL**	**5.5 L**	4.7	4.7	0 UL	**0**	3.2	0 UL	0 UL
	silver	ug/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**11.2 L**	2.9	5.7	0	**0**	0.99	0 UL	0 UL
	sodium	ug/L	14400	12800	12800	14200 J	48900	48400	13100	45200	45300	14400 J	19800 J	20900 J	23200 J	22900 J	22700 J	23100 J	**22700 J**	**724000 J**	167000 J	94500 J	23400 J	**1280000 J**	906000	638000 L	474000 L
	thallium	ug/L	0 UL	0 UL	0 UL	2.2 K	0 UL	0 UL	0 UL	0 UL	0 UL	0	0	0	0	0	2.4	0	**0**	**6.2 J**	0	0	2 J	**35**	0	0 UL	0 UL
	vanadium	ug/L	3.2	3.5	5.3	1.8	10.4	9.9	2.6	10.1	12.5	1.8	1.5	1.4	1.5	1.5	1.3	1.2	**0**	**513 L**	181	117	0	**615**	189	31.7 J	7.6 J
	zinc	ug/L	0 B	0 B	0 B	5.6	0 B	0 B	0 B	0 B	48.5	0 UL	0 UL	0 UL	0 UL	2.3 L	2.8 L	2.1 L	**14.8**	**6070 J**	865 J	2000 J	5.2	**3200 J**	2890	89.8 L	0 UL
	cyanide	ug/L	0	0	0	2.1	0	0	0	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	**0 UL**	**299**	0 B	13.9	2.8 L	**22.3**	60.7		

Shaded cells are samples selected for aquatic toxicity test.

Table 1
Surface Water and Leachate Substances Detected
Lower Darby Creek Area

					Darby Creek (North of Landfill)										Cobbs Creek (North of Landfill)									
	Analyte	Units	LD-SEEP6	LD-SEEP5	SW10	SW09	SW08	SW07	SW06	SW05	SW04	SW03	SW02	SW01	SW20	LD-SEEP3	SW19	SW18	SW17	SW16	SW15	SW14	SW13	SW12	SW11
DISSOLVED METALS	aluminum	ug/L	64.6 J	43900 L	0 B	0 UL	0 B	0 UL	27.4 L	0 UL	0 B	0 B	0 B	0 B	0 UL	6980 L	0 UL	0 B	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL
	antimony	ug/L	0 UL	3.3 J	0	0	0	0	0	0	0	0	0 B	0 B	0	2.9 J	2.2	2.8	0	0	0	0	0	0
	arsenic	ug/L	0 UL	15.7 L	0 UL	0 UL	0 UL	0	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	7 J	0 UL	0 UL	0	0 B	4.4 L	0	0	3.2
	barium	ug/L	592 L	2030 L	70.8	70.3	95	80	80.2	79.5	82	80.1	80.7	79.5	67.2	704 L	60.9	45.7	59.9	71.3	39.2	73.4	73.7	73.5	63.3
	beryllium	ug/L	0 UL	1.9 J	0 B	0	0	0 UL	0 UL	0 UL	0	0	0	0	0	0 UL	0 UL	0	0 UL	0 UL	0	0 UL	0 UL	0 UL	0 UL
	cadmium	ug/L	0 UL	1.2 J	0	0	0	0	0	0	0	0	0	0	0	0 UL	0	0	0	0	0	0	0	0	0
	calcium	ug/L	154000 L	114000 L	31300	31400	36300	32800	33500	33300	34000	33300	33900	33800	30500	98500 L	34300	24900	33500	42400	21000	43400	41900	43100	43600
	chromium, total	ug/L	3.3 J	161 L	0	0	0	0	0	0	0	0	0	0	0	80.6 L	0	1.2	0	0	1.1	0	0	0	0
	cobalt	ug/L	3.8 J	48.6 J	0	0	0	0	0	0	0	0	0	0	0	25.4 J	0	0	0	2.4	0	0	0	0	0
	copper	ug/L	0 UL	129 L	0	0	0 B	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0	37.2 L	1.3	5.6	0 UL	0 UL	6.6	0 UL	0 UL	0 UL	0 UL
	iron	ug/L	47300 L	95100 L	123	90	415 J	71.4	124	55.5	58 J	48.6 J	65.7 J	52 J	102	20100 L	322	266	338	298	321	381	581	303	382
	lead	ug/L	4.4 J	268 L	0 UL	0 UL	3.3	0 UJ	0 UJ	0 UJ	0	0	0	0	0 UL	54.2 L	0 UL	0 UL	0	0 UJ	0 UL	0 UJ	0 UJ	0 UJ	0
	magnesium	ug/L	53400 L	109000 L	14200	13700	15800	14300	14700	14500	14800	14600	14800	14900	13400	103000 L	11800	7500	11100	15000	5970	15300	15000	15300	14600
	manganese	ug/L	520 L	1390 L	37	20.9	75.7	29.5	19.4	16.9	23.2	20.1	19.9	12.7	38	470 L	80.5	245	314	106	275	163	201	106	388
	mercury	ug/L	0 UL	2.2 L	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0	0 B	0	0	0 UL	0 UL	0	0 UL	0 UL	0 UL	0 UL
	nickel	ug/L	9.6 J	61.8 L	1.5	0 B	2.1	0 UL	0 UL	0 UL	1.1	0	0	0	0 B	32.7 J	0 B	0 B	1.4	1.2 L	0 B	1.6 L	0 UL	1.3 L	0
	potassium	ug/L	29700 L	145000 L	3300	3380	3840	3360	3380	3450	3580	3270	3520	3630	3360	180000 L	4880	4010	4120	4720	3810	4900	4890	4620	4840
	selenium	ug/L	0 UL	7.5 J	0 UL	0 UL	0 UL	3.2 K	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	2.2 L	0	0	0 UL	0	0	0	0
	silver	ug/L	0 UL	0 UL	0	0	0	0	0	0	0	0	0	0	0	0 UL	0	0	0	0	0	0	0	0	0
	sodium	ug/L	67000 L	633000 L	24300 J	20500 J	23200	22300 J	21600 J	22200 J	22500	21600	22200	22500	21400 J	1070000 L	23700 J	16500 J	21500 J	27300 J	14100 J	28500 J	28100 J	27700 J	26600 J
	thallium	ug/L	0 UL	0 UL	0	0 B	0	0 B	0	0	0	0	0 B	0	0	0 UL	0 B	0 UL	0 B	0 B	0 B	0 B	0 B	0	0
	vanadium	ug/L	1.1 J	129 L	0	1	1.4	0	0	0	0	0	0	0	0	54.9 L	0	2.6	0	0	2.6	0	0	0	1.6
	zinc	ug/L	38.2 J	834 L	0 UL	0	0 B	0 UL	0 UL	0 UL	0 B	0 B	0	0	8.6	73.4 L	10	42.2	0 UL	0 UL	47.8	0 UL	0 UL	0 UL	0 UL
TOTAL METALS	aluminum	ug/L	0 B	0 B	0 B	95.8	0 B	0 B	0 UL	0 UL	0 B	0 B	0 B	0 B	86.2	0 B	79.6	296	0 UL	359	166	0 B	103	7350	7450
	antimony	ug/L	0	0 UL	0	0	0	0	0	0	0	0	0 B	0	0	0 UL	0	0	4.9	0	2.3	0	0	0	3.8
	arsenic	ug/L	0	3.1 J	0 UL	0	0 UL	0	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	4.5 J	0 UL	0 UL	0	0	0 UL	0	0	4	7.2
	barium	ug/L	367	196 J	71.8	72.8	83.2	87.5	81.7	84.4	87.3	85.6	89.3	78.2	75.9	130 J	67.3	59.1	63.2	83.1	47.2	82.5	78.9	332	182
	beryllium	ug/L	0	0 UL	0 B	0	0	0 UL	0 UL	0 UL	0	0	0	0	0	0 UL	0 UL	0	0 UL	0 UL	0	0	0	0	0
	cadmium	ug/L	0	0 UL	1.5	0	0	0	0	0	0	0	0	0	0	0 UL	0	0	0	0	0	0	0	2.3	0
	calcium	ug/L	151000	99400 L	29800	31300	34300	35700	33500	35400	32700	34900	34600	31400	33100	91500 L	37600	27000	33700	43900	23100	43600	43200	73500	48200
	chromium, total	ug/L	2.4 J	31.2 L	0	0	0	0	0	0	0	0	1.5	0	0	56.4 L	0	1.9	0	1.4	1.6	0	0	22	20.6
	cobalt	ug/L	0 B	16.8 J	2.1	0	0	0	0	2.4	0	0	0	0	0	20.3 J	0	0	0	0	0	0	0	9.9	4.9
	copper	ug/L	0	2.8 J	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 B	0 UL	0 B	0 UL	1.3	6.4 J	3	17.3	0 UL	0 B	15	2.4 L	0 UL	40.1 L	66.6
	cyanide	ug/L	0 B	40.3 L												17.8 L									
	iron	ug/L	19100	1290 L	373	287	63.5 J	161	137	152	512 J	119 J	646 J	354 J	387	2050 L	723	1020	778	1540	762	1340	1220	20200	14500
	lead	ug/L	0	0 UL	7.4	0	0	0 UJ	0 UJ	0 UJ	0	0	1.7	0 UL	0 UL	0 UL	1.1 L	10.8	0 B	9.1	8.6	0	0 B	287	168
	magnesium	ug/L	52900	102000 L	13500	13700	14900	15500	14600	15300	14500	15300	15300	13900	14600	101000 L	12800	8200	11200	15600	6490	16400	15500	29700	17900
	manganese	ug/L	510	233 L	40	29.2	28.2	32.4	21	24.1	58.4	20.1	54.2	42.7	53.9	251 L	147	304	319	142	313	231	177	766	537
	mercury	ug/L	0 B	0 B	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0	0 B	0	0.14	0 UL	0 UL	0	0 UL	0 UL	0.29 L	0.15 L
	nickel	ug/L	9.3 J	16.4 J	1.6	0	0	0 UL	0 UL	0 UL	1.6	0	2.2	1.1 L	0 B	25.1 J	0 B	0 B	0	1.8	0 B	1.4	1.4	25.4	12.6
	potassium	ug/L	30200	148000 L	2910	3310	3670	3310	3210	3300	3510	3440	3690	3140	3550	183000 L	5780	4270	4320	4600	3890	5610	4700	6000	6030
	selenium	ug/L	0	0 UL	0 UL	0	0 UL	0	0	0	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0	0	0 UL	0	3.2 K	0	0
	silver	ug/L	0	0 UL	0	0	0	0	0	0	1.1	0	0	0	0	0 UL	0	0	0	0	0	0	0	0	1.3
	sodium	ug/L	67900	662000 L	21300 J	20600 J	22700	21500 J	21000 J	21900 J	22000	22700	22300	21000	22800 J	1110000 L	24900 J	16900 J	22000 J	26400 J	14400 J	47100 J+	28000 J	28200 J	27000 J
	thallium	ug/L	0	0 UL	0	0	0	0	0	0	0	0	0	3.8	4.5 J	0 UL	3.8 K	0 UL	5.2	0	0 UL	0	0	0	0
	vanadium	ug/L	0	13.1 J	1.2	1.5	0	0	0	1	1.4	0	1.7	1.4	1.2	35.1 J	1.4	3.4	1.7	2.3	3.1	0	1.3	40.6	22.8
	zinc	ug/L	0 B	0 UL	6.9	0 UL	0 B	0 UL	0 UL	0 UL	0 B	0	0 B	0 B	6.6	0 UL	13	73.5	0 UL	7.7 L	74.3	0 UL	5.5 L	1040	263
	cyanide	ug/L			0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL	0 UL		0	3.2	3 L	0 UL	0	0 UL	0 UL	0 UL	0 UL

Shaded cells are samples selected for aquatic toxicity test.

APPENDIX H-3

PORE WATER PLOTS

Figure 1
Aluminum Pore Water Results (Total) for 2013 and 2016
Lower Darby Creek

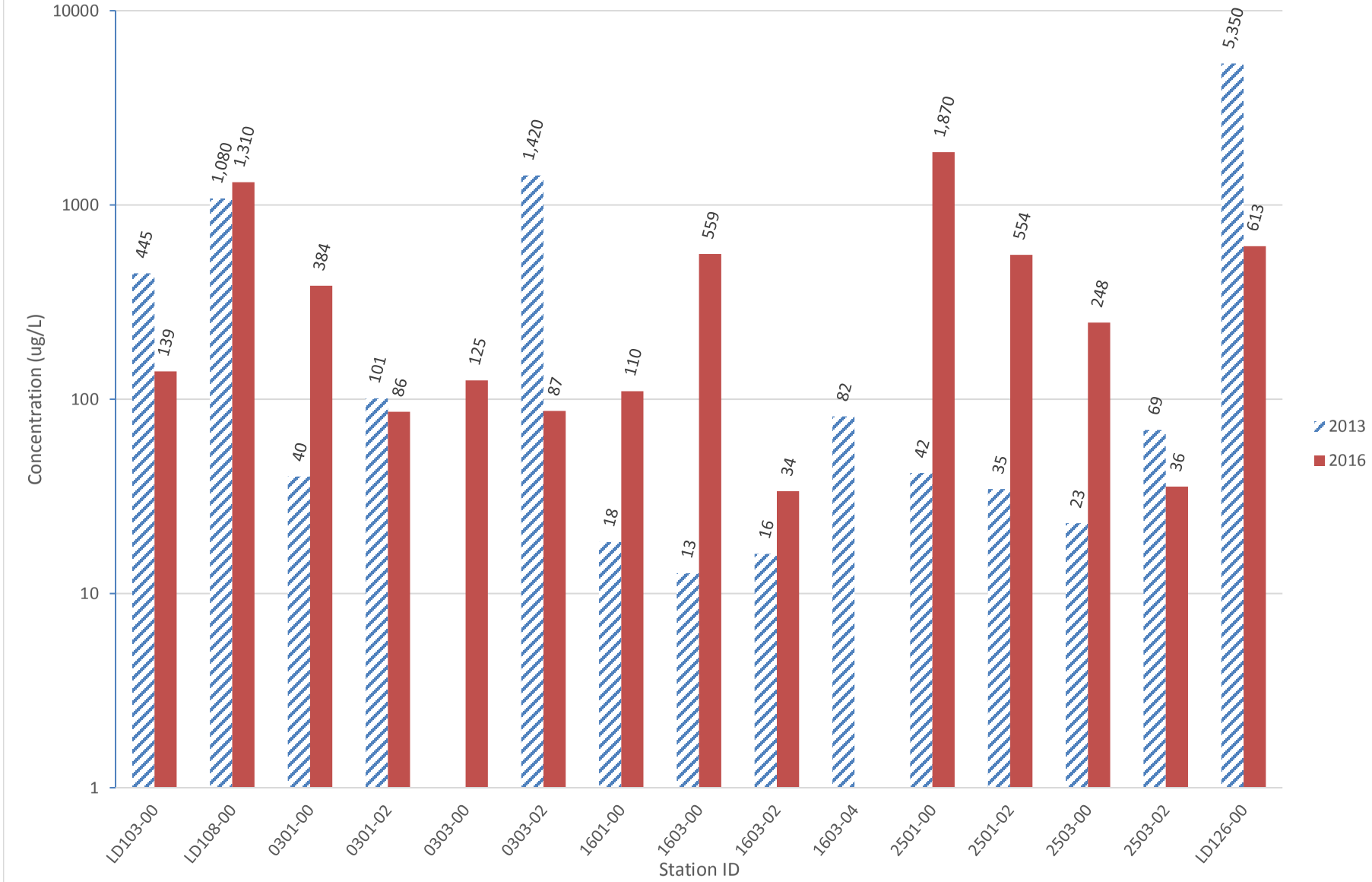


Figure 2
Barium Pore Water Results (Total) for 2013 and 2016
Lower Darby Creek

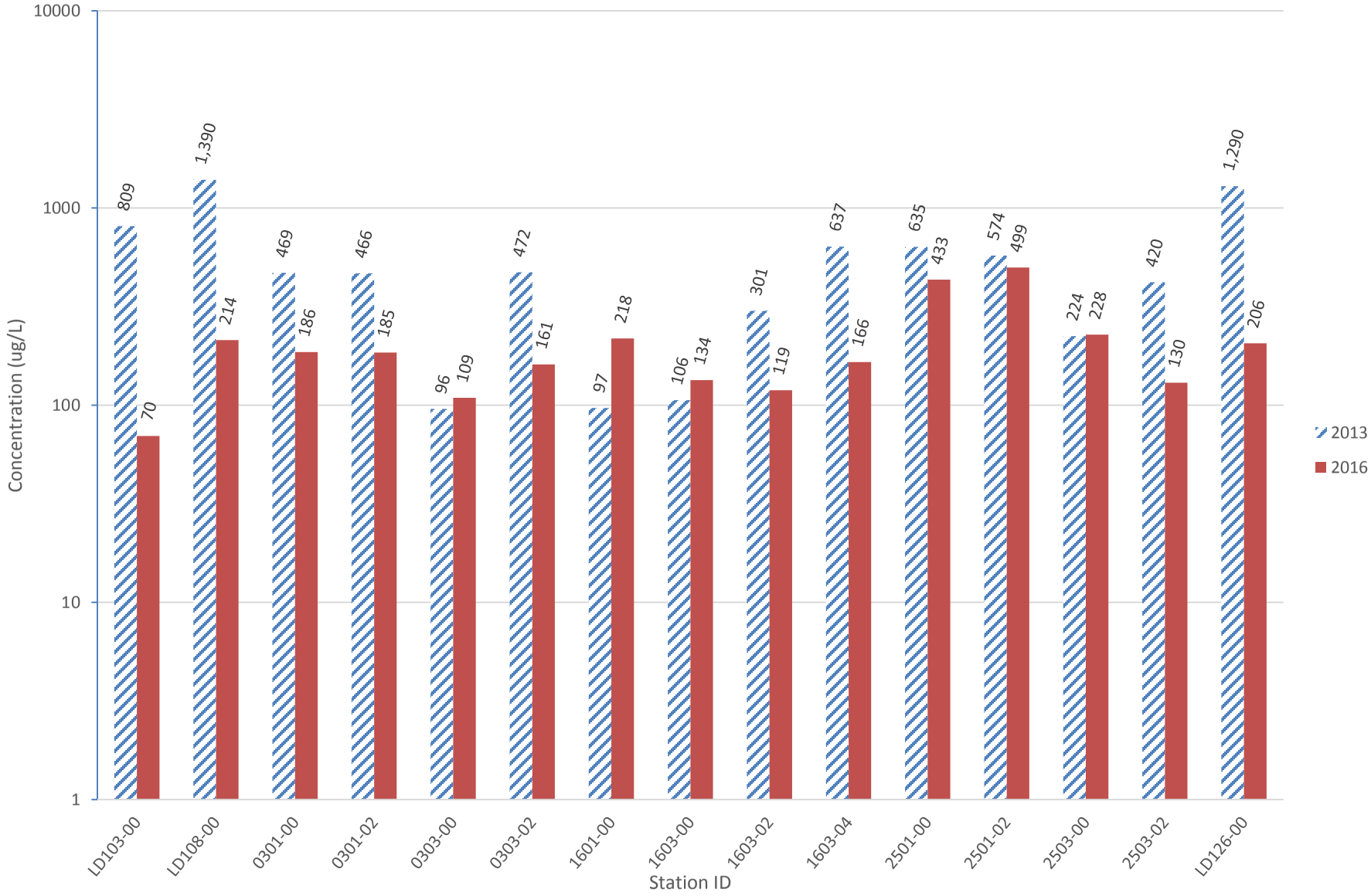


Figure 3
Copper Pore Water Results (Total) for 2013 and 2016
Lower Darby Creek

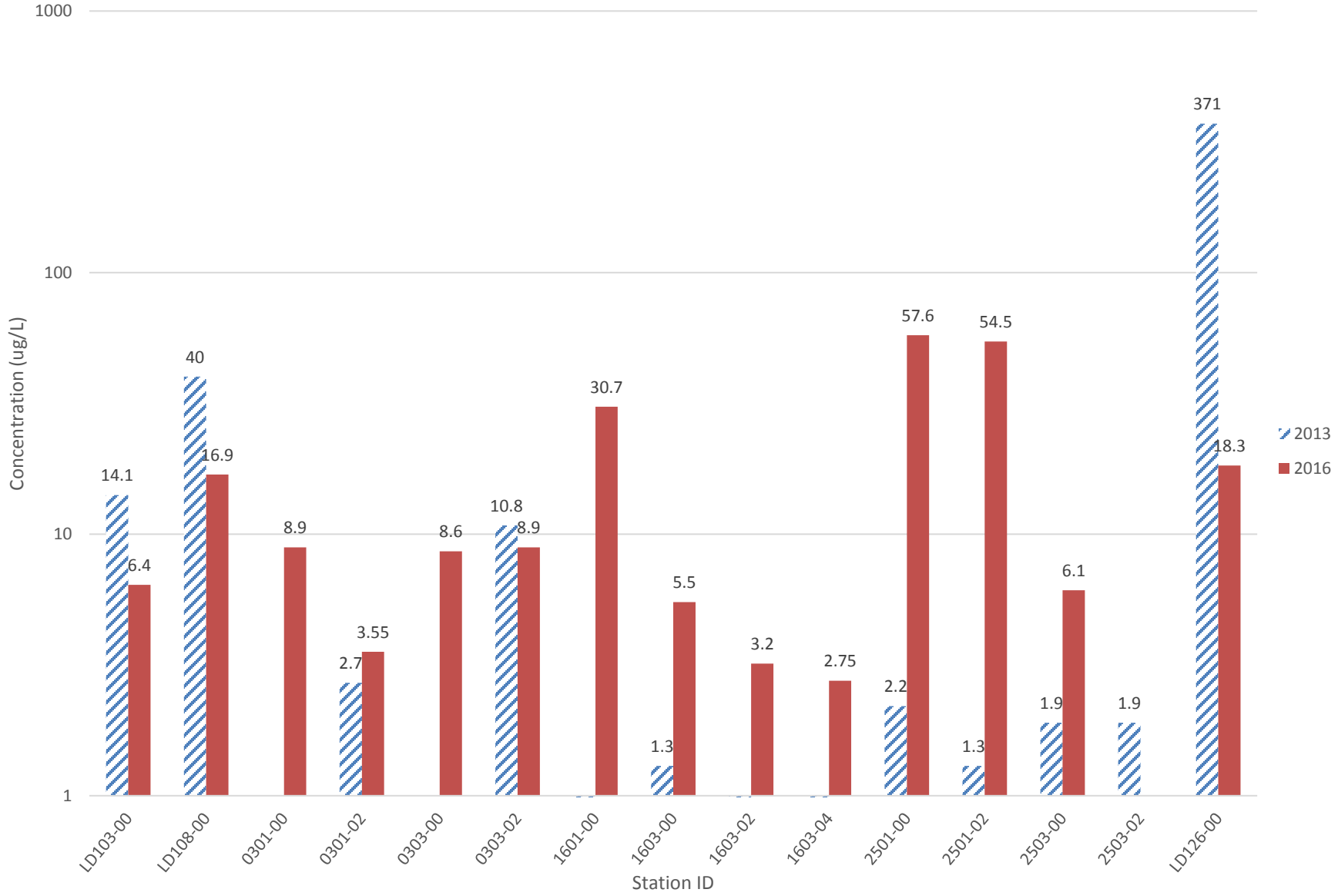


Figure 4
Iron Pore Water Results (Total) for 2013 and 2016
Lower Darby Creek

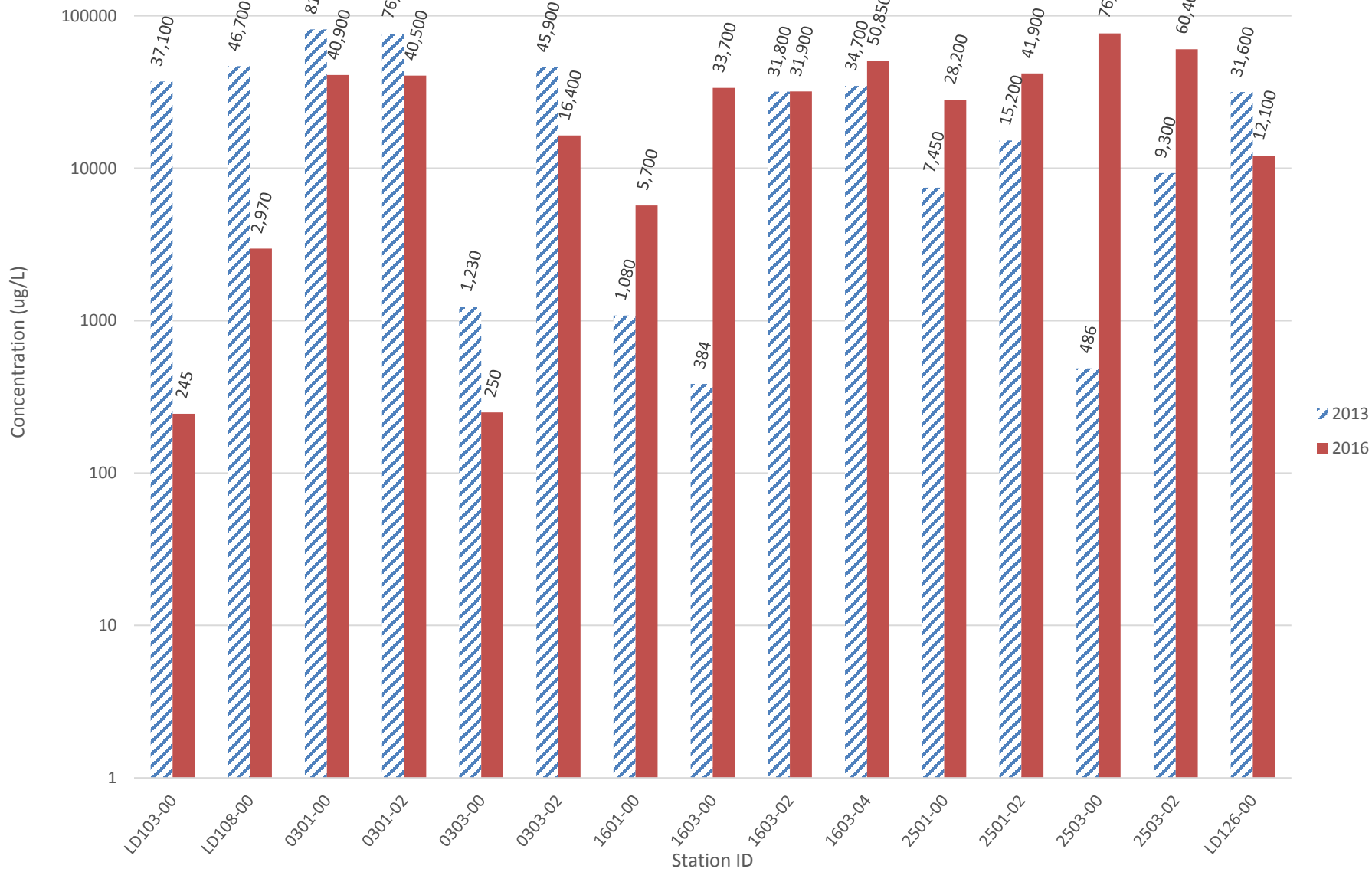


Figure 5
Manganese Pore Water Results (Total) for 2013 and 2016
Lower Darby Creek

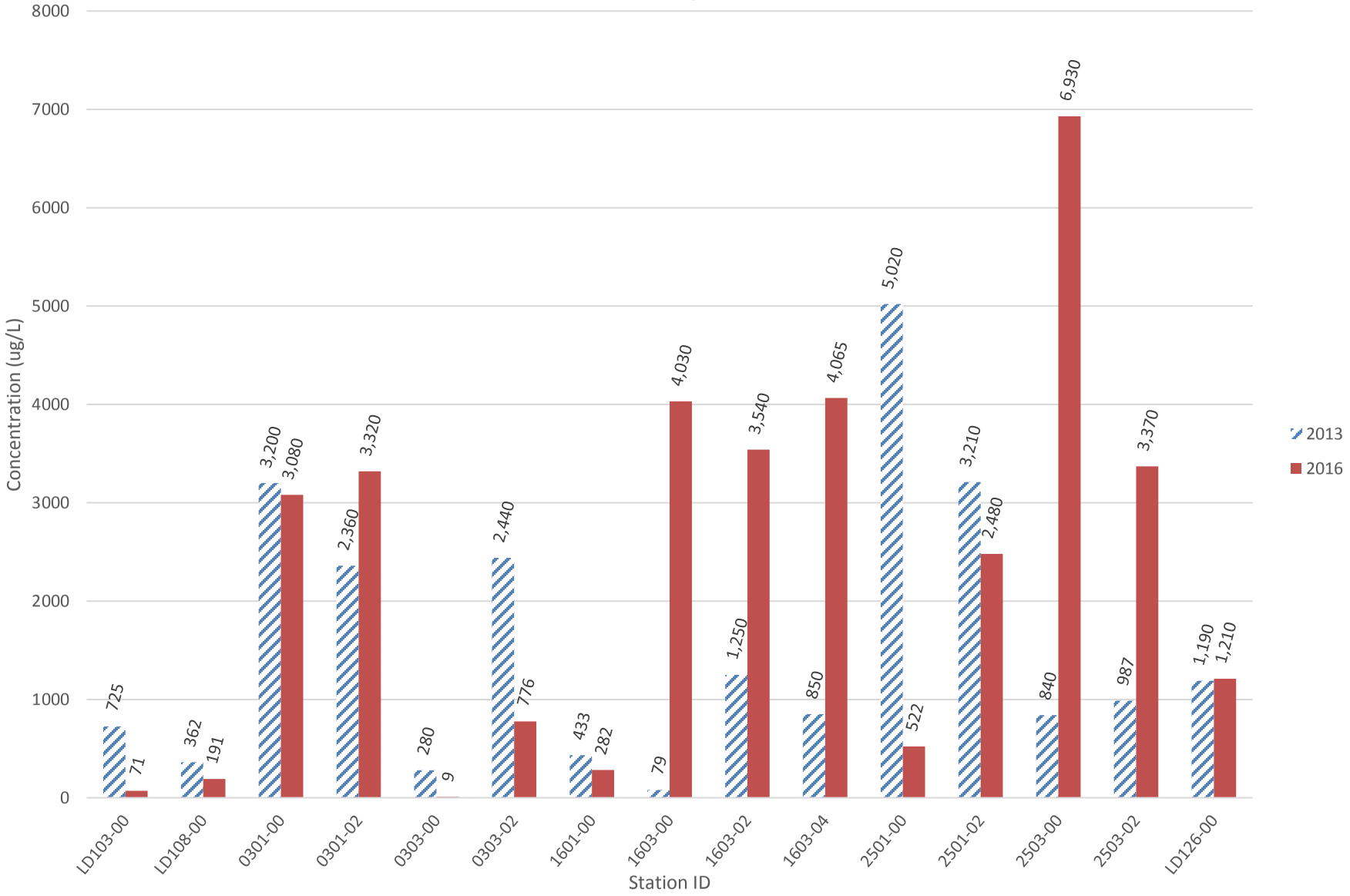


Figure 6
Barium 2016 Pore Water Results (Dissolved and Total)
Lower Darby Creek

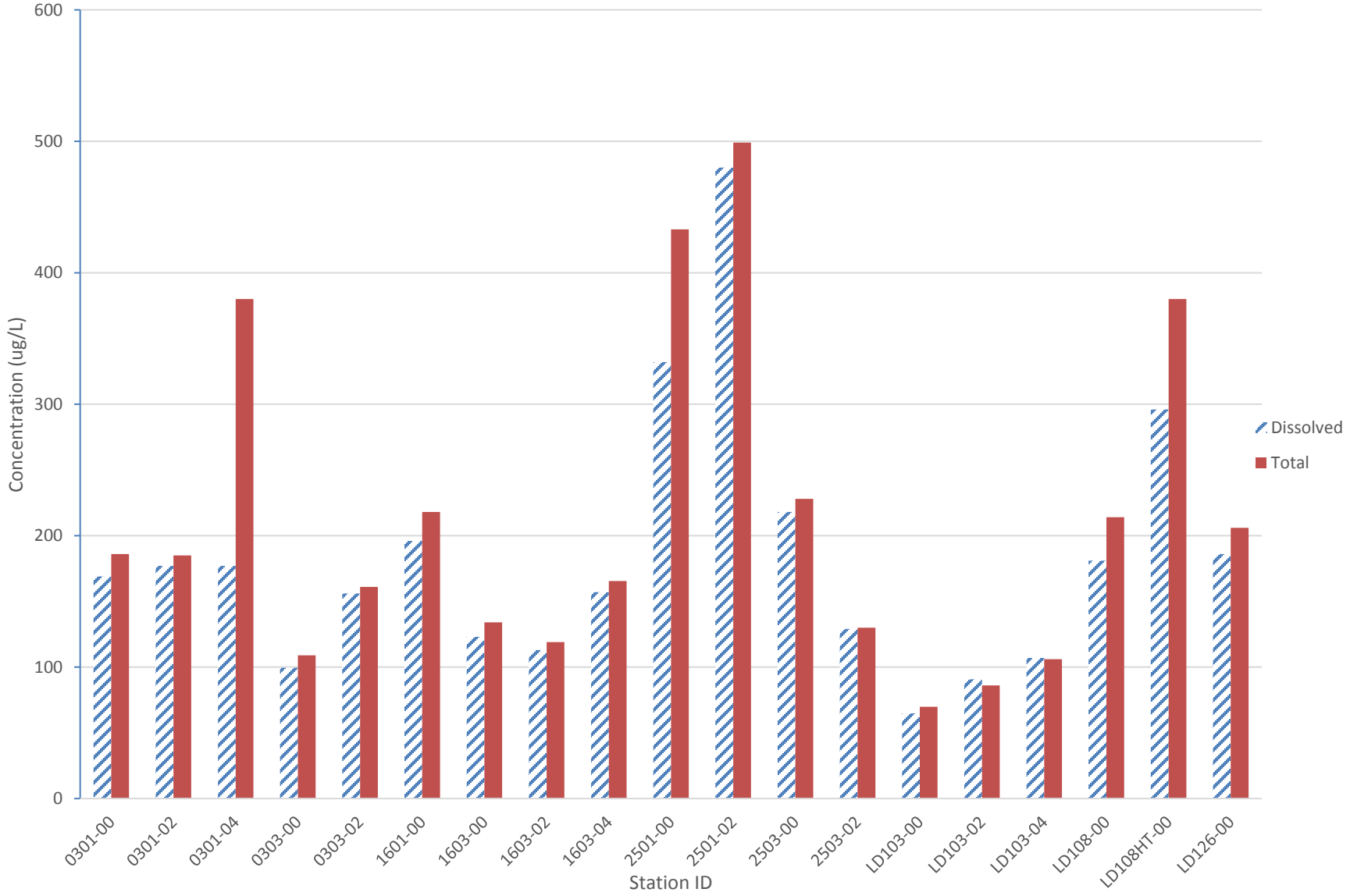


Figure 7
Copper 2016 Pore Water Results (Dissolved and Total)
Lower Darby Creek

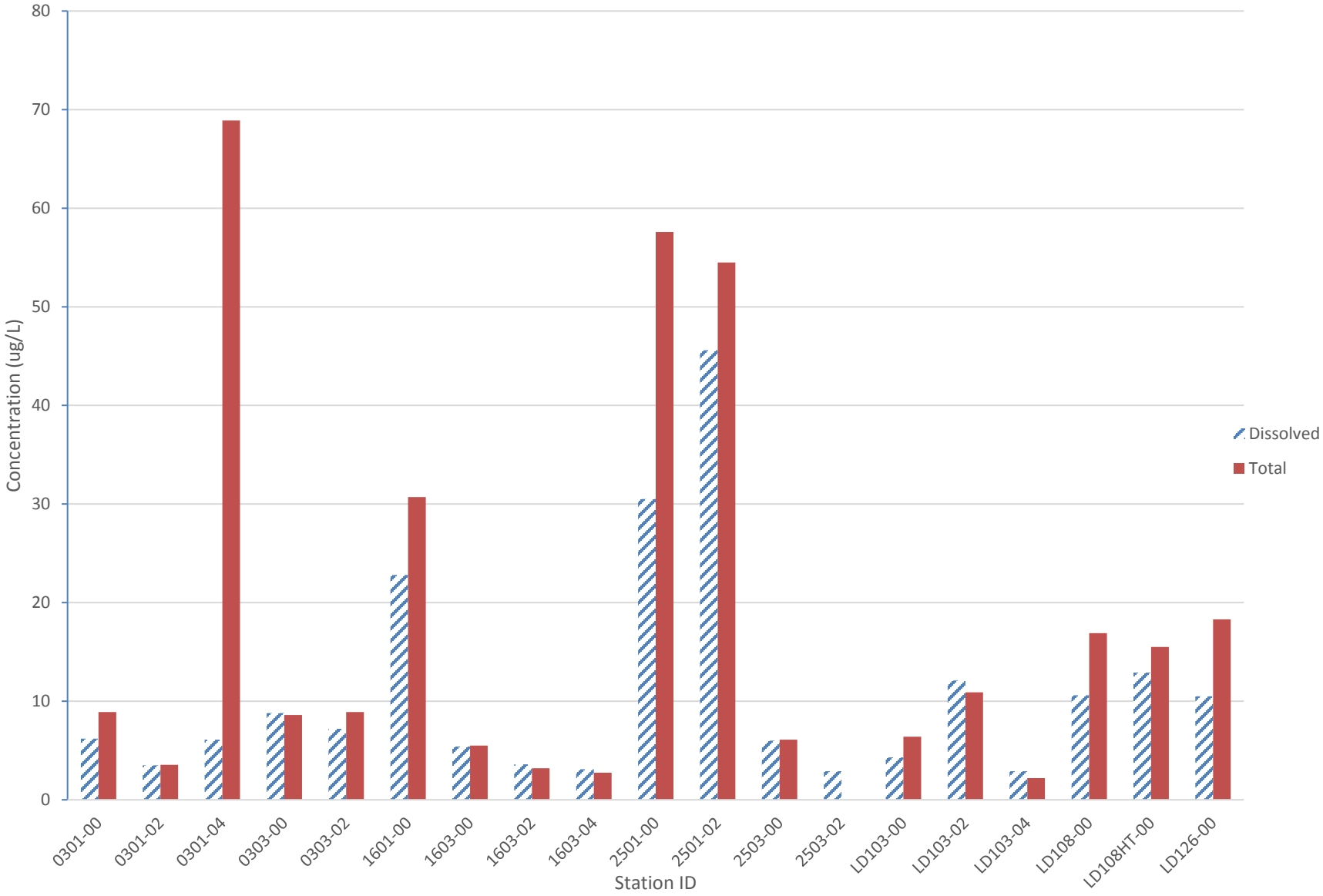


Figure 8
Iron 2016 Pore Water Results (Dissolved and Total)
Lower Darby Creek

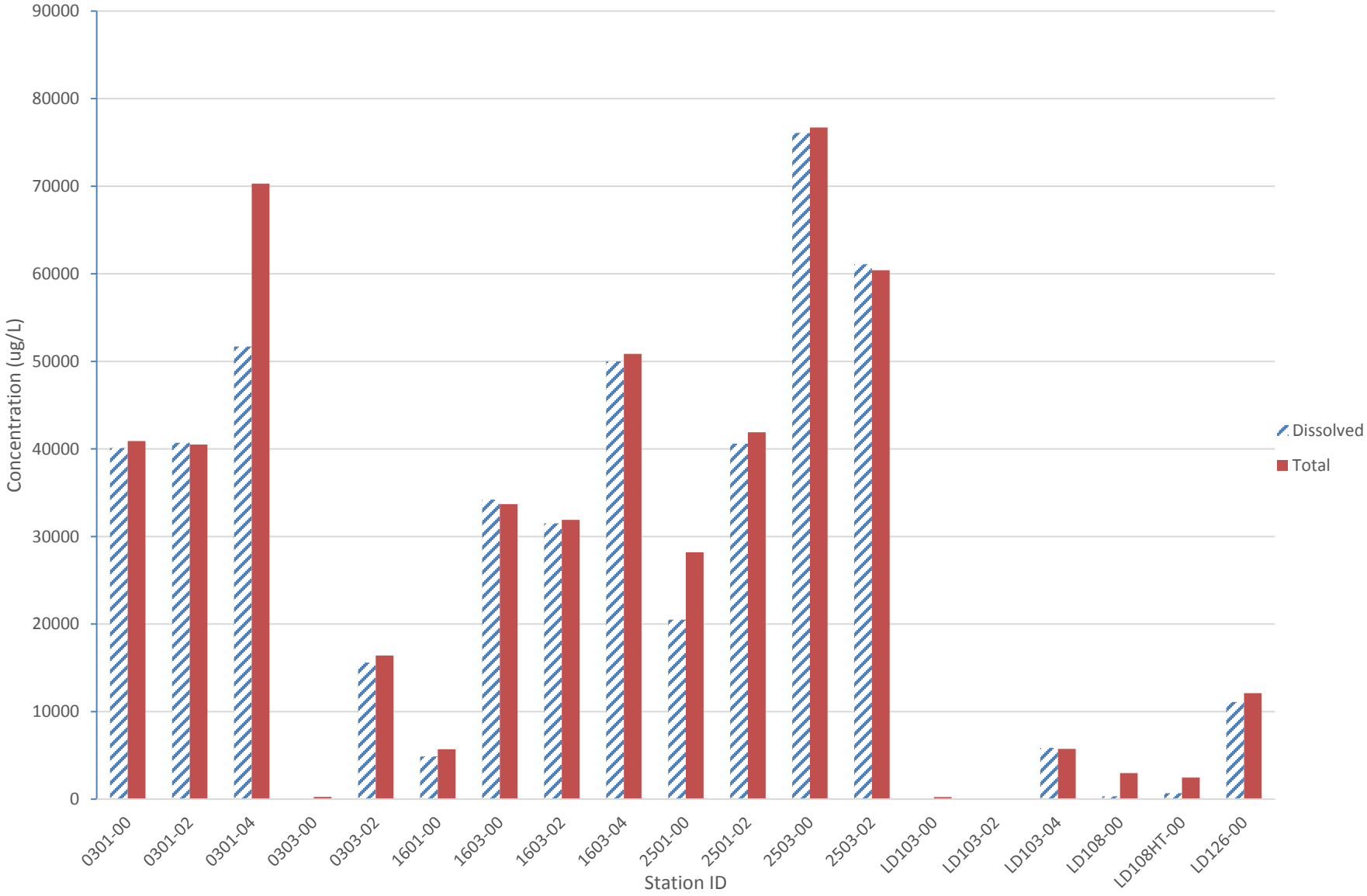


Figure 9
Manganese 2016 Pore Water Results (Dissolved and Total)
Lower Darby Creek

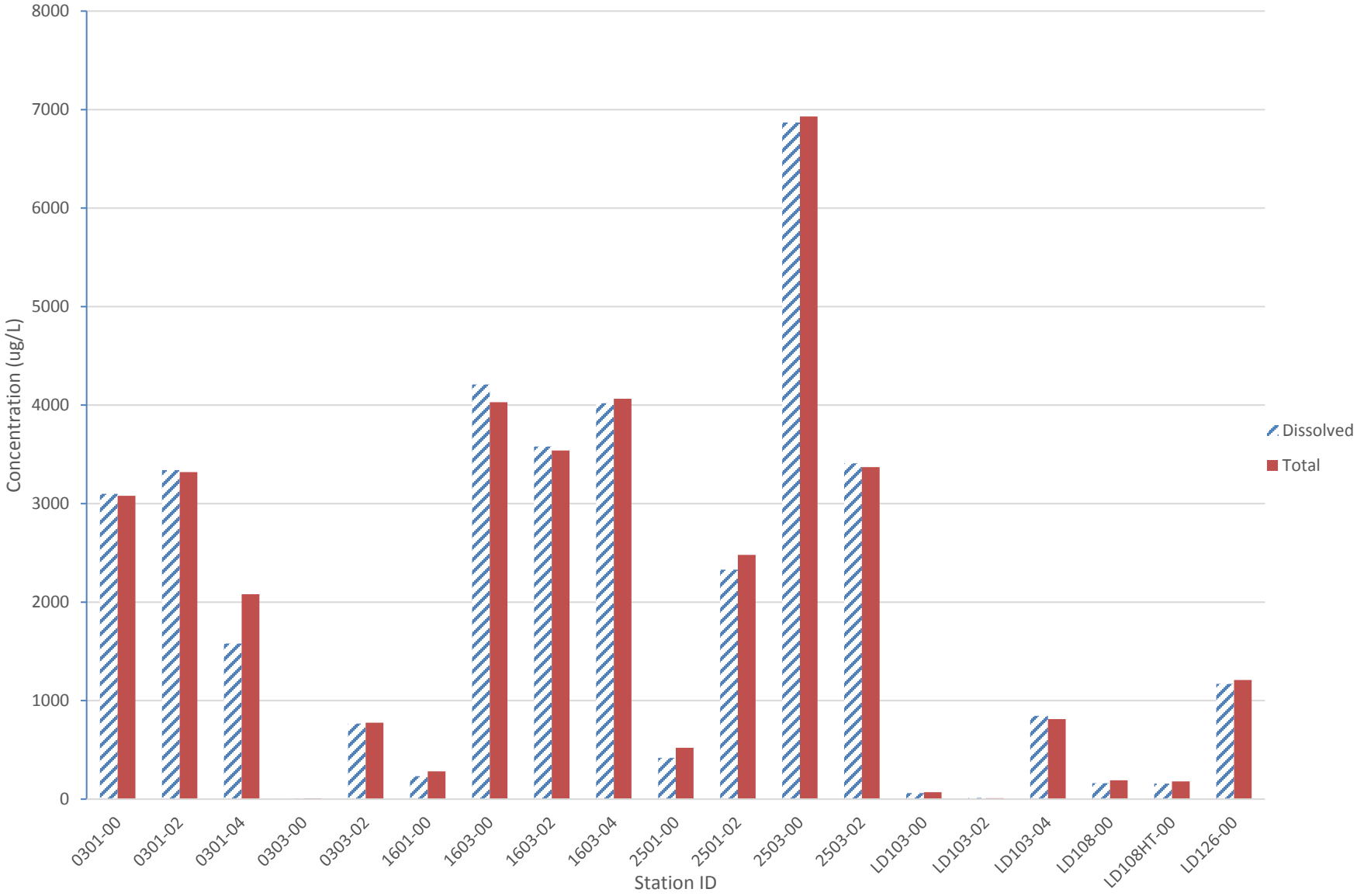


Figure 10
Barium 2016 Pore Water Results - Dissolved Concentrations by Location in Creek
Lower Darby Creek

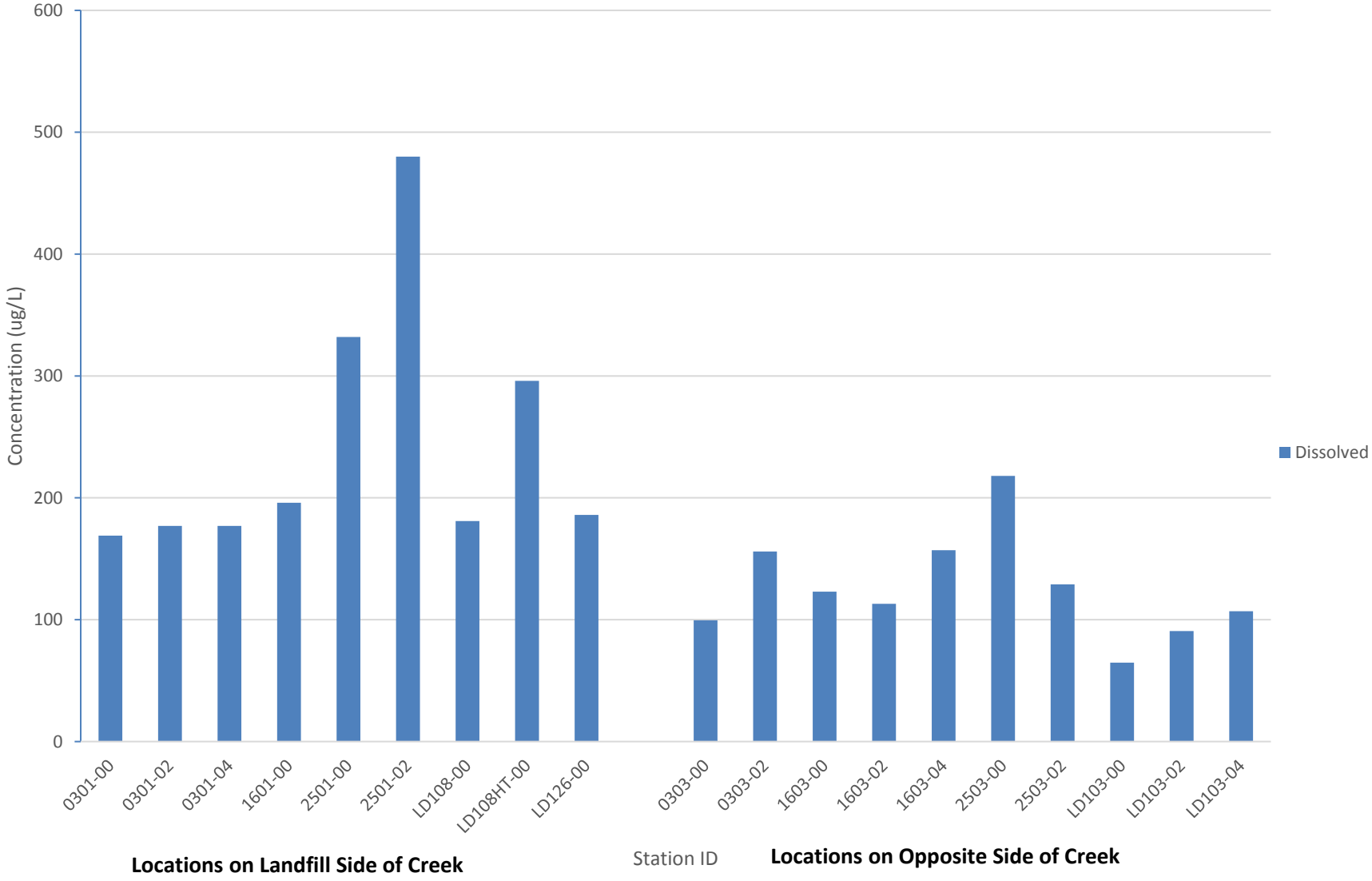


Figure 11
Copper 2016 Pore Water Results - Dissolved Concentrations by Location in Creek
Lower Darby Creek

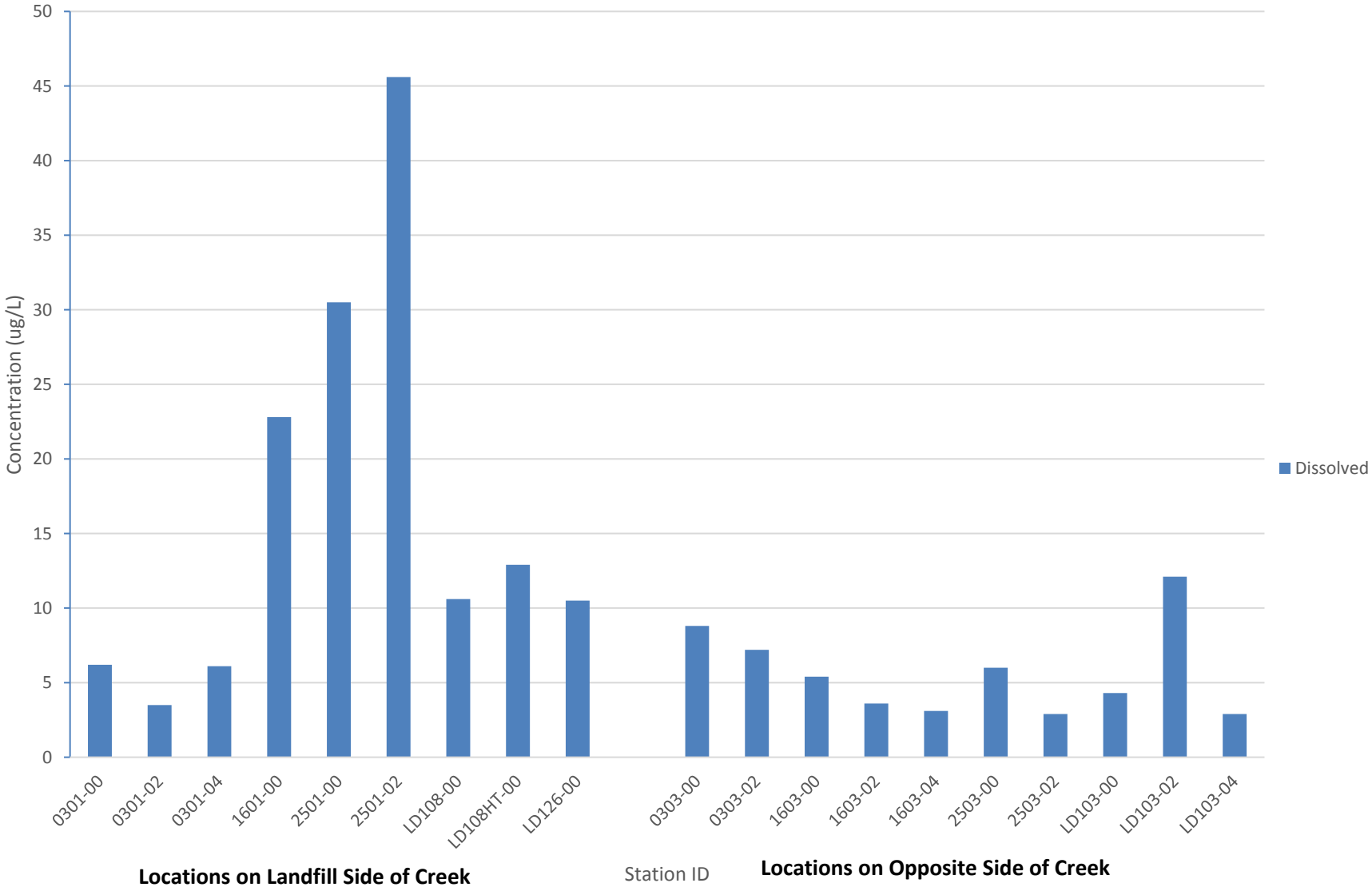


Figure 12
Iron 2016 Pore Water Results - Dissolved Concentrations by Location in Creek
Lower Darby Creek

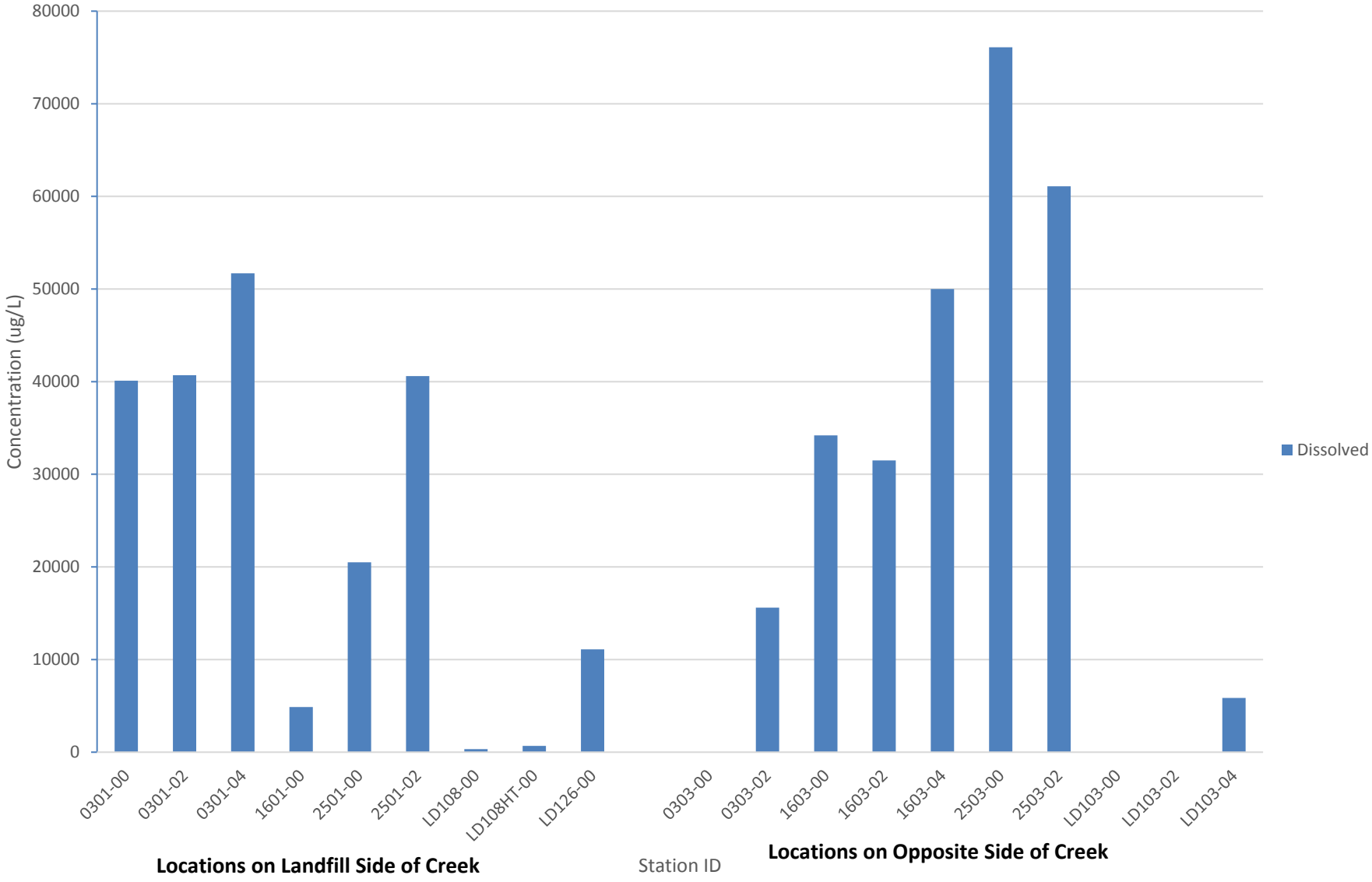


Figure 13
Manganese 2016 Pore Water Results - Dissolved Concentrations by Location in Creek
Lower Darby Creek

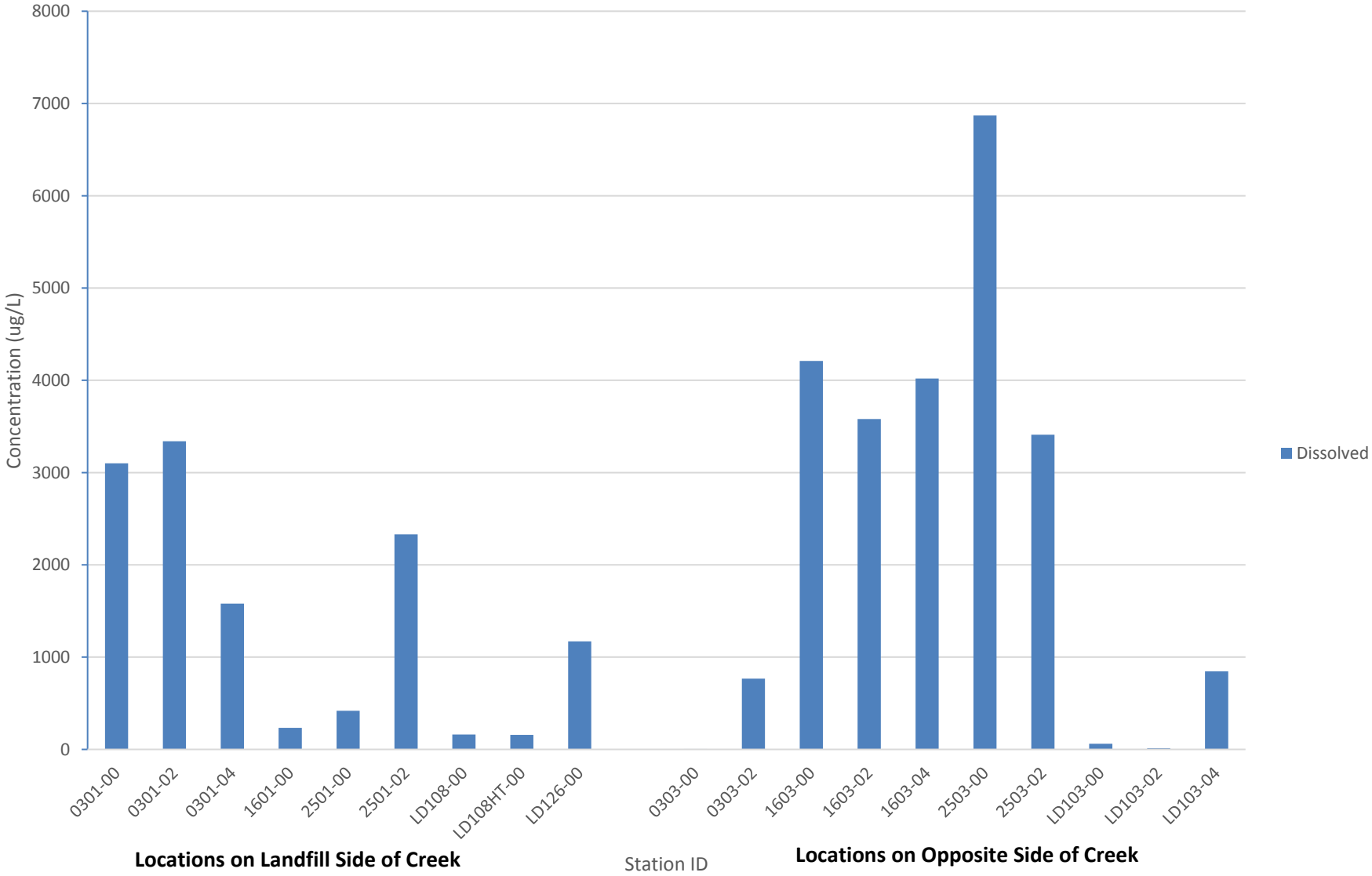


Figure 14
Barium 2016 Pore Water Results - Dissolved Concentrations by Transect Across Creek
Lower Darby Creek

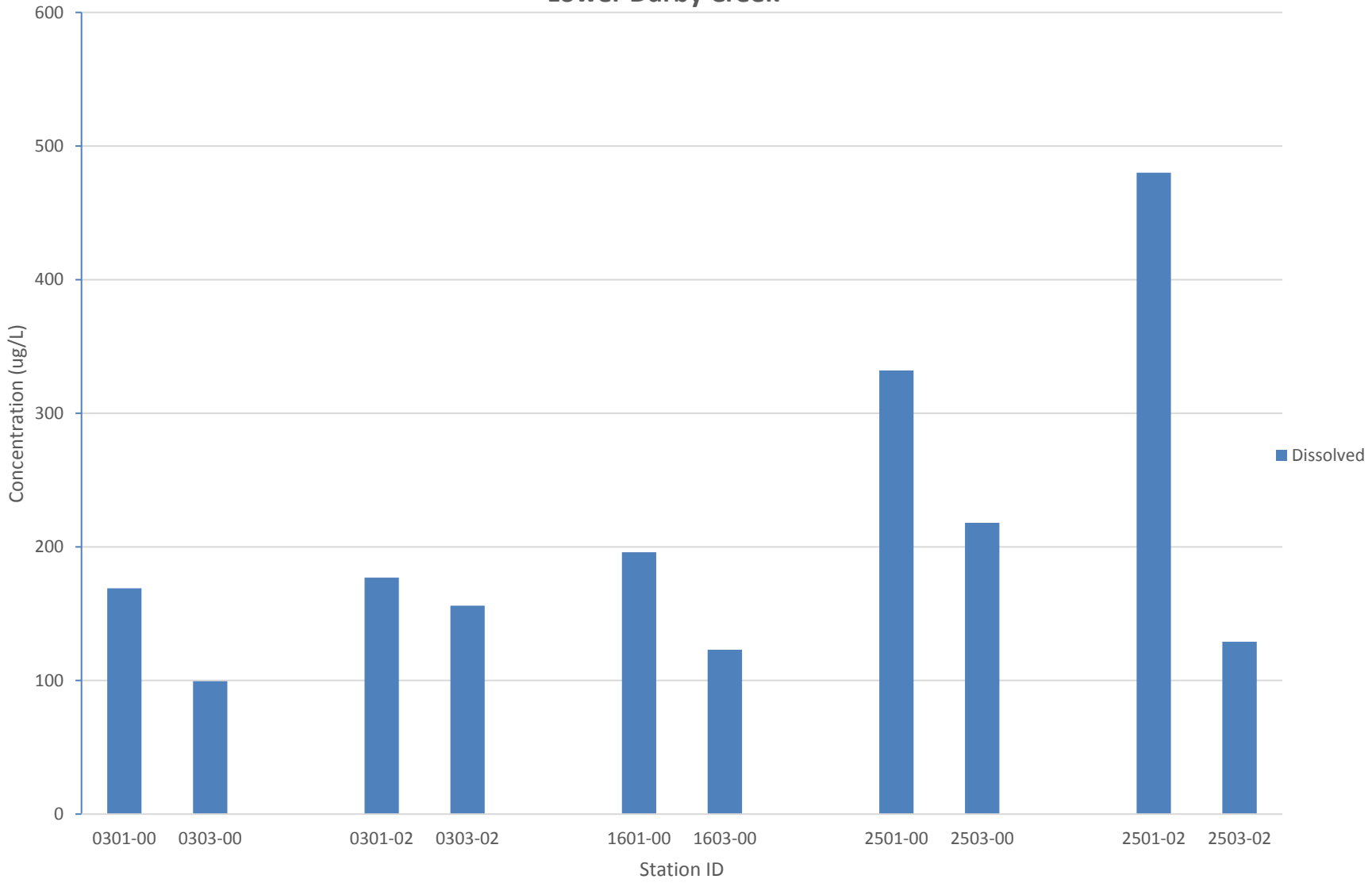


Figure 15
Copper 2016 Pore Water Results - Dissolved Concentrations by Transect Across Creek
Lower Darby Creek

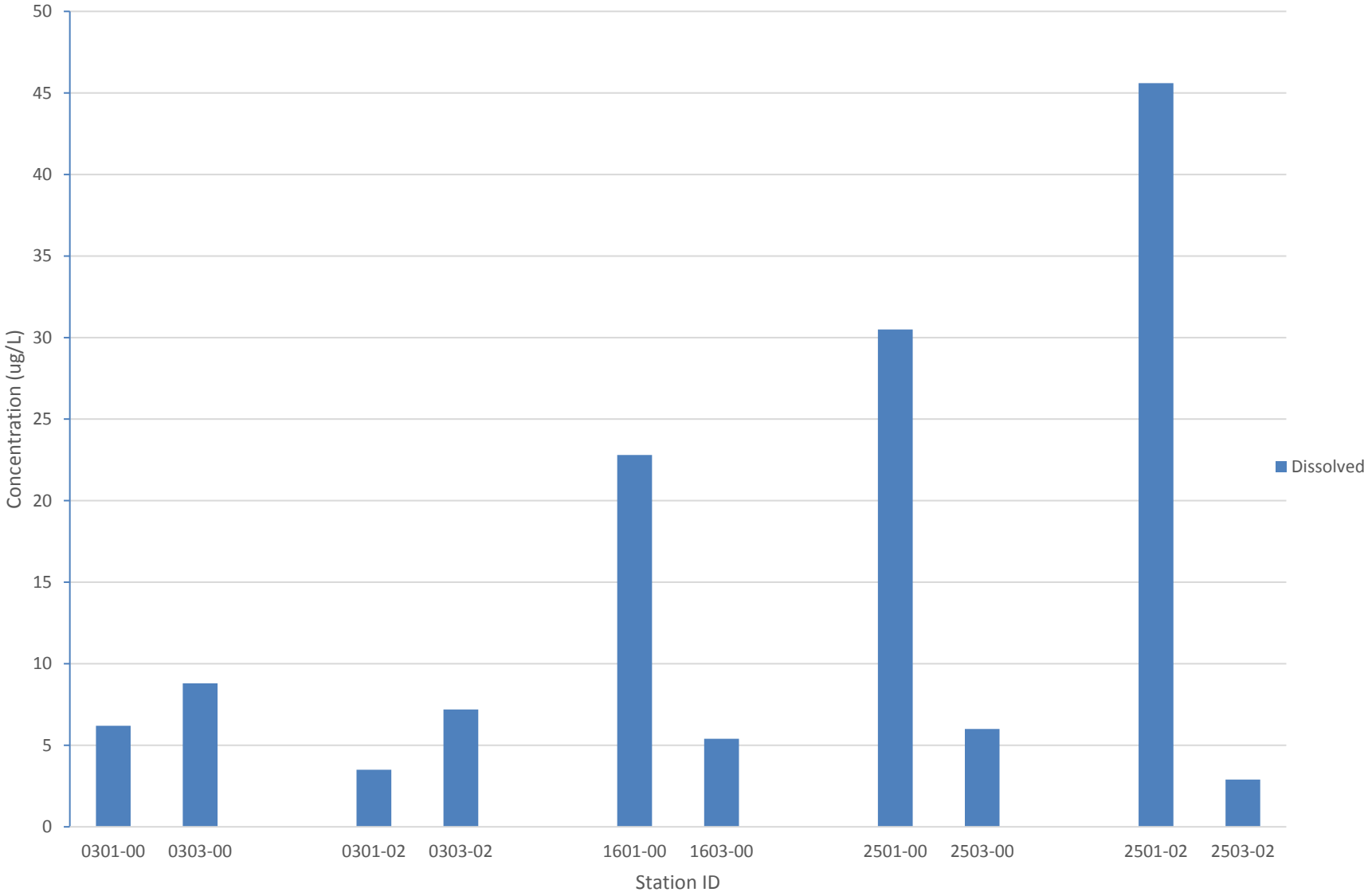


Figure 16
Iron 2016 Pore Water Results - Dissolved Concentrations by Transect Across Creek
Lower Darby Creek

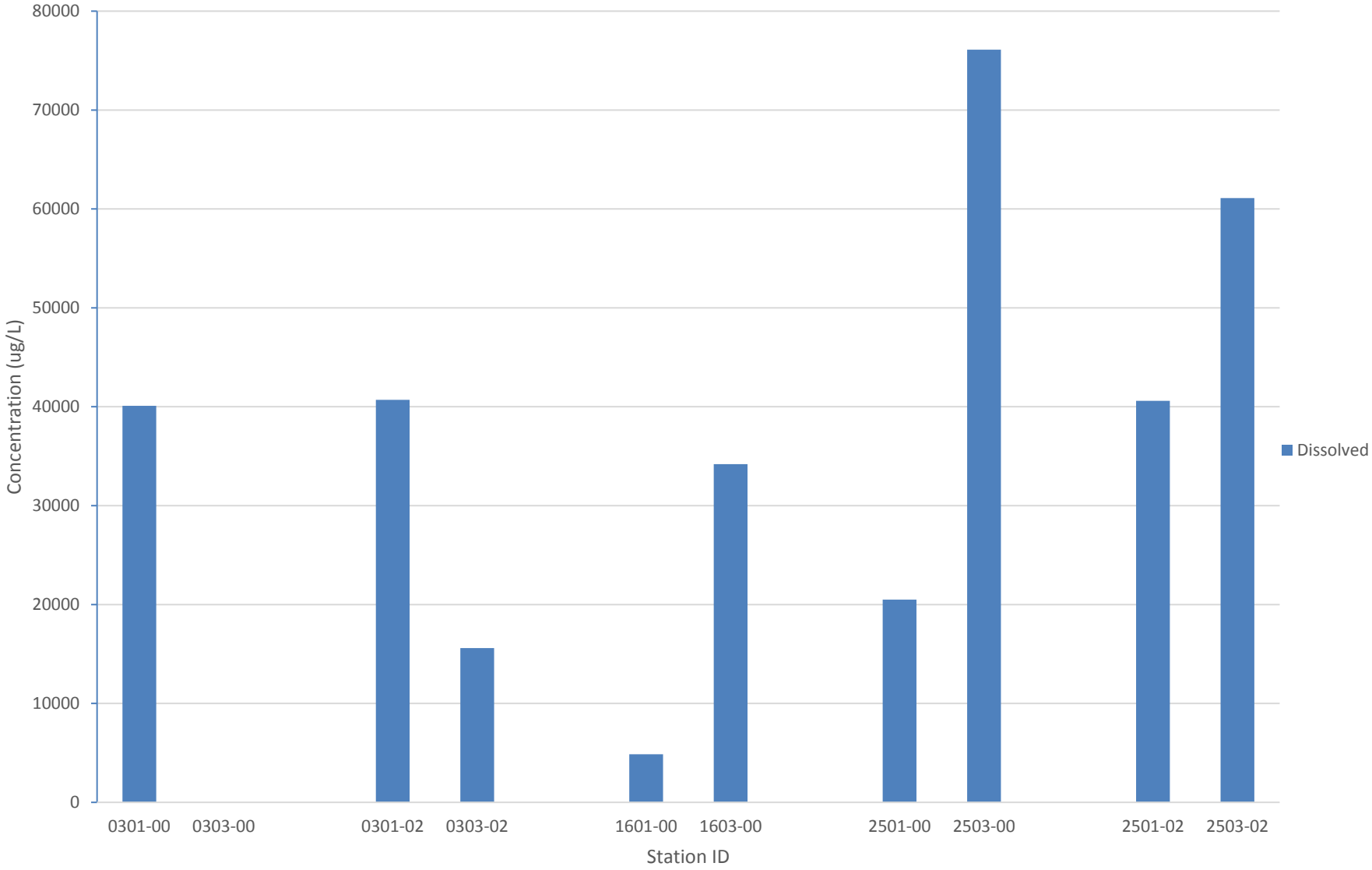


Figure 17
Manganese 2016 Pore Water Results - Dissolved Concentrations by Transect Across Creek
Lower Darby Creek

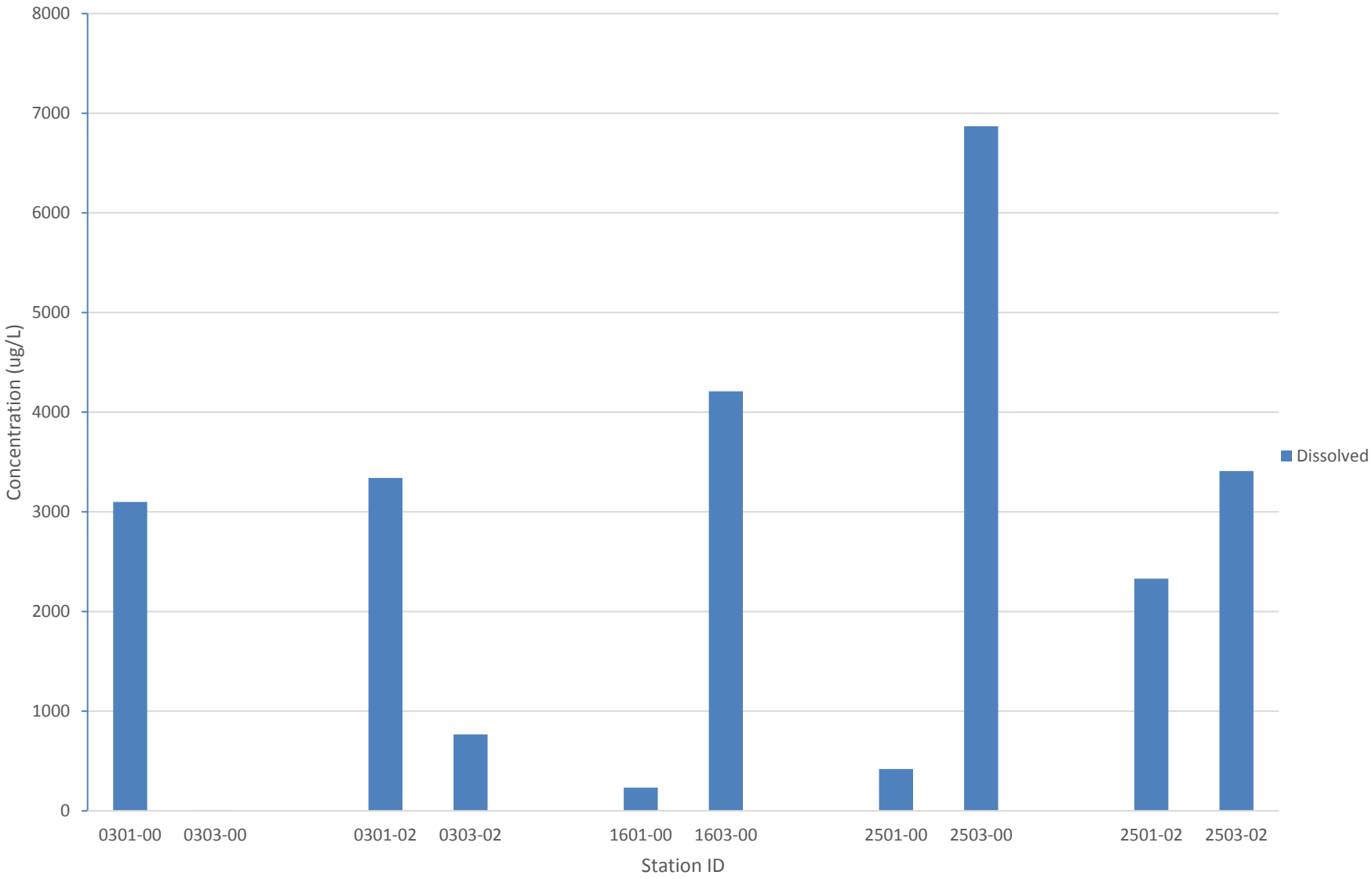


Figure 18
Barium 2016 Pore Water Results - Dissolved Concentrations by Depth
Lower Darby Creek

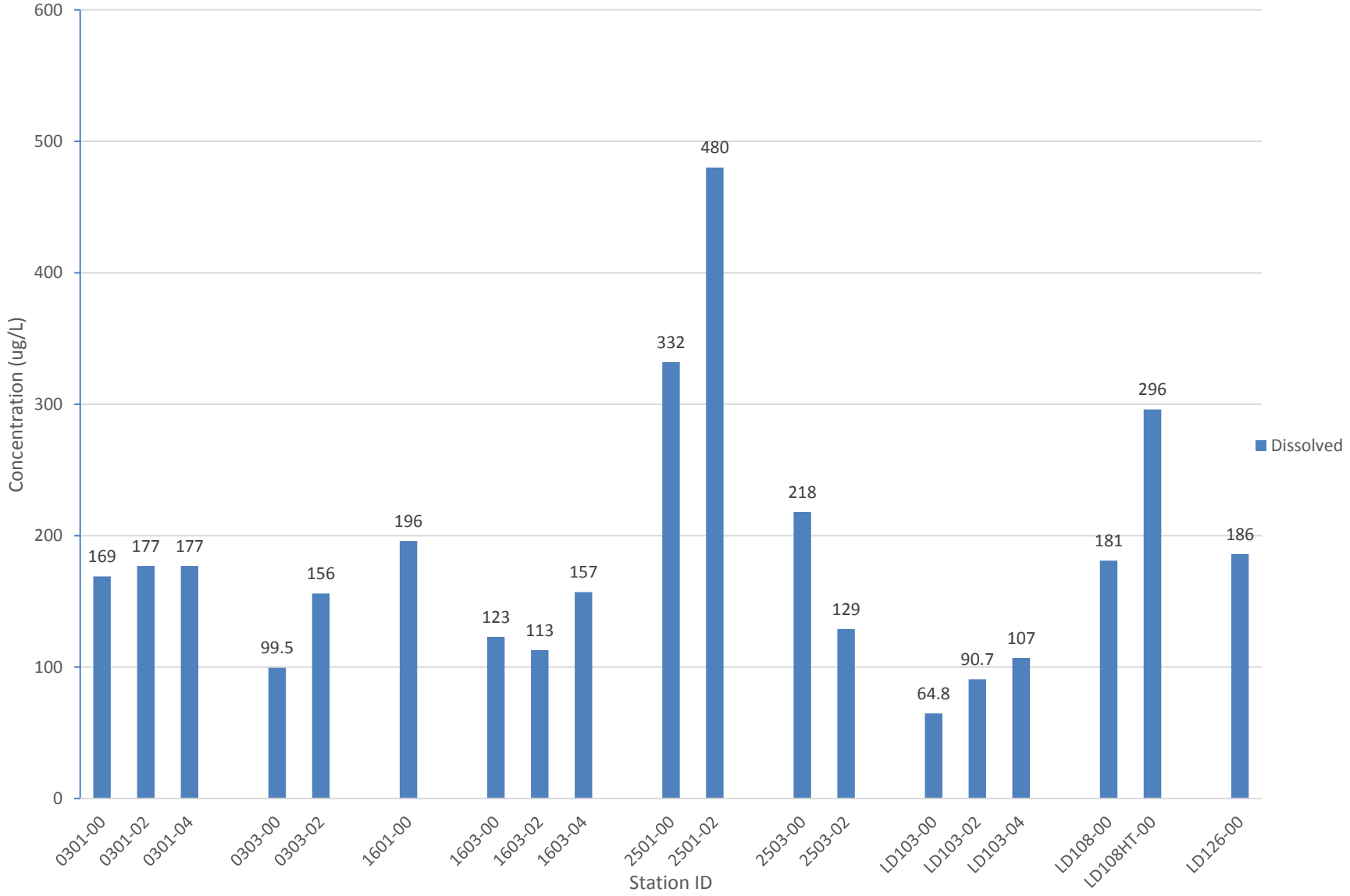


Figure 19
Copper 2016 Pore Water Results - Dissolved Concentrations by Depth
Lower Darby Creek

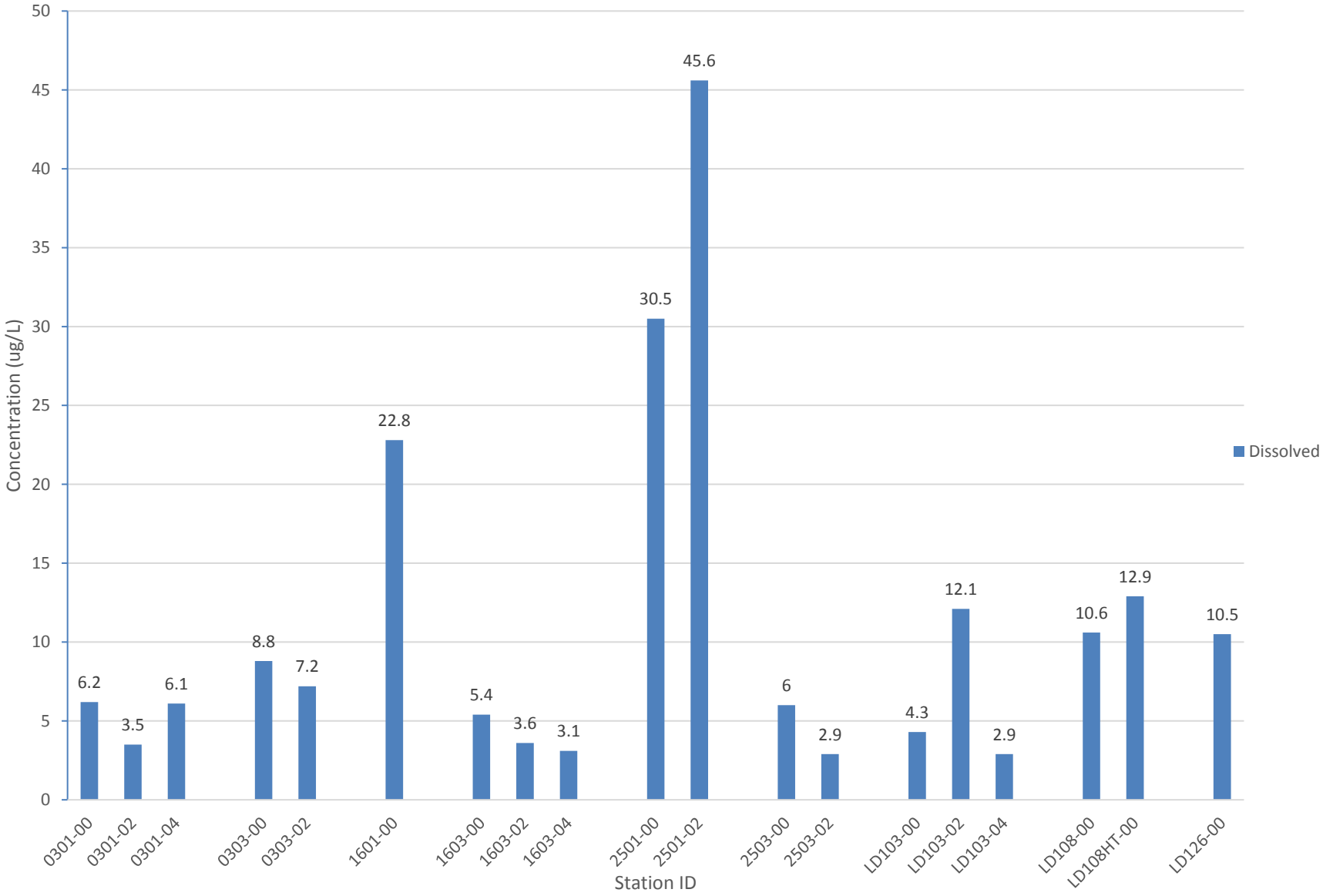


Figure 20
Iron 2016 Pore Water Results - Dissolved Concentrations by Depth
Lower Darby Creek

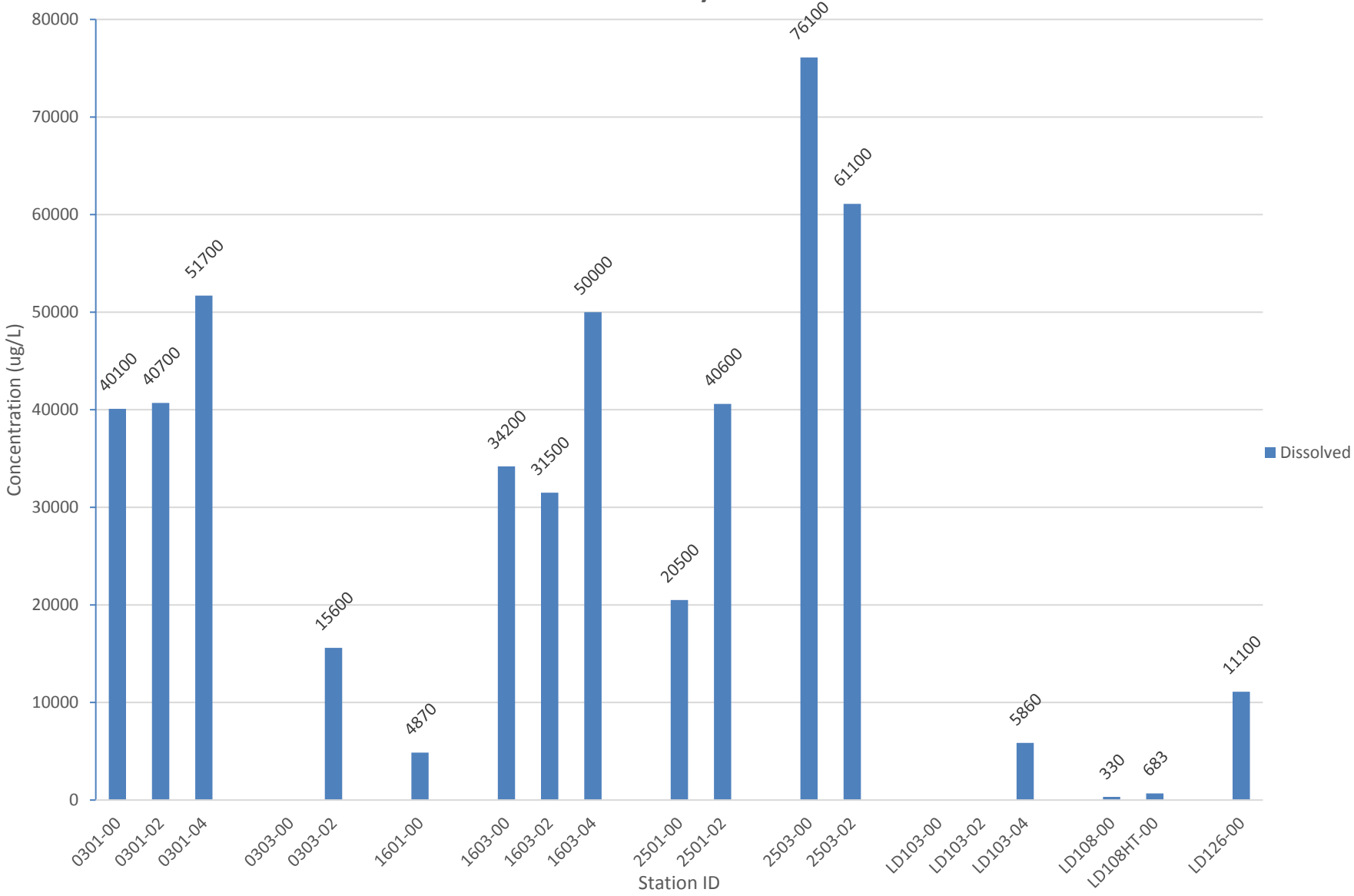
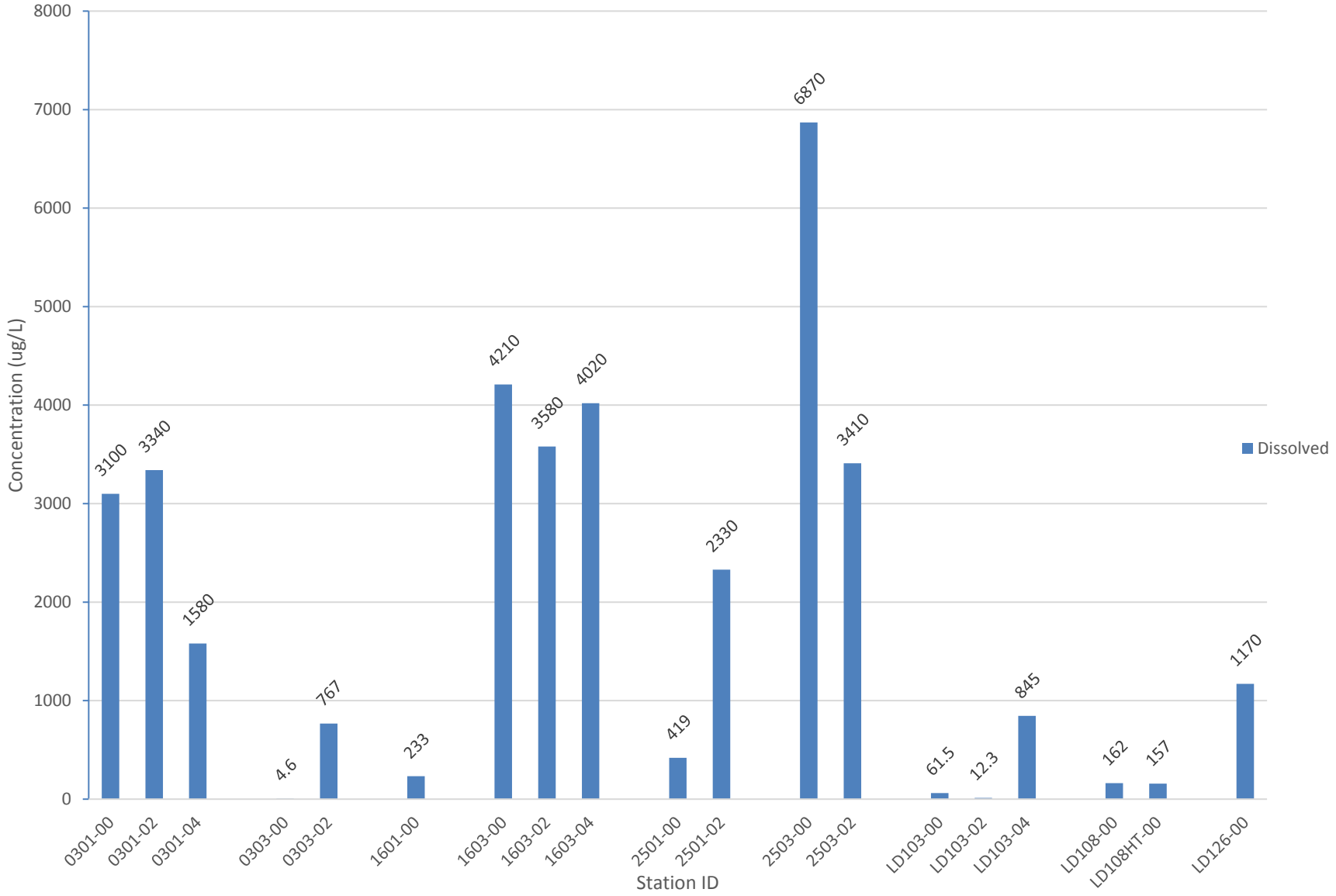


Figure 21
Manganese 2016 Pore Water Results - Dissolved Concentrations by Depth
Lower Darby Creek



APPENDIX I

VAPOR INTRUSION MODELING AND RISK EVALUATION

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8061Mars Place - Janga
RECEPTOR: Child - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
tetrachloroethylene	0.87	0.27	0.0000059	0.003089802	4.2189E-07
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.003089802	4.2189E-07

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8061Mars Place - Janga
RECEPTOR: Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

-	-	-	-	-	-	-	-

HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	3.1	0.03	0.0000078	0.099086758	1.9874E-06
ethylbenzene	1.5	1	0.0000025	0.001438356	3.08219E-07
1,2,4-trimethylbenzene	1.1	0.007		0.150684932	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.251210046	2.29561E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8061Mars Place - Janga
RECEPTOR: Adult - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS	ADULT RESIDENT	CHILD RESIDENT		ADULT WORKER		
ET	24	24	24	8		
EF	350	350	350	250		
ED	24	24	6	25		
AT-NC	8760	8760	2190	9125		
AT-C	25550	25550	25550	25550		

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
tetrachloroethylene	0.87	0.27	0.0000059	0.003089802	1.68756E-06
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.003089802	1.68756E-06

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8061Mars Place - Janga
RECEPTOR: Adult- Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	3.1	0.03	0.0000078	0.099086758	7.94956E-06
ethylbenzene	1.5	1	0.0000025	0.001438356	1.23288E-06
1,2,4-trimethylbenzene	1.1	0.007		0.150684932	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.251210046	9.18243E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8025Mars Place - billips
RECEPTOR: Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	3.4	0.03	0.0000078	0.108675799	2.17972E-06
butadiene	1.3	0.002	0.00003	0.623287671	3.20547E-06
ethylbenzene	1.2	1	0.0000025	0.001150685	2.46575E-07
1,2,4-trimethylbenzene	1.2	0.007		0.164383562	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.897497717	5.63177E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8025Mars Place - Billips
RECEPTOR: Adult - indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	3.4	0.03	0.0000078	0.108675799	8.71887E-06
butadiene	1.3	0.002	0.00003	0.623287671	1.28218E-05
ethylbenzene	1.2	1	0.0000025	0.001150685	9.86301E-07
1,2,4-trimethylbenzene	1.2	0.007		0.164383562	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.897497717	2.2527E-05

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8017Mars Place - Boyer-Graves
RECEPTOR: Child - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	0.79	0.03	0.0000078	0.025251142	5.06466E-07
chloroform	1.2	0.098	0.000023	0.011741683	2.26849E-06
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.036992825	2.77496E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8017Mars Place - Boyer-Graves
RECEPTOR: Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER		
ET	24	24	24	8		
EF	350	350	350	250		
ED	6	24	6	25		
AT-NC	2190	8760	2190	9125		
AT-C	25550	25550	25550	25550		
CHEMICAL		C (UG/M3)	RFC	IUR	HQ	CR
benzene		2.1	0.03	0.0000078	0.067123288	1.3463E-06
chloroform		1.7	0.098	0.000023	0.016634051	3.21369E-06
					N/A	0
					N/A	0
					N/A	0
					N/A	0
					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
TOTALS					0.083757339	4.55999E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8017Mars Place - Boyer-Graves
RECEPTOR: Adult - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	0.79	0.03	0.0000078	0.025251142	2.02586E-06
chloroform	1.2	0.098	0.000023	0.011741683	9.07393E-06
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.036992825	1.10998E-05

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8017Mars Place - Boyer-Graves
RECEPTOR: Adult - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2.1	0.03	0.0000078	0.067123288	5.38519E-06
chloroform	1.7	0.098	0.000023	0.016634051	1.28547E-05
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.083757339	1.82399E-05

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AIR EMISSIONS (FROM AIR DATA)

SITE NAME:	LDCA - 8007Mars Place - Folk
RECEPTOR:	Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2.6	0.03	0.0000078	0.083105023	1.66685E-06
butadiene	0.64	0.002	0.00003	0.306849315	1.57808E-06
tetrachloroethylene	2.8	0.27	0.0000059	0.009944191	1.35781E-06
1,2,4-trimethylbenzene	0.99	0.007		0.135616438	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.535514967	4.60274E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 8007Mars Place - Folk
RECEPTOR: Adult - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2.6	0.03	0.0000078	0.083105023	6.66738E-06
butadiene	0.64	0.002	0.00003	0.306849315	6.31231E-06
tetrachloroethylene	2.8	0.27	0.0000059	0.009944191	5.43122E-06
1,2,4-trimethylbenzene	0.99	0.007		0.135616438	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.535514967	1.84109E-05

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 7929Mars Place - Fitzgerald
RECEPTOR: Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS	ADULT RESIDENT	CHILD RESIDENT		ADULT WORKER		
ET	24	24	24	8		
EF	350	350	350	250		
ED	6	24	6	25		
AT-NC	2190	8760	2190	9125		
AT-C	25550	25550	25550	25550		

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2.1	0.03	0.0000078	0.067123288	1.3463E-06
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.067123288	1.3463E-06

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 7929Mars Place - Fitzgerald
RECEPTOR: Adult - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2.1	0.03	0.0000078	0.067123288	5.38519E-06
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.067123288	5.38519E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 7915Mars Place - Foster
RECEPTOR: Child - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
1,2,4-trimethylbenzene	2.2	0.007		0.301369863	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.301369863	0

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 7915Mars Place - Foster
RECEPTOR: Child - Indoor

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	3	0.03	0.0000078	0.095890411	1.92329E-06
butadiene	0.73	0.002	0.00003	0.35	1.8E-06
ethylbenzene	1.5	1	0.0000025	0.001438356	3.08219E-07
1,2,4-trimethylbenzene	2	0.007		0.273972603	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.72130137	4.0315E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 7915Mars Place - Foster
RECEPTOR: Adult - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
1,2,4-trimethylbenzene	2.2	0.007		0.301369863	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.301369863	0

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AIR EMISSIONS (FROM AIR DATA)

SITE NAME:	LDCA - 7915Mars Place - Foster
RECEPTOR:	Adult - Indoor

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

-	-	-	-	-	-	-	-

HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	3	0.03	0.0000078	0.095890411	7.69312E-06
butadiene	0.73	0.002	0.00003	0.35	7.19997E-06
ethylbenzene	1.5	1	0.0000025	0.001438356	1.23288E-06
1,2,4-trimethylbenzene	2	0.007		0.273972603	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.72130137	1.6126E-05

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AIR EMISSIONS (FROM AIR DATA)

SITE NAME:	LDCA - 79 & Mars Place - Baker
RECEPTOR:	Child - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

-	-	-	-	-	-	-	-

HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
bromodichloromethane	0.17		0.000037	N/A	5.16986E-07
chloroform	1.5	0.098	0.000023	0.014677104	2.83561E-06
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.014677104	3.3526E-06

-	-	-	-	-	-	-	-

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 79 & Mars Place - Baker
RECEPTOR: Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
1,2-dichloroethane	1.2	2.4	0.000026	0.000479452	2.56438E-06
benzene	5.3	0.03	0.0000078	0.169406393	3.3978E-06
chloroform	1.4	0.098	0.000023	0.01369863	2.64657E-06
ethylbenzene	5.9	1	0.0000025	0.005657534	1.21233E-06
m&p xylene	25	0.7		0.034246575	0
1,2,4-trimethylbenzene	5.2	0.007		0.712328767	0
1,3,5-trimethylbenzene	1.6	0.01		0.153424658	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				1.089242009	9.82108E-06

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AIR EMISSIONS (FROM AIR DATA)

SITE NAME:	LDCA - 79 & Mars Place - Baker
RECEPTOR:	Adult - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
bromodichloromethane	0.17		0.000037	N/A	2.06794E-06
chloroform	1.5	0.098	0.000023	0.014677104	1.13424E-05
				N/A	0
				N/A	0
				N/A	0
				N/A	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.014677104	1.34103E-05

- - - - - - - -

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 79 & Mars Place - Baker
RECEPTOR: Adult - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

-	-	-	-	-	-	-	-

HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER		
ET	24	24	24	8		
EF	350	350	350	250		
ED	24	24	6	25		
AT-NC	8760	8760	2190	9125		
AT-C	25550	25550	25550	25550		
CHEMICAL		C (UG/M3)	RFC	IUR	HQ	CR
1,2-dichloroethane		1.2	2.4	0.000026	0.000479452	1.02575E-05
benzene		5.3	0.03	0.0000078	0.169406393	1.35911E-05
chloroform		1.4	0.098	0.000023	0.01369863	1.05862E-05
ethylbenzene		5.9	1	0.0000025	0.005657534	4.8493E-06
m&p xylene		25	0.7		0.034246575	0
1,2,4-trimethylbenzene		5.2	0.007		0.712328767	0
1,3,5-trimethylbenzene		1.6	0.01		0.153424658	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
-					N/A	0
TOTALS					1.089242009	3.92842E-05

-	-	-	-	-	-	-	-

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA-7842 Saturn Place - Mokbel
RECEPTOR: Child-Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2	0.03	0.0000078	0.063926941	1.28219E-06
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.063926941	1.28219E-06

\- - - - - - - -

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA-7842 Saturn Place - Mokbel
RECEPTOR: Adult-Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	2	0.03	0.0000078	0.063926941	5.12875E-06
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.063926941	5.12875E-06

- - - - - - - -

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 79 & Mars Place-Eastwick RC
RECEPTOR: Child- Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
dichlorodifluoromethane	27	0.2		0.129452055	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.129452055	0

- - - - - - - -

AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 79 & Mars Place-Eastwick RC
RECEPTOR: Child - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	6	24	6	25
AT-NC	2190	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	0.72	0.03	0.0000078	0.023013699	4.61589E-07
chloroform	1.6	0.098	0.000023	0.015655577	3.02465E-06
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.038669276	3.48624E-06

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AIR EMISSIONS (FROM AIR DATA)
SITE NAME: LDCA - 79 & Mars Place-Eastwick RC
RECEPTOR: Adult - Subslab

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT		CHILD RESIDENT	ADULT WORKER
ET	24		24	24	8
EF	350		350	350	250
ED	24		24	6	25
AT-NC	8760		8760	2190	9125
AT-C	25550		25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
dichlorodifluoromethane	27	0.2		0.129452055	0
				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.129452055	0

- - - - - - - -

AIR EMISSIONS (FROM AIR DATA)

SITE NAME:	LDCA - 79 & Mars Place-Eastwick RC
RECEPTOR:	Adult - Indoor Air

EQUATIONS:

Cadj = (C x ET x EF x ED x CF1 x CF2) / (AT)

Cadj = INHALED CONCENTRATION (MG/M3)
C = CONCENTRATION IN AIR (UG/M3)
ET = EXPOSURE TIME (HR/DAY)
EF = EXPOSURE FREQUENCY (DAYS/YR)
ED = EXPOSURE DURATION (YR)
CF1 = CONVERSION FACTOR (DAYS/HR: 1/24)
CF2 = CONVERSION FACTOR (MG/UG: 1E-3)
AT = AVERAGING TIME (DAYS)

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HQ = Cadj / RFC

HQ = HAZARD QUOTIENT
RFC = REFERENCE CONCENTRATION (MG/M3)

CR = 1 - EXP(-IUR x Cadj/CF2)

CR = CANCER RISK
IUR = INHALATION UNIT RISK (M3/UG)

INPUTS		ADULT RESIDENT	CHILD RESIDENT	ADULT WORKER
ET	24	24	24	8
EF	350	350	350	250
ED	24	24	6	25
AT-NC	8760	8760	2190	9125
AT-C	25550	25550	25550	25550

CHEMICAL	C (UG/M3)	RFC	IUR	HQ	CR
benzene	0.72	0.03	0.0000078	0.023013699	1.84635E-06
chloroform	1.6	0.098	0.000023	0.015655577	1.20986E-05
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
-				N/A	0
TOTALS				0.038669276	1.39449E-05

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APPENDIX J

LEACHATE VOLUME CALCULATIONS

LEACHATE COLLECTION SYSTEM DESIGN REPORT

(DRAFT)

For

REMEDIAL DESIGN

- OPERABLE UNIT 1 -

CLEARVIEW LANDFILL - SOILS AND WASTE

LOWER DARBY CREEK AREA SUPERFUND SITE

DARBY TOWNSHIP, DELAWARE COUNTY &

CITY OF PHILADELPHIA, PHILADELPHIA COUNTY

PENNSYLVANIA

EPA Contract Number EP-S3-07-04

Work Assignment Number 061-RDRD-D366

Tetra Tech Project Number G01067

JANUARY 2018

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Written by: J. Kim/Jie Xu Date: 10/17/2017 Reviewed by: Date:

Client: U.S. EPA Project: Clearview Landfill Project No.: 112G07477 Task No. 1120

1.0 OBJECTIVE

The objective of this calculation package is to explain the method used for estimating the volume of leachate in the leachate collection system (LCS), and to design proposed leachate management systems in terms of appropriate pipe sizing, sump size, and pump size for the leachate collection and transmission systems. The three-dimensional groundwater flow model, MODFLOW 2005 by the U.S. Geologic Survey (USGS), was used to analyze hydrologic conditions at the landfill and estimate the volume of leachate (mixed with shallow groundwater) being collected in the LCS along the creek bank side of the landfill.

The mean high tide line (3 feet above mean sea level [msl]) was determined to be the demarcation elevation with respect to a distinction between leachate and groundwater for Operable Unit 1 (OU1); therefore, serves as the elevation for use in the design of the LCS. This determination was based on the definitions of leachate at the site as the water within the water mound caused by the construction of the landfill, and groundwater as the subsurface water that would be present if the landfill had not been constructed. Figure 1 conceptually shows comparison of historic (prior to landfill construction) and current groundwater conditions at the site. Based on generally applicable hydrologic theory, it is understood that if the landfill had not been constructed, the water table elevation next to Darby and Cobbs Creeks would be similar to the base flow elevations of the creek, as evidenced by several monitoring wells (MW-26S, MW-24, MW-25, and MW-18S) located near the creek (Figure 2) with their water levels ranging between 4 and 6 feet above msl. As such, the groundwater elevation in the area would naturally fluctuate between the low and high tide elevations, if not influenced by the landfill.

In addition, groundwater is being investigated separately as OU3. Therefore, extending the bottom of the LCS below the mean high tide elevation will likely result in the collection of groundwater, which is not an approved media to be directly addressed as part of the OU1 selected remedy.

2.0 METHOD

Analysis of expected leachate generation in Clearview Landfill was done by considering that the purpose of the LCS is to extend its bottom to the mean high tide elevation (3 feet above msl) of the creeks to collect leachate seeps along the creek banks, thereby reducing visual leachate seeps along the banks, while minimizing collecting surface water and shallow groundwater.

Two cover conditions were analyzed to determine the overall site leachate generation rate: poor stand of tree condition and good/excellent stand of tree condition, which represent pre-construction and post-construction of the ET cover conditions, respectively. Maximum effectiveness of the evapotranspiration (ET) cover in reduction of infiltration will not be realized immediately upon installation completion. Infiltration through the ET cover and subsequent leachate generation will decrease over time as vegetation and tree growth become more established, and the elevation of the groundwater mound within the landfill reduces due to decreased precipitation infiltration.

The steady-state MODFLOW model was used to calculate a rate of leachate collected from the LCS. Runoff is allowed to occur on 100 percent of the site during construction, and will be managed by temporary stormwater retention basins, and erosion and sediment control best management practices on the landfill. Therefore, runoff was not included as part of the total leachate collected in the LCS. Refer to the Stormwater Management Report in the Basis of Design Report (BDR) for details.

3.0 MODEL INPUT DATA

3.1 Model Domain and Layer

The model domain was subdivided into a finite difference grid of 456 columns and 354 rows covering 6,192.2 ft by 5,153.2 ft, respectively. The grid has its origin (southwestern corner) at 2,666,649.69 E, 214,267.17 N, NAD83 PA-South coordinate system. The model grid spacing varies from 7.6 ft in the area of interest to 75 ft at the outer regions of the model domain.

A total of 9 layers were used to represent the groundwater system beneath the model domain area. The base of the model is approximately 315 ft below ground surface (bgs), which is below the deepest well borings at the site. The shallow aquifer zone is represented by model Layers 1 through 4, whereas the deep aquifer zone is represented by model Layers 5 through 9. The top and bottom elevations of each model layer were defined, based on regional trends of the geologic units and site-specific boring logs. The model domain and layers are included in Appendix A.

3.2 Boundary Conditions

The model boundary conditions were defined to represent hydrogeologic features in the model domain in accordance with guidelines in the American Society for Testing and Materials (ASTM) D5609. Boundary

conditions simulated in Layer 1 include net recharge, river leakage, and constant head boundary. The values of the constant head boundaries were based on the December 2014 potentiometric surface maps. The primary sources of water entering into and exiting from the model boundary are precipitation-derived recharge and evapotranspiration, respectively. The seasonal groundwater recharge values were obtained from the mean annual (16.8 inches) and monthly recharges reported for the U.S. Geological Survey (USGS) Darby Creek near Darby station (Station ID 01475510) (https://pa.water.usgs.gov/recharge/station_graphs/01475510_graphs.html). For post-construction conditions, evaporation and transpiration rates estimated by the VADOSE/W model (refer to the Water Balance Analysis report for details) were incorporated in the MODFLOW model.

Darby Creek was simulated using river-boundary-conditions cells. River cell conductance was calculated as the product of the length and width of the river reach in each river cell, multiplied by the hydraulic conductivity of the river bed and divided by the thickness of the river bed. The length of the river bed is generally the length of the grid cell because the river crosses the entire cell. The thickness of the river bed was assumed to be 1 ft. The hydraulic conductivity of the river bed was assigned 1 ft/day initially, and was adjusted during the calibration process to obtain values that are consistent with observed hydraulic heads. The PEST (Paramter ESTimation) with pilot points was used to statistically compare the modeled results with real-world data during calibration. The values at these pilot points were spatially interpolated via a geostatistical method (called kriging) to all cells throughout the model domain. The heads at the constant head boundaries were estimated based on the site-specific potentiometric surface maps. Recharge, evapotranspiration, and river boundaries were only applied to Layer 1. Moreover, the bottom of Layer 9 is a no-flow boundary to represent the low permeability of the competent bedrock in this zone.

3.3 Hydraulic Properties

Various sources of site-specific information (e.g., boring logs and slug test results) were used to characterize hydraulic properties at the site, and more specifically to define horizontal and vertical hydraulic conductivity, as well as storage coefficients. It was reported that Clearview Landfill received large amount of municipal solid waste (MSW). Therefore, the initial values of hydraulic conductivity in the model were assigned based on an average hydraulic conductivity for MSW, sand, and sand/gravel mixture (1×10^{-3} to 1.0 cm/sec) reported in the User's Guide for the U.S. Environmental Protection Agency (EPA) Hydraulic Evaluation of Landfill Performance (HELP) Model version 3. The initial values in the model were modified as appropriate during model calibration to match the hydraulic responses in the shallow and deep aquifer zones. A total of 62 monitoring wells were included in the model, and their

simulated and observed groundwater levels (December 2014) are provided in Appendix A. A pneumatic slug test was conducted to estimate the hydraulic conductivity of a shallow aquifer with a total of 8 monitoring wells within the model domain, as part of operable unit 3 (OU-3) of the site for groundwater investigation in July 2015. The test results are included in Appendix A. Both observed groundwater levels and hydraulic conductivity were generally in an agreement with the modeled values.

3.4 Sensitivity Analysis

A sensitivity analysis was performed to evaluate how changes in selected model parameters, such as the horizontal and vertical hydraulic conductivities, affect the model. One parameter at a time was varied, while all other parameters were held constant. The tested model parameters were varied by 50% of the calibrated values. These results were analyzed to identify the parameters that cause the greatest sensitivity when changed, and to confirm that final calibrated values fall within the range of expected values according to the ranges set during conceptual model formulation.

As summarized below, model results are most sensitive to changes in horizontal hydraulic conductivity values in the shallow zone. Results of the sensitivity analysis are summarized below. This is expected because local groundwater flow is primarily horizontal, and horizontal hydraulic conductivity is the primary property that accurately simulates the flow field. Calibrated values for these parameters were consistent with values from the field slug tests (Appendix A). In addition, no significant improvement in model calibration was achieved by adjusting these parameters. Therefore, the model parameter values were accepted for predictive use.

Model Parameters

Model Parameter	Multiplier	Normalized RSS
Horizontal Hydraulic Conductivity of Shallow Zone	0.5	2.67
Horizontal Hydraulic Conductivity of Shallow Zone	1.5	0.99
Horizontal Hydraulic Conductivity of Deep Zone	0.5	1.01
Horizontal Hydraulic Conductivity of Deep Zone	1.5	1.00
Vertical Hydraulic Conductivity of Shallow Zone	0.5	0.99
Vertical Hydraulic Conductivity of Shallow Zone	1.5	1.03
Vertical Hydraulic Conductivity of Deep Zone	0.5	1.00
Vertical Hydraulic Conductivity of Deep Zone	1.5	1.00

Note: Normalized RSS (residual sum of squares) is the new RSS divided by calibrated model RSS.

4.0 MODFLOW MODEL RESULTS

The MODFLOW simulation results for the two cover conditions are included in Appendix B and summarized in the table below. The estimated volumes of leachate to be collected in the LCS when the LCS bottom is extended to the mean high and low tide elevations of the creek are provided for comparison purposes. The design of the LCS will be based on the estimated volume of leachate in the LCS with its bottom extended to the mean high tide elevation (3 feet above MSL) of the creeks under the spring post-construction conditions. The total estimated volumes of shallow groundwater discharging to the creeks under two tide and post-construction cover conditions are also provided in the summary table below.

Model Results

Stand of Tree Condition	Season	Total Discharge to Creek (ft^3/day) w/ LCS		Total Discharge to Creek (gal/day) w/ LCS		Total Collection in LCS (ft^3/day)		Total Collection in LCS (gal/day)	
		High Tide	Low Tide	High Tide	Low Tide	High Tide	Low Tide	High Tide	Low Tide
Poor	Spring	4,936	6,860	36,924	51,316	5,396	7,070	40,365	52,887
	Summer	2,008	3,910	15,021	29,249	1,322	2,660	9,889	19,898
	Fall	2,062	4,342	15,425	32,480	2,086	3,596	15,604	26,900
	Winter	4,236	5,960	31,687	44,584	4,362	6,019	32,630	45,025
Good/ Excellent	Spring	1,318	3,275	9,859	24,499	1,236	2,881	9,246	21,551
	Summer	825	1,978	6,171	14,796	202	795	1,511	5,947
	Fall	974	2,028	7,286	15,170	317	1,239	2,371	9,268
	Winter	1,047	2,898	7,832	21,679	892	2,388	6,673	17,863

5.0 LEACHATE COLLECTION SYSTEM DESIGN

A 6-inch HDPE perforated pipe will be placed horizontally at the bottom of the trench and backfilled with gravel. The trench will be located approximately 50 feet away from the creek, and its bottom will be extended to 3 feet above msl, which is the mean high tide elevation of the creek. The gravel envelope shall be surround by a non-woven geotextile to minimize entry of fines into the perforated pipe. The slope

of the pipe will be 0.5% to accommodate a gravity flow to the sumps that will pump water to the treatment wetland (or its pretreatment systems) through a force main.

5.1 Leachate Collection Trenches

As shown in design drawings in Appendix D, an approximately 2-foot wide trench along the landfill bank will be excavated down to high tide elevation (i.e., 3 feet above msl). Note that the trench bottom elevation will not be at high tide elevation throughout the entire length of the trench and will partly be higher (up to 1.275 feet) than high tide elevation to accommodate 0.5% slope of the pipe at the bottom for a gravity flow without collecting water below high tide elevation.

5.2 Pipe Design

5.2.1 Pipe Sizing

Based on the model results summarized previously, the maximum leachate flow that a pipe in the collection trench would need to carry is 1,236 ft^3/day or 0.0143 ft^3/sec under good/excellent stand of tree condition. The proposed pipe design is a 7 in. nominal outer diameter (OD) (6-in. inner diameter) corrugated HDPE pipe. The pipe capacity is calculated using Manning's equation:

$$Q_{pipe} = \frac{1.49}{n} A R_h^{2/3} S^{1/2}$$

where:

- Q_{pipe} = maximum flow rate through the pipe (cfs)
- R_h = hydraulic radius (ft) = wetted area/wetted perimeter
- S = hydraulic gradient (ft/ft)
- A = cross-sectional flow area (ft^2)
- n = Manning's roughness coefficient

The Manning's coefficient, n, for a corrugated HDPE pipe is 0.012. The hydraulic gradient used in calculating the full flow pipe capacity is the minimum base grade slope, which is 0.5 percent. So, the full flowing pipe capacity for a 6 in. ID HDPE pipe is:

$$Q_{pipe} = \frac{1.49}{0.012}\left(0.196\,ft^2\right)\left(\frac{0.196\,ft^2}{1.57\,ft}\right)^{2/3}\left(0.005\right)^{1/2} = 0.431\,ft^3/\sec$$

The factor of safety against pipe overflow is:

$$FS = \frac{Q_{pipe}}{Q_{\max}} = \frac{0.431\,ft^3/\sec}{0.0143\ ft^3/\sec} = 30$$

5.2.2 Pipe Perforation Sizing

The maximum allowable diameter of perforations in the collector pipe will be specified to ensure the retention of the LCS gravel particles (AASHTO No. 57 stone). The maximum allowable diameter of the perforations in the collector pipes to provide particle retention of gravel particles may be determined as follows:

$$d_{h-\mathbf{max}} = \frac{d_{85}}{F}$$

where:

$d_{h\text{-}max}$ = maximum perforation diameter to provide particle retention (in.)

d_{85} = particle size of the pipe bedding material for which 85 percent by weight of the particles are finer

F = factor varying between 1.2 to 2

For calculations of the maximum perforation diameter in leachate collection pipes surrounded by AASHTO No. 57 stone, a particle gradation curve is shown as Figure 3. The range of d_{85} taken from the figure varies from 23 mm (0.905 in) to 30 mm (1.18 in). For a conservative design, the minimum d_{85} will be used with an F factor of 1.8, therefore the maximum pipe perforation size allowable for pipes surrounded by AASHTO No. 57 stone is ½ in (0.905/1.8).

The ability of the pipe perforation to convey leachate collected is evaluated using the Bernoulii equation of flow (Q) through an orifice (per hole or slot):

$$Q = aC_B\sqrt{2gh}$$

where:

a = cross-sectional area of the orifice (ft^2)
C_B = orifice discharge coefficient (usually 0.62)
g = acceleration of gravity = 32.2 ft/sec^2
h = liquid depth above the hole (ft)

Assuming a typical diameter of pipe perforation of 0.375 inch and the pipe is fully submerged (leachate head equal to an outer pipe diameter of 8.625 inches), the calculated flow is:

$$Q = \pi(0.1875/12)^2(0.62)\sqrt{2(32.2\ ft/\sec^2)(8.625/12)} = 0.0032 cfs/hole$$

For an average leachate collection pipe length of 500 ft., the maximum flow per linear foot is equal to 0.0143 cfs/500 ft. = 0.0000286 cfs/ft. Thus, 0.375-inch perforations spaced every 5 inches will have more than enough capacity to handle the maximum flow.

5.3 Pump Station Design

The leachate collection manhole and pump (precast pump station) were sized, based on maximum volume of leachate under good stand of tree conditions in spring (Section 4.0). Currently, it is planned to construct 6 pump stations along the LCS. For conservative design, the overall impingement rate of leachate collection to each station is assumed to be equal to maximum estimated volume:

$$Q_{\max} = 1{,}236\ ft^3/day = 6.42 gal/\min$$

The designed manhole grades and corresponding volumes are shown in Attachment A of the BDR. A pump-off level of -0.5 feet (below msl) will be used to ensure adequate liquid level above the pump hose.

The pump-on level will be 3.2 ft above msl. For these pump on/off levels, the permanent leachate pool and maximum leachate pool in the manhole with an inner diameter of 48 inches (4 ft) and a bottom elevation at -2.33 feet below msl are 172 and 520 gallons, respectively. The net leachate storage volume within the manhole was calculated as follows:

$$V = 520gal - 172gal = 348gal$$

The minimum pumping rate was calculated to provide a velocity greater than 2 ft/sec in a 2-in. diameter force main (Schedule 80, Area = 0.0218 ft^2) as follows:

$$q_{p,\min} = VA = (2\,ft/\sec)(0.0218\,ft^2)(60\sec/\min)(7.48gal/\,ft^3) = 19.57gpm$$

The pump time off (t_{off}) was calculated as follows:

$$t_{off} = \frac{348gal}{6.42gpm} = 54\min$$

A 20-gallons per minute (gpm) pump will be used in the sump for the leachate collection system. Therefore, the pump time on (t_{on}) was calculated as follow:

$$t_{on} = \frac{348gal}{(20gpm - 6.42gpm)} = 26\min$$

Calculate the pump on/off ratio (r) as:

$$r = \frac{26}{54} = 0.47$$

The calculated operating cycle for the 20-gpm pump is (1,440 min/day)/(54+26 min on/off) = 18 cycles/day.

With a 20-gpm pump, a total volume of leachate to be conveyed to the treatment wetland is:

(20 gal/min)(26 min)(18 times/day) = 9,216 gal/day

The pump time is controlled by a computer program such that a maximum combined pumping rate from six pump stations to the treatment wetland does not significantly exceed its design flow of 9,250 gal/day.

6.0 LEACHATE TRANSMISSION SYSTEM DESIGN

6.1 Methods of Analyses

The LCS pump will be designed to supply the required head to overcome the elevation difference between the sump (manhole) and the engineered treatment wetland (or pretreatment processes), as well as the frictional losses along the force main. Frictional losses increase as flow velocity increases. The worst-case scenario (i.e., a pump with greatest required head) is used as the minimum pump size for the leachate pump station.

The head required to transfer leachate between two points is calculated using the conservation of energy equation as follows:

$$Z_1 + \frac{P_1}{\gamma} + \frac{V_1^2}{2g} + H_p = Z_2 + \frac{P_2}{\gamma} + \frac{V_2^2}{2g} + \sum h_{L1-2}$$

where:

- $Z_{1,2}$ = elevations at points 1 and 2;
- $P_{1,2}$ = pressures at points 1 and 2;
- γ = unit weight of leachate;
- $V_{1,2}$ = velocities at points 1 and 2;
- g = acceleration due to gravity;
- H_p = required head supplied by pump at point 1; and
- $\sum h_{L1-2}$ = summation of frictional head losses between points 1 and 2.

The velocity and pressure head terms ($V^2/2g$, P/γ) can be neglected because: (i) the pipe cross section is constant and, therefore, the velocity head terms cancel; and (ii) both ends of the transmission system

pipe (the pump station and engineered treatment wetland) are at atmospheric pressure and, therefore, the pressure head terms cancel. Thus, the equation can be reduced and rearranged as follows:

$$H_p = (Z_2 - Z_1) + \sum h_{L1-2}$$

Therefore, the required head to be delivered by a pump is equal to the elevation difference between the pump and engineered treatment wetland, and the frictional head losses along the force main.

Frictional losses occur due to the fittings and pipe through which the leachate travels. Frictional losses due to the fittings are calculated using the following equation:

$$h_{LF} = K\left(\frac{V^2}{2g}\right)$$

where:

h_{LF} = frictional head loss due to fitting;
K = loss coefficient for fitting (dimensionless); and
V = average flow velocity through fitting (flow rate/flow area).

Frictional losses due to the pipe wall are calculated using the Darcy-Weisbach equation:

$$h_{LP} = f\left(\frac{L}{D}\right)\left(\frac{V^2}{2g}\right)$$

where:

h_{LP} = frictional head loss due to pipe wall;
f = friction factor;
L = length of pipe;
D = inside diameter of pipe;
V = average flow velocity through pipe (flow rate/flow area); and
g = acceleration of gravity.

The friction factor, f, is a function of Reynolds number (R_e) and the relative roughness of the pipe wall. The equation for the Reynolds number is:

$$R_e = \frac{VD}{\upsilon}$$

where:

ν = kinematic viscosity of leachate

6.2 Selection of Design Flow Rate for Pumps

A 20-gpm pump will be used in each pump station and operated, as previously discussed (Section 5.3).

6.3 Selection of Required Head for Pumps

6.3.1 Elevation Head

The elevation head which must be overcome for each pump station is the difference in elevation between the sump invert and the inlet of the engineered treatment wetland (or pretreatment units). The elevation at the bottom of the pump station is -1.75 ft-msl, and the elevation of the inlet of the treatment wetland or pretreatment units (as shown in Attachment A of the BDR) is 24.5 ft-msl. Total elevation head difference that needs to be overcome by the pump at each pump station is summarized below:

Treatment Wetland/Pretreatment Unit Elevation (ft-msl)	Pump Station	Elevation (ft-msl)	Elevation Head Difference (ft)
24.5	PS-1	-1.75	26.25
	PS-2	-1.75	26.25
	PS-3	-1.75	26.25
	PS-4	-1.75	26.25
	PS-5	-1.75	26.25
	PS-6	-1.75	26.25

6.3.2 Frictional Losses

The layout of the pipe network between the pump stations and the engineered treatment wetland with a pretreatment unit(s) is shown in Attachment A of the BDR. As stated previously, all pipes in the force main are 2-inch diameter dual wall HDPE pipes. In transportation systems, the pipe wall friction head loss is usually predominant, and head losses due to fittings, valves, and bends are typically minor. Frictional losses along the pipe walls are based on the pipe length, pipe diameter, and liquid viscosity.

The pipe lengths were measured and the following distances were used in the calculations:

Start Point	End Point	Length (ft)*
PS-1	Engineered Treatment Wetland or Pretreatment Units	480
PS-2		288
PS-3		845
PS-4		1,348
PS-5		1,855
PS-6		2,375

* These are approximate distances.

The kinematic viscosity of leachate (ν) used in the calculation of the Reynolds number, is assumed to be equal to that of water at 50°F (i.e., 1.41×10^{-5} ft^2/sec) [Daugherty, 1985]. The friction factor, f, used in calculating the frictional losses along the pipe wall is taken from the Moody diagram (Figure 4). In the range of Reynolds numbers above 4,000, the Moody diagram for smooth walled pipe is modeled by the equation:

$$f = 0.195 \times (R_e)^{-0.206}$$

For Reynolds numbers less than 4,000 (laminar flow), the friction factor is calculated using the following equation:

$$f = \frac{64}{R_e}$$

6.4 Calculations and Results

6.4.1 Frictional Losses

The frictional losses along the force main are dependent on the velocity of flow through the pipes. Minor frictional losses resulting from fittings and valves may be considered in the pump selection. As previously discussed, frictional losses due to the pipe wall are calculated using the Darcy-Weisbach equation. To determine frictional losses, Reynolds number (R_e) and friction factor (f) must be calculated, as follows:

$$R_e = \frac{VD}{\upsilon}$$

where:

Q = 20 gal/min = 0.044563 ft^3/sec

A = 0.0218 ft^2 (for 2-inch pipe)

V = Q/A = 0.044563/0.0218 = 2.0442 ft/sec

D = 2 in = 0.1667 ft

v = 1.41 x 10^{-5} ft^2/sec @ 50°F (assumed)

$$R_e = \frac{(2.0442)(0.1667)}{(1.41\times10^{-5})} = 24{,}168$$

The friction factor (f) of a smooth pipe with Reynolds number of 24,168 is approximately 0.024 from the Moody diagram or the following equation:

$$f = 0.195 \times (R_e)^{-0.206} = (0.195)(24{,}168)^{-0.206} = 0.024$$

Frictional losses (h_{LP}) due to the pipe wall were calculated using the Darcy-Weisbach equation:

$$h_{LP} = f\left(\frac{L}{D}\right)\left(\frac{V^2}{2g}\right)$$

where:

f = 0.024

D = 2 in = 0.1667 ft

V = 2.0442 ft/sec

g = 32.2 ft/sec^2

Calculated friction losses at each pump station are summarized below:

Pump Station	Pipe Length, L (ft)	Frictional Loss (ft)
PS-1	480	4.55
PS-2	288	2.73
PS-3	845	8.02
PS-4	1,348	12.79
PS-5	1,855	17.60
PS-6	2,375	22.54

6.4.2 Required Head for Pumps

The required head for the pump consists of two components: elevation head and friction head along the force main. Total head required by a pump at a design flow of 20 gpm is summarized below. A submersible pump that will meet a maximum head (i.e., 311 feet) and its specifications are included in Appendix C.

Pump Station	Frictional Loss (ft)	Elevation Head (ft)	Total Head Required (ft)
PS-1	4.55	26.25	30.80
PS-2	2.73	26.25	28.98
PS-3	8.02	26.25	34.27
PS-4	12.79	26.25	39.04
PS-5	17.60	26.25	43.85
PS-6	22.54	26.25	48.79

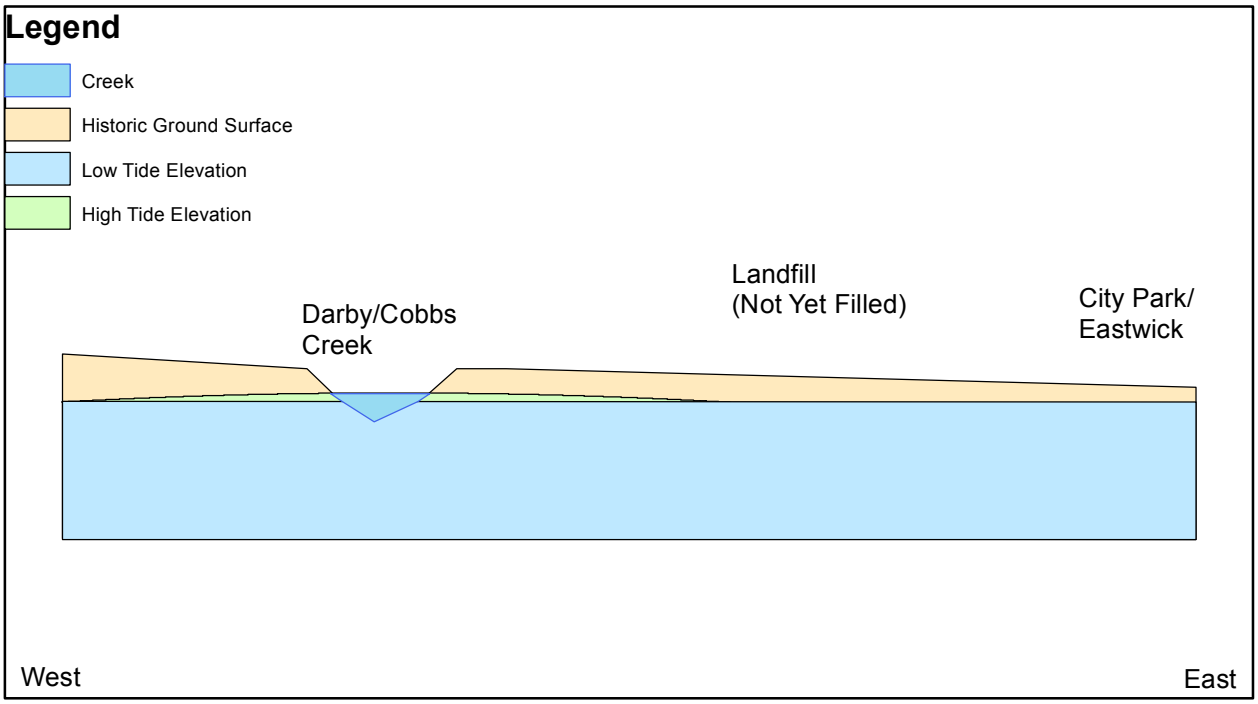
6.4.3 Pipe Pressure Requirements

The maximum internal pressure expected by the 20-gpm pump operating at 50 feet of head is:

$$50\,ft \times 62.4 \frac{lb}{ft^3} \times \frac{ft^2}{144 in^2} = 22\,psi$$

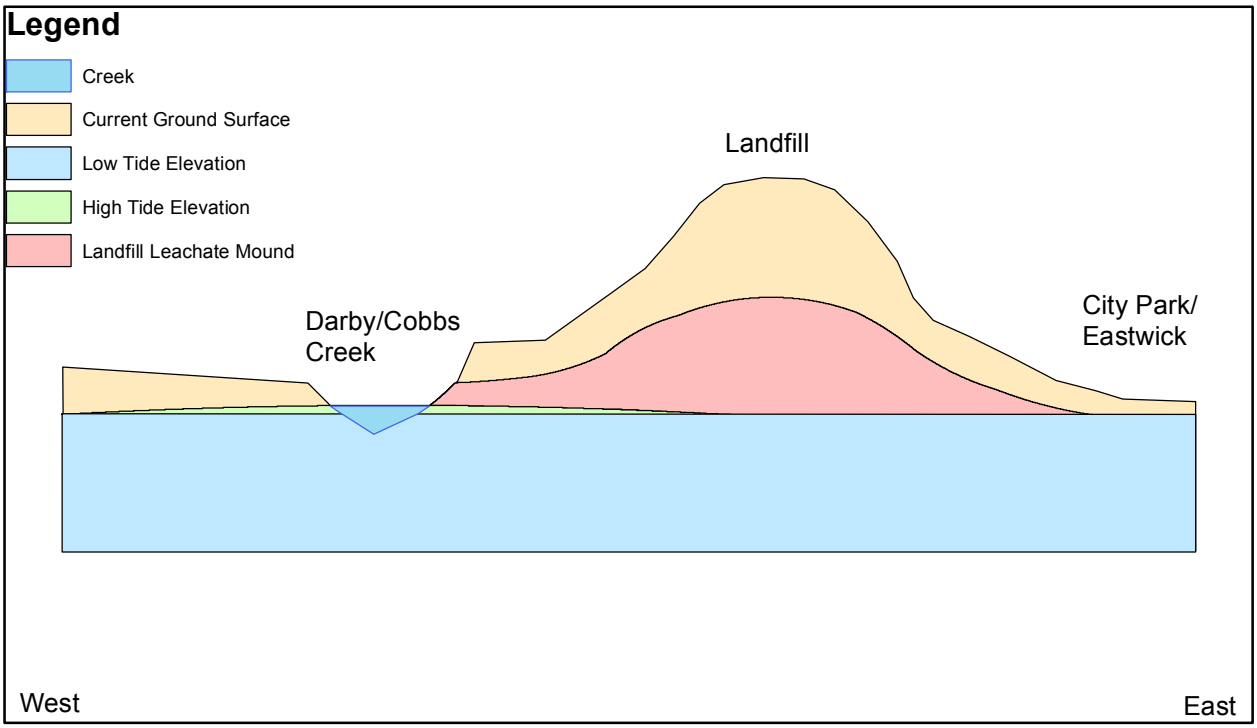
All pipes and fittings that are rated for internal pressure greater than the maximum operating pressure will be used in pump stations and the force main. A data sheet for pipes that would meet this pressure requirements is included in Appendix C.

Historic Site Conditions



Not to scale, for demonstration purposes only

Current Site Conditions



Not to scale, for demonstration purposes only

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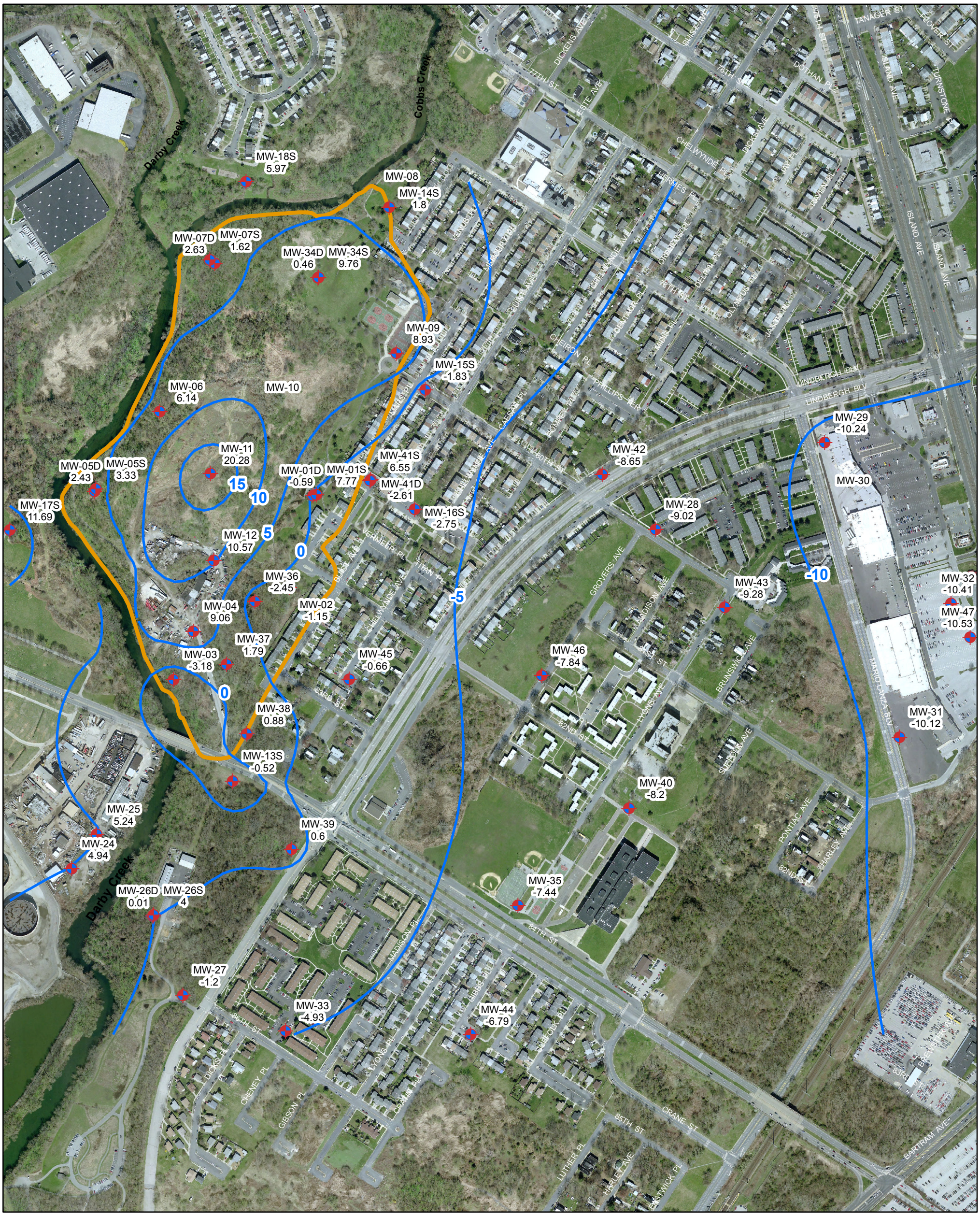
Newark, DE 19713
Phone: (302) 738-7551
Toll Free: (800) 462-0910
www.tetratech.com

Figure 1
Comparison of Historic and Current
Leachate and Groundwater Conditions
Lower Darby Creek Site
Philadelphia, Pennsylvania



Legend

- Shallow Groundwater Wells
- Historical Extent of Clearview Landfill
- -4 Shallow Aquifer Groundwater Contours
- 2.43 Shallow Groundwater Elevation (ft msl), Measured in July 2015

N
W E
S

500 250 0 500 Feet

1:6,000 1 inch = 500 feet

Figure 2
Shallow Aquifer Groundwater Contours
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

Tetra Tech, Inc
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Toll Free: (800) 462-0910
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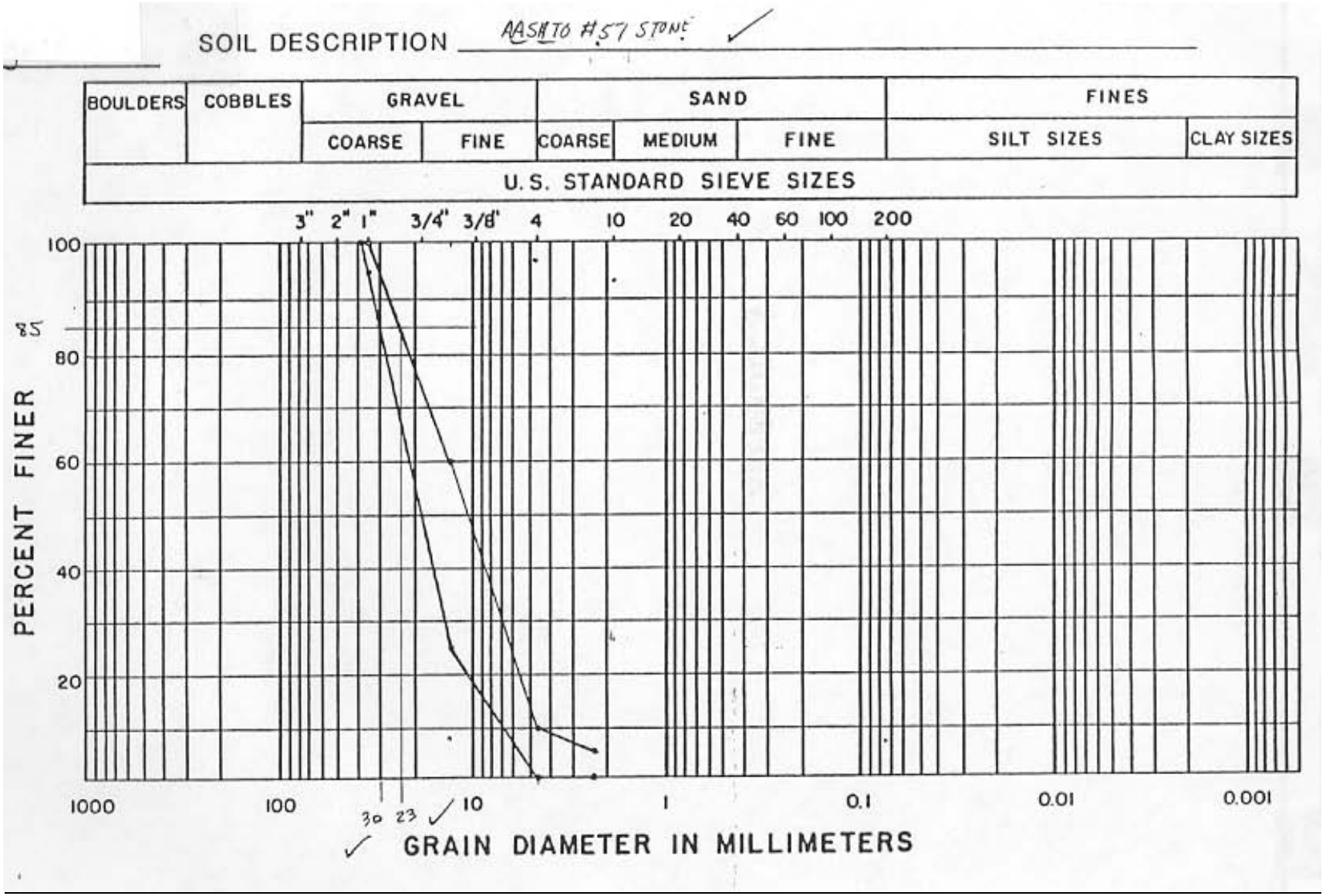


Figure 3. AASHTO No. 57 Stone Particle Gradation Curve

Figure 4

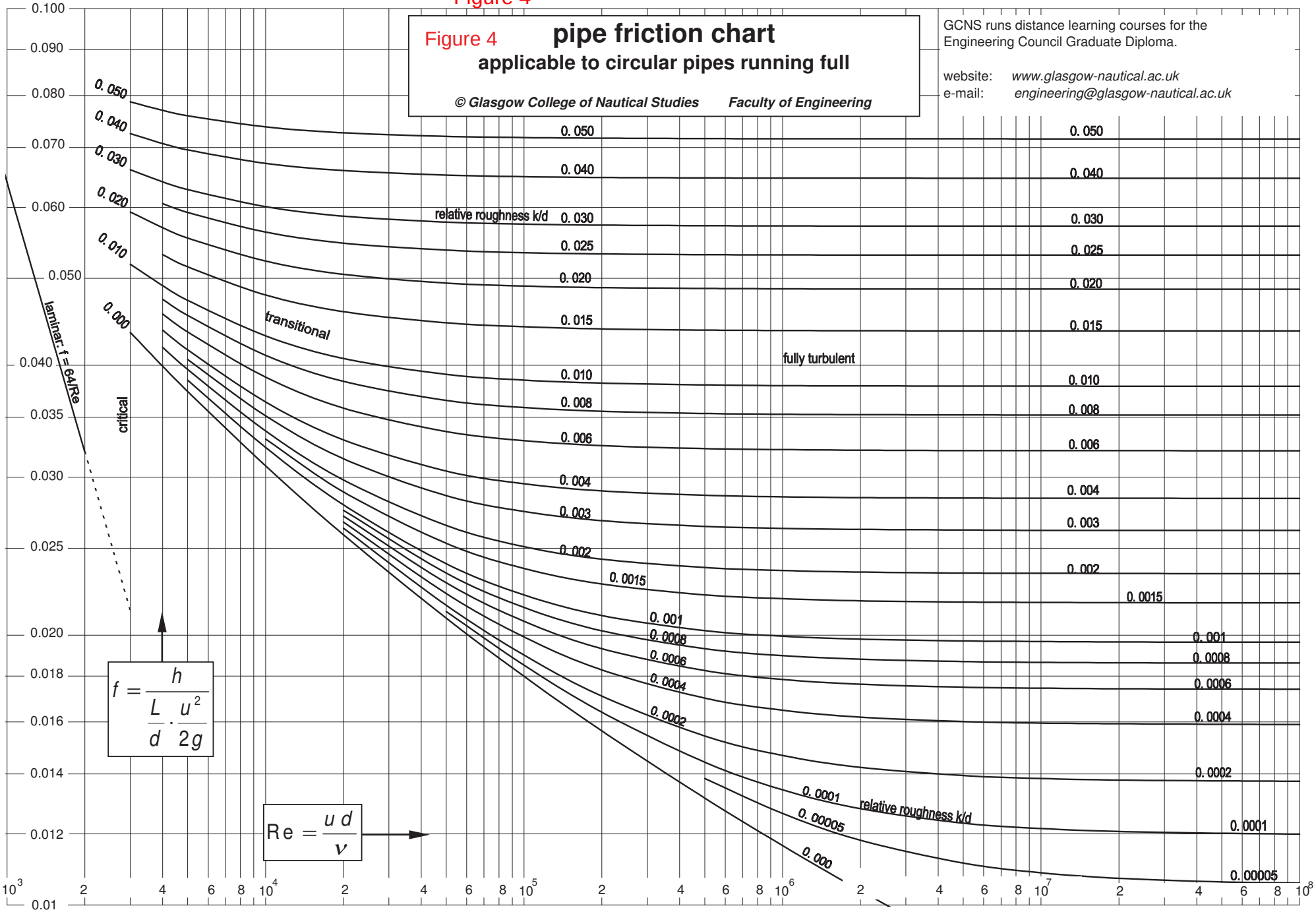
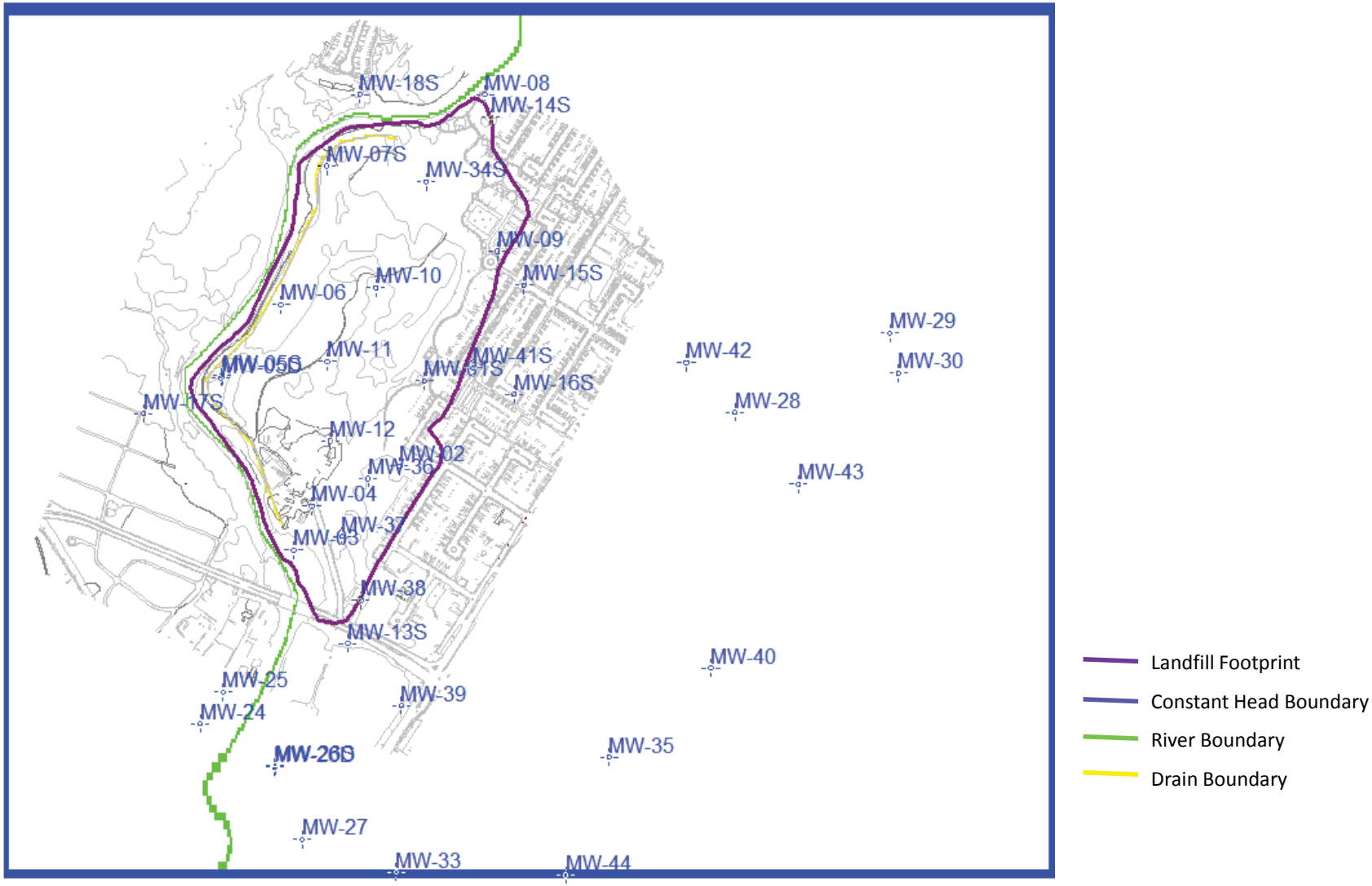


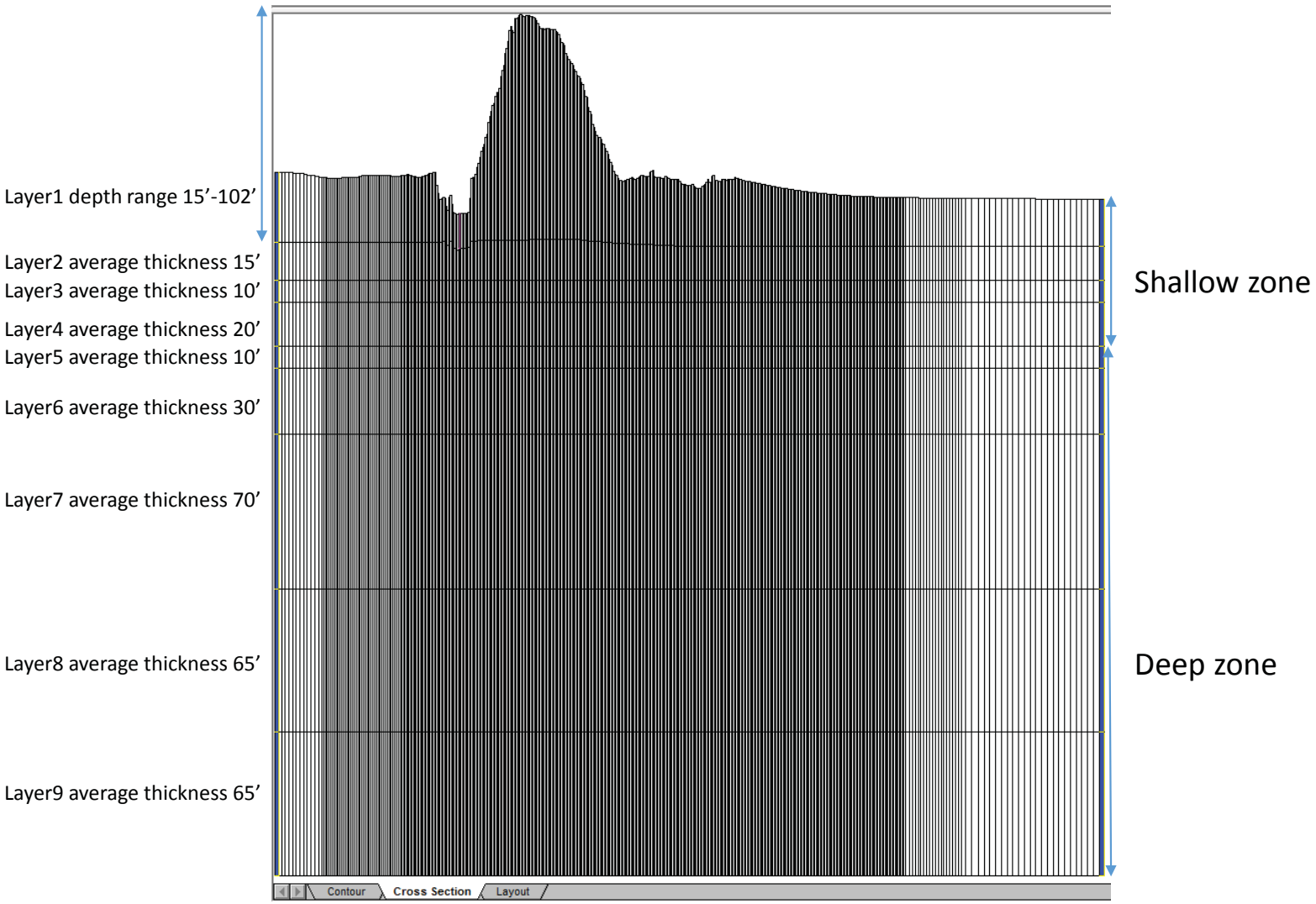
Figure 4 pipe friction chart
applicable to circular pipes running full
© Glasgow College of Nautical Studies Faculty of Engineering
GCNS runs distance learning courses for the Engineering Council Graduate Diploma.
website: www.glasgow-nautical.ac.uk
e-mail: engineering@glasgow-nautical.ac.uk
relative roughness k/d
0. 050
0. 040
0. 030
0. 025
0. 020
0. 015
0. 010
0. 008
0. 006
0. 004
0. 003
0. 002
0. 0015
0. 001
0. 0008
0. 0006
0. 0004
0. 0002
0. 0001
0. 00005
0. 000
laminar: f = 64/Re
critical
transitional
fully turbulent
$f = \frac{h}{\frac{L}{d} \cdot \frac{u^2}{2g}}$
$Re = \frac{u\,d}{\nu}$
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.035
0.030
0.025
0.020
0.018
0.016
0.014
0.012
0.01
10^3
10^4
10^5
10^6
10^7
10^8

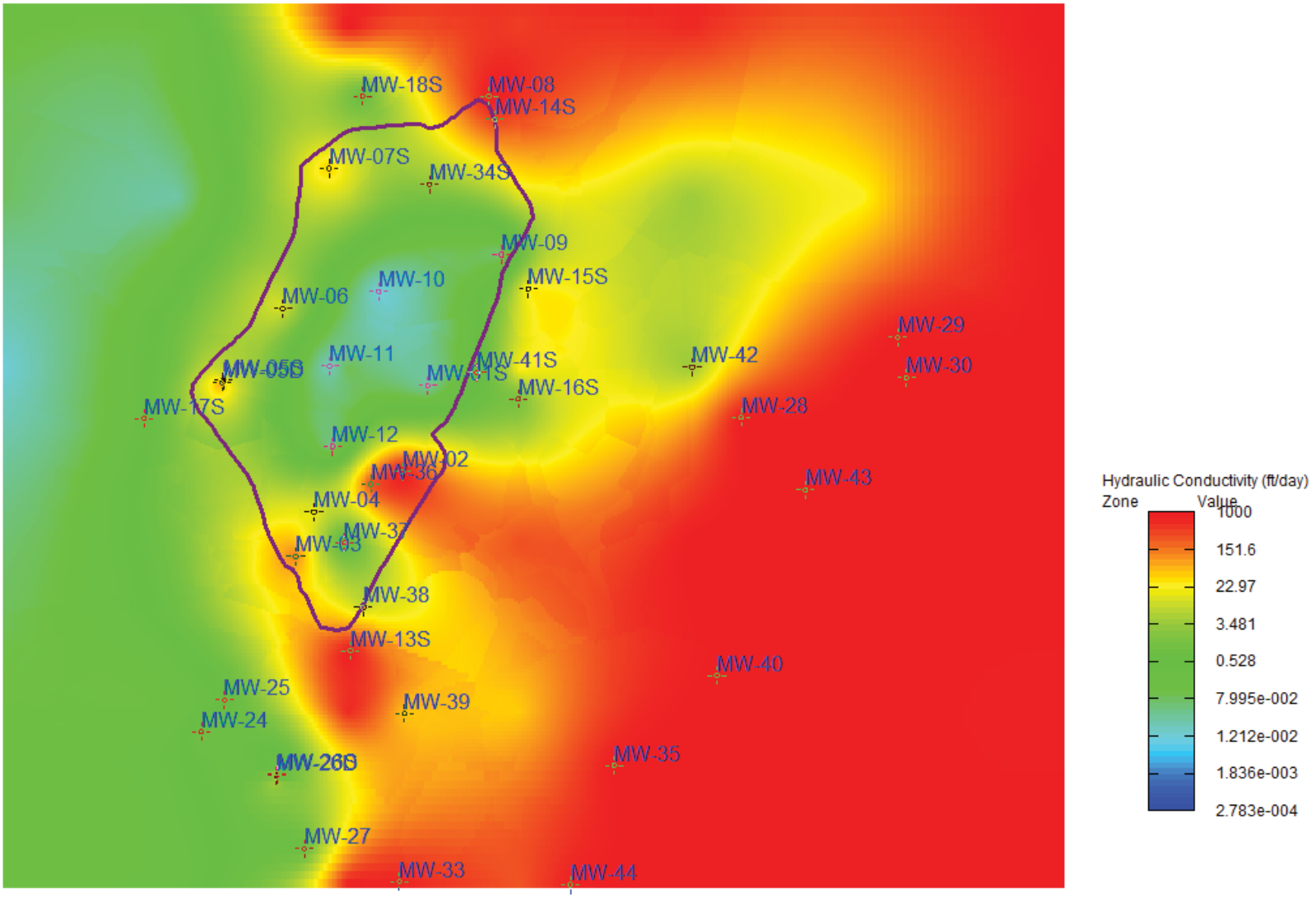
APPENDIX A

LDCA Model Constructions

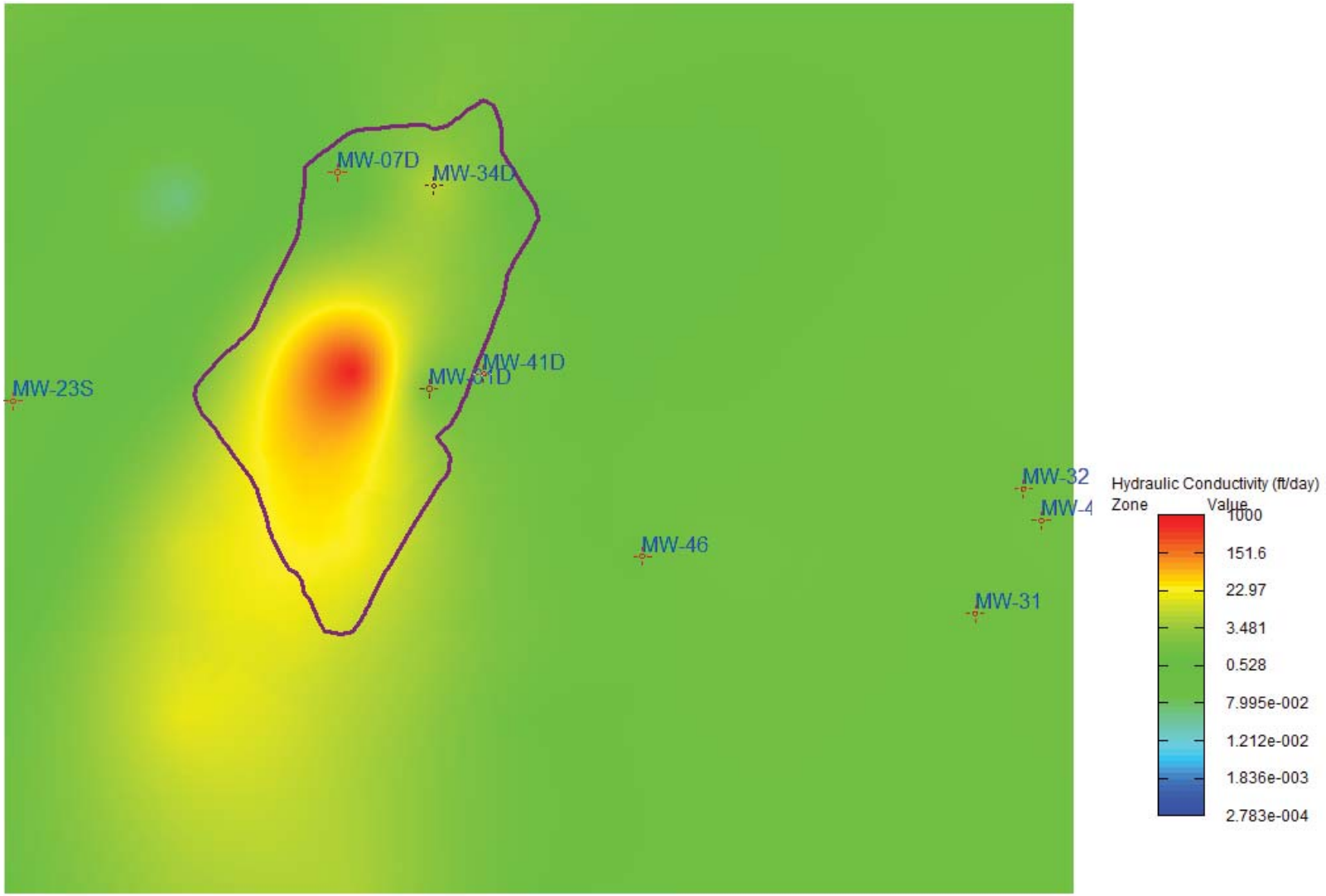
Model Domain and Boundary Conditions



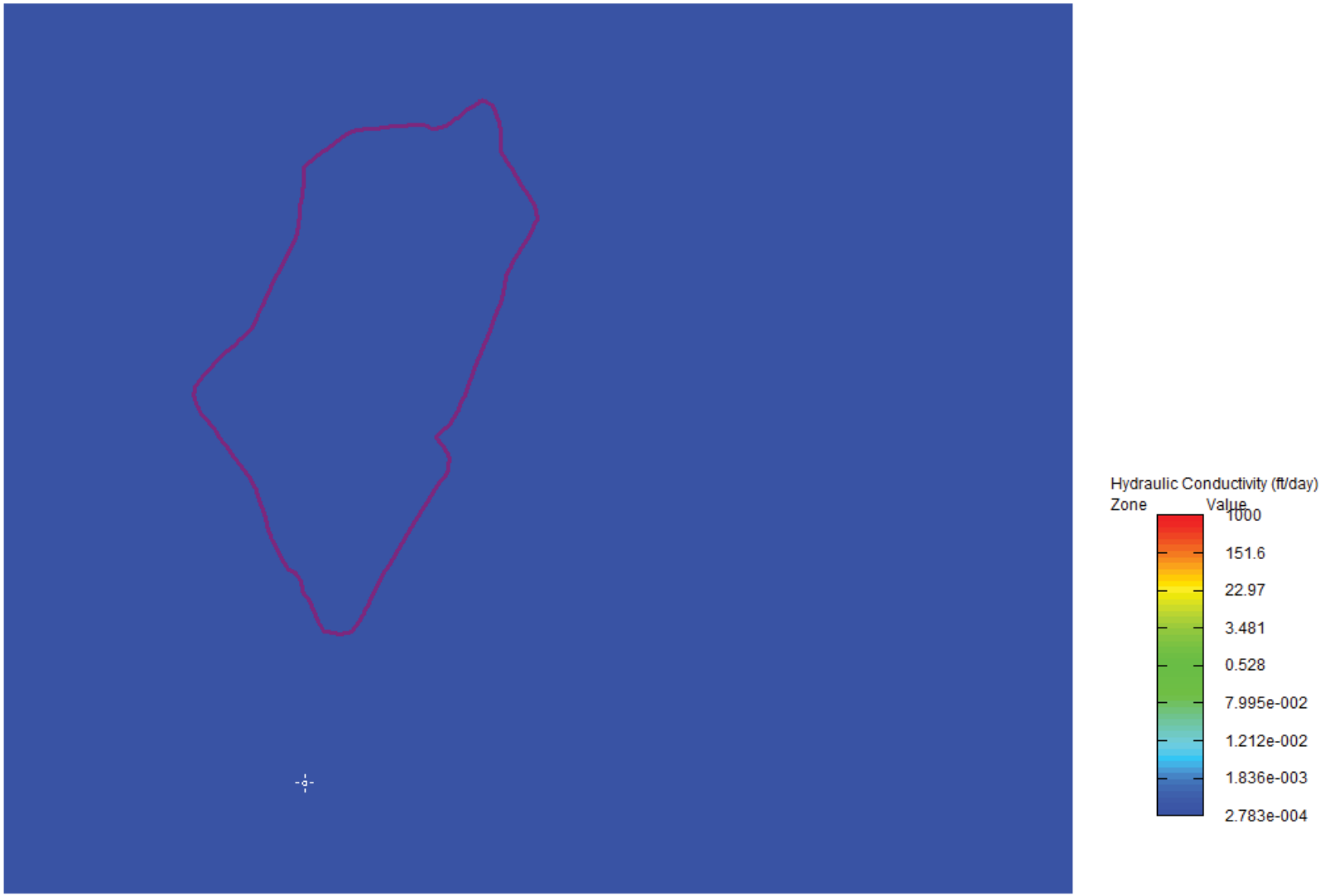

Layer1 depth range 15’-102’
Layer2 average thickness 15’
Layer3 average thickness 10’
Layer4 average thickness 20’
Layer5 average thickness 10’
Layer6 average thickness 30’
Layer7 average thickness 70’
Layer8 average thickness 65’
Layer9 average thickness 65’
Shallow zone
Deep zone
Contour
Cross Section
Layout


MW-18S
MW-08
MW-14S
MW-07S
MW-34S
MW-09
MW-10
MW-15S
MW-06
MW-29
MW-11
MW-41S
MW-42
MW-30
MW-16S
MW-17S
MW-28
MW-12
MW-02
MW-36
MW-43
MW-04
MW-37
MW-38
MW-13S
MW-40
MW-25
MW-39
MW-24
MW-35
MW-27
MW-33
MW-44
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

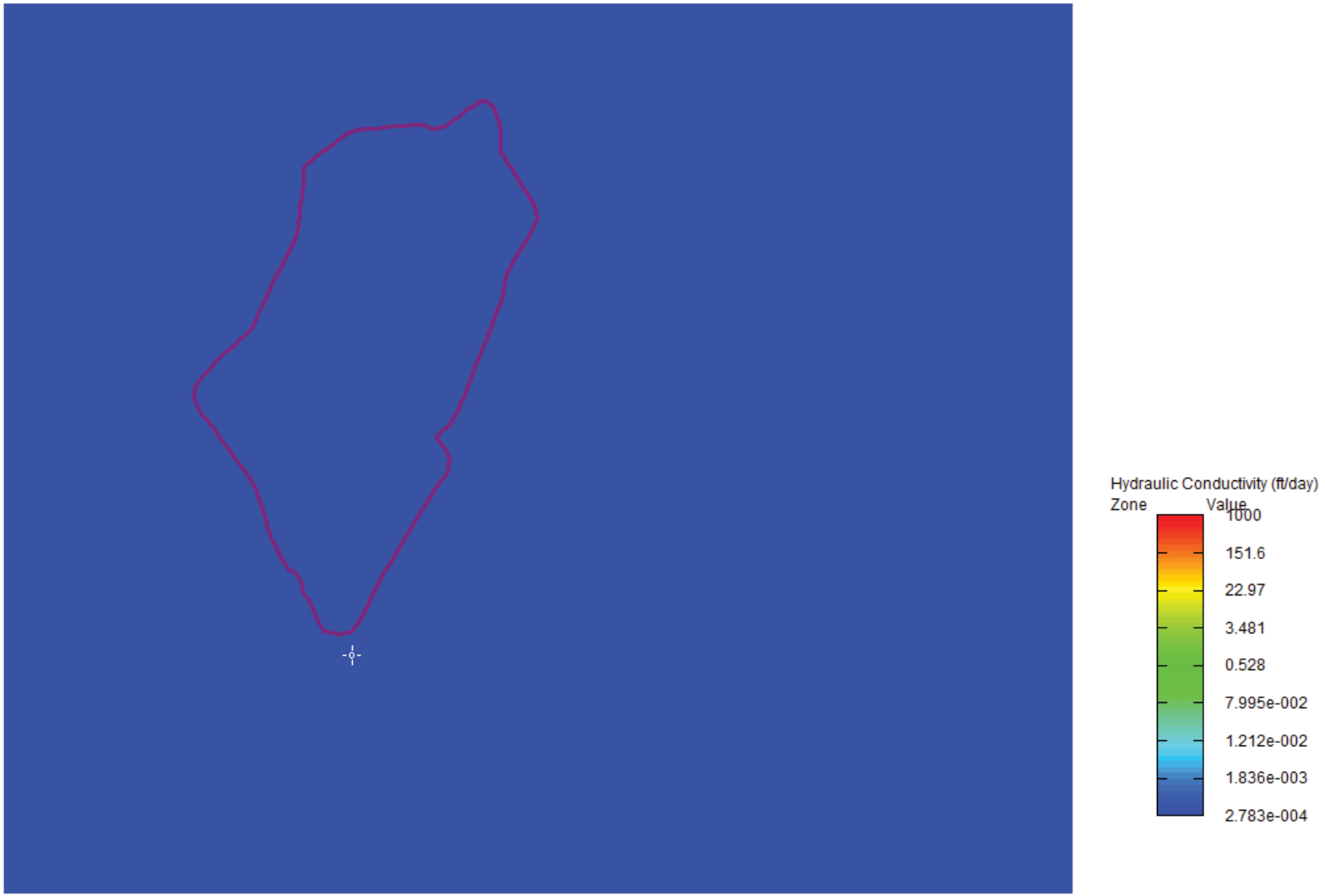
Layer 1


MW-07D
MW-34D
MW-41D
MW-23S
MW-32
MW-46
MW-31
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-003
1.836e-003
2.783e-004

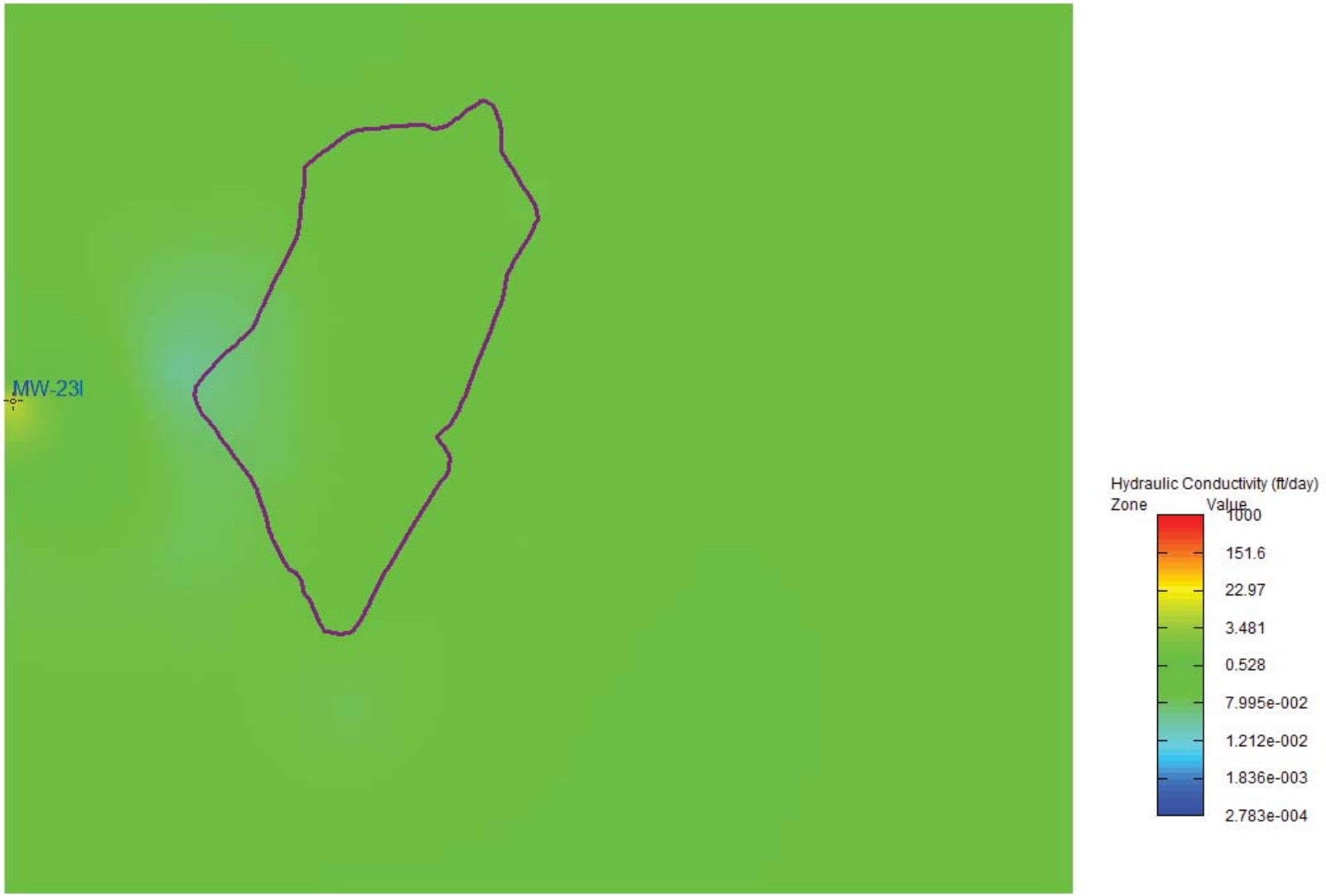
Layer 2


Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

Layer 3


Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

Layer 4


MW-23I
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

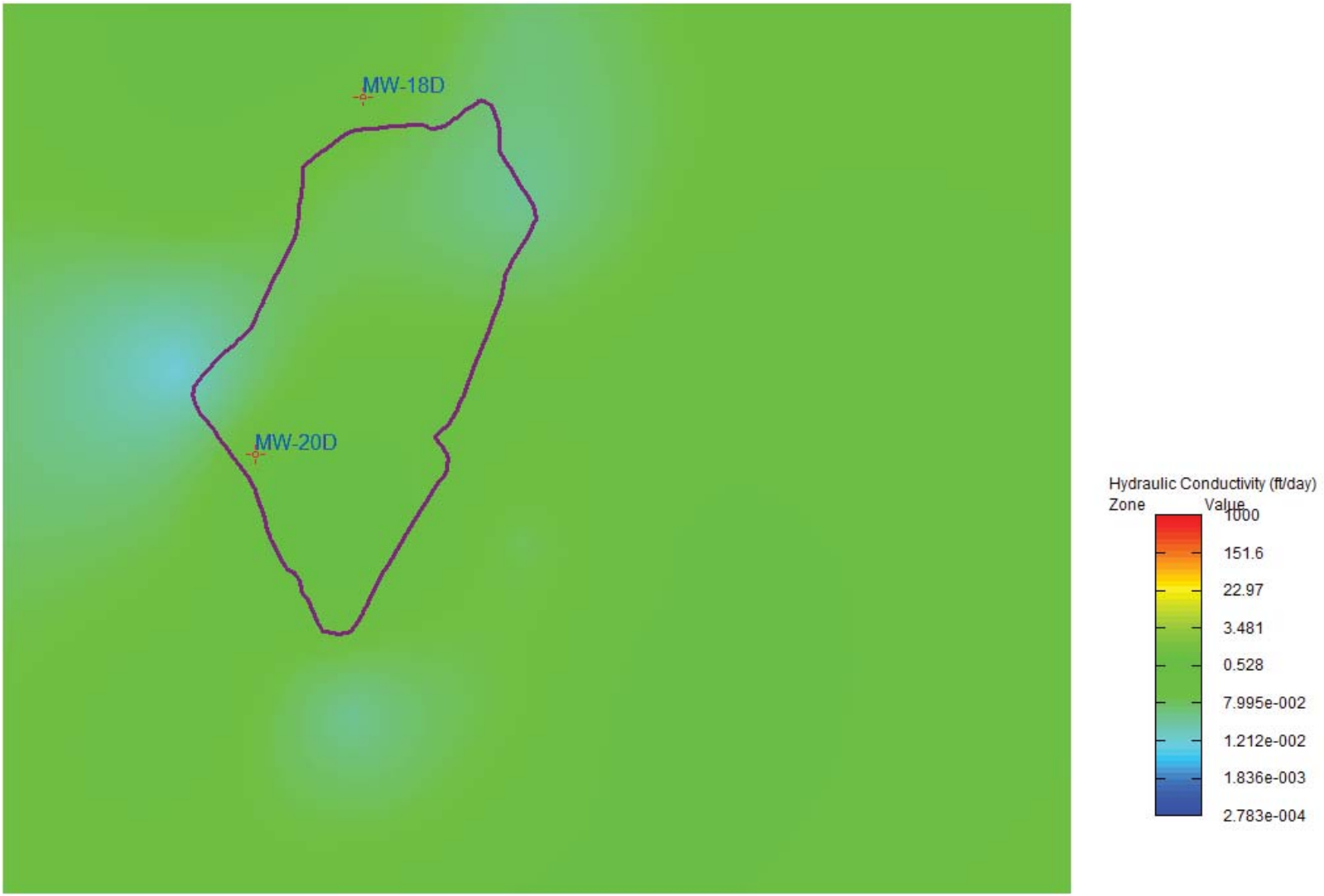
Layer 5

MW-17D
MW-19
MW-22
MW-21D
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

Layer 6

MW-14D
MW-23D
MW-16D
MW-20S
MW-13D
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

Layer 7


MW-18D
MW-20D
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

Layer 8

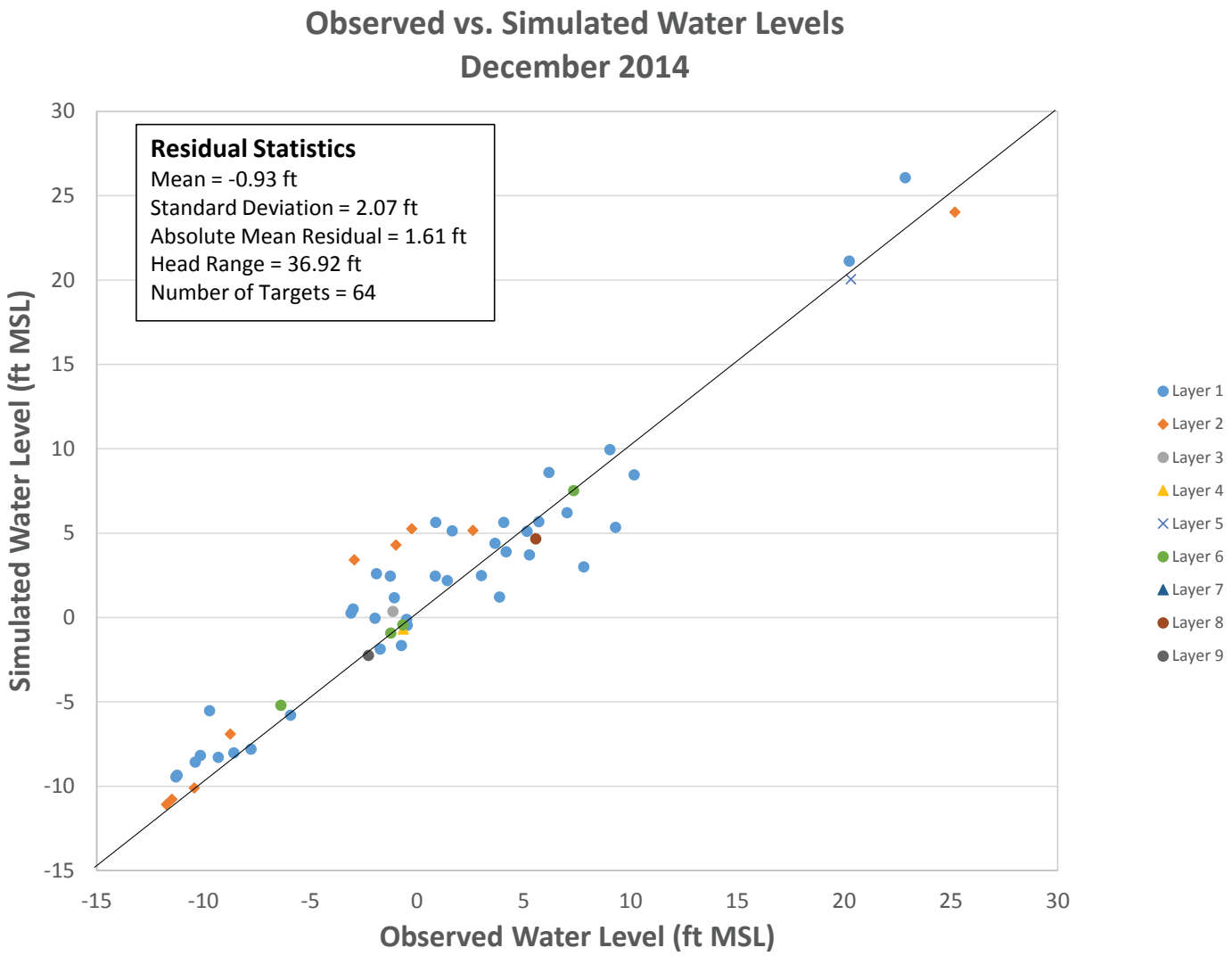
MW-15D
Hydraulic Conductivity (ft/day)
Zone
Value
1000
151.6
22.97
3.481
0.528
7.995e-002
1.212e-002
1.836e-003
2.783e-004

Layer 9

Summary of Hydraulic Conductivity (K)

ID	Average K (ft/sec)	Average K (ft/da	Modeled (ft/day)
MW-01D	0.0000184	1.58976	1.69
MW-04	0.000326	28.1664	20
MW-34D	0.0000582	5.02848	7.12
MW-34S	0.0000507	4.38048	3.13
MW-37	0.0000129	1.11456	0.62
MW-38	0.00167	144.288	100
MW-41D	0.0000177	1.52928	1.46
MW-42	0.0000563	4.86432	4.65

Average hydraulic conductivity at each location was obtained at least four slug tests.
Lithology at each well location represents a type of material encountered underneath the site.


Observed vs. Simulated Water Levels
December 2014
Residual Statistics
Mean = -0.93 ft
Standard Deviation = 2.07 ft
Absolute Mean Residual = 1.61 ft
Head Range = 36.92 ft
Number of Targets = 64
Simulated Water Level (ft MSL)
Observed Water Level (ft MSL)
30
25
20
15
10
5
0
-5
-10
-15
-15
-10
-5
0
5
10
15
20
25
30
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Layer 7
Layer 8
Layer 9

Legend

- **Shallow Monitoring Wells (Installed in 2003/2005/2006 during OU-1 RI)**
- **Deep Monitoring Wells (Installed in 2011 during OU-1 RI)**
- **Shallow Monitoring Wells (Installed in 2013 during OU-3 RI)**
- **Deep Monitoring Wells (Installed in 2013 during OU-3 RI)**
- **Historical Extent of Clearview Landfill**

Tetra Tech, Inc
Phone: (302) 738-7551
Toll Free: (800) 462-0910
www.tetratech.com

400 200 0 400 800 1,200 Feet

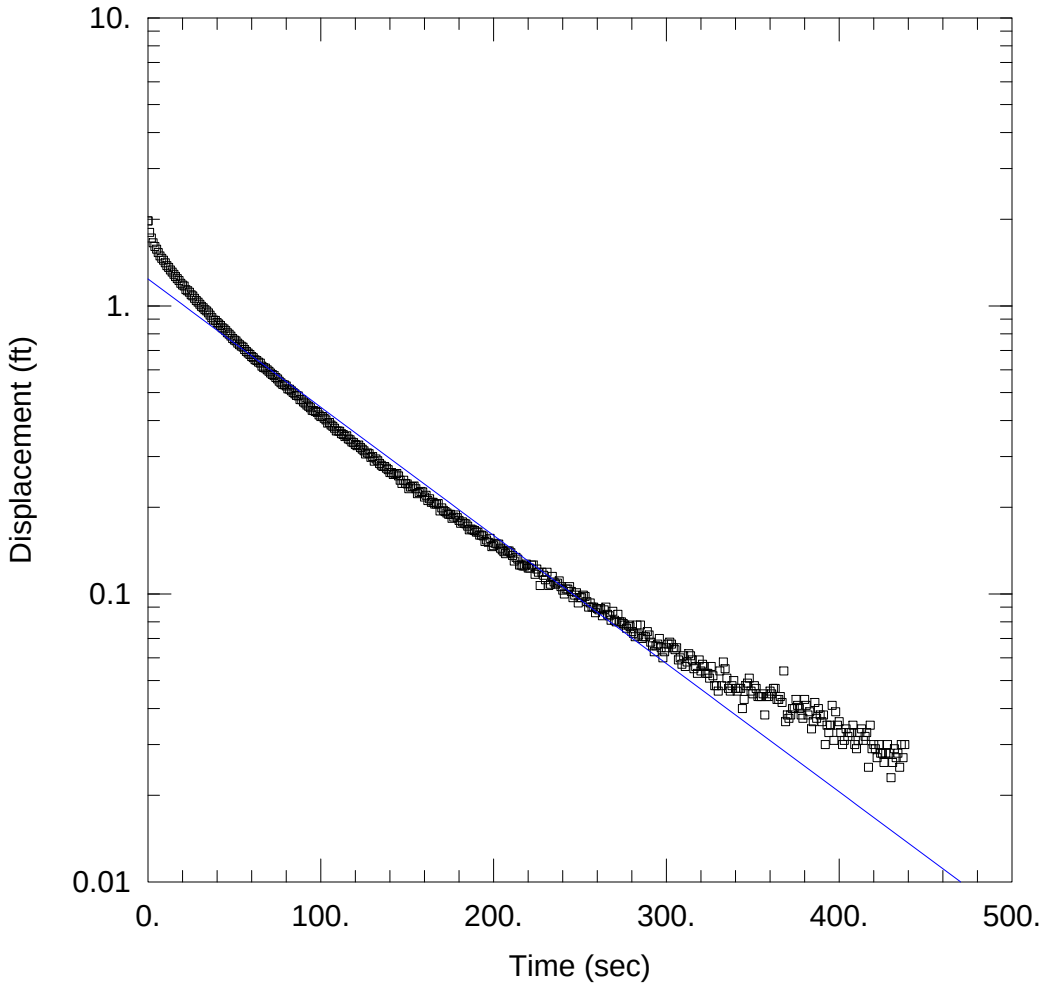
1:7,200 1 inch = 600 feet

Figure 3-1
Monitoring Well Locations
Lower Darby Creek Area (LDCA) Site
Operable Unit 3 (OU-3)
Philadelphia and Delaware Counties, Pennsylvania

N W E S

This map is provided by Tetra Tech solely for display and reference purposes and is subject to change without notice. No claims, either real or assumed, as to the absolute accuracy or precision of any data contained herein are made by Tetra Tech, nor will Tetra Tech be held responsible for any use of this document for purposes other than which it was intended.

S:\03-Projects\Federal\EPA R3 RAC Assignments\Lower Darby\112G03943 - LDCA OU3 RI_FS - JCK\Documents\RI Report\Figure\Figure 3-1 Monitoring Well Locations.rev1.mxd



WELL TEST ANALYSIS

Data Set: S:\...\MW1DTEST1.aqt
Date: 05/02/17 Time: 09:50:17

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 19.93 ft Anisotropy Ratio (Kz/Kr): 0.1

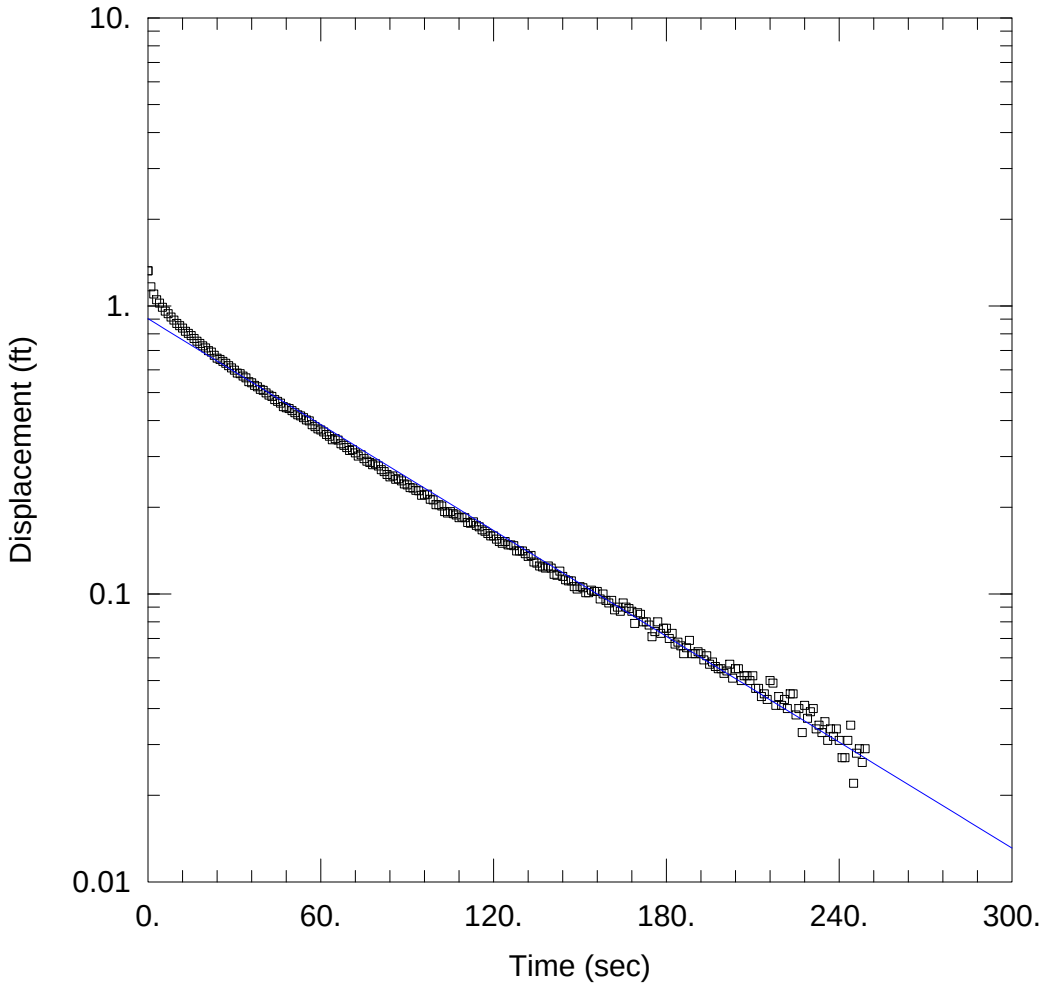
WELL DATA (MW-01D)

Initial Displacement: 1.974 ft
Total Well Penetration Depth: 25.41 ft
Casing Radius: 0.083 ft
Static Water Column Height: 25.41 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.559E-5 ft/sec y0 = 1.24 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW1DTEST2.aqt
Date: 05/02/17 Time: 09:50:36

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

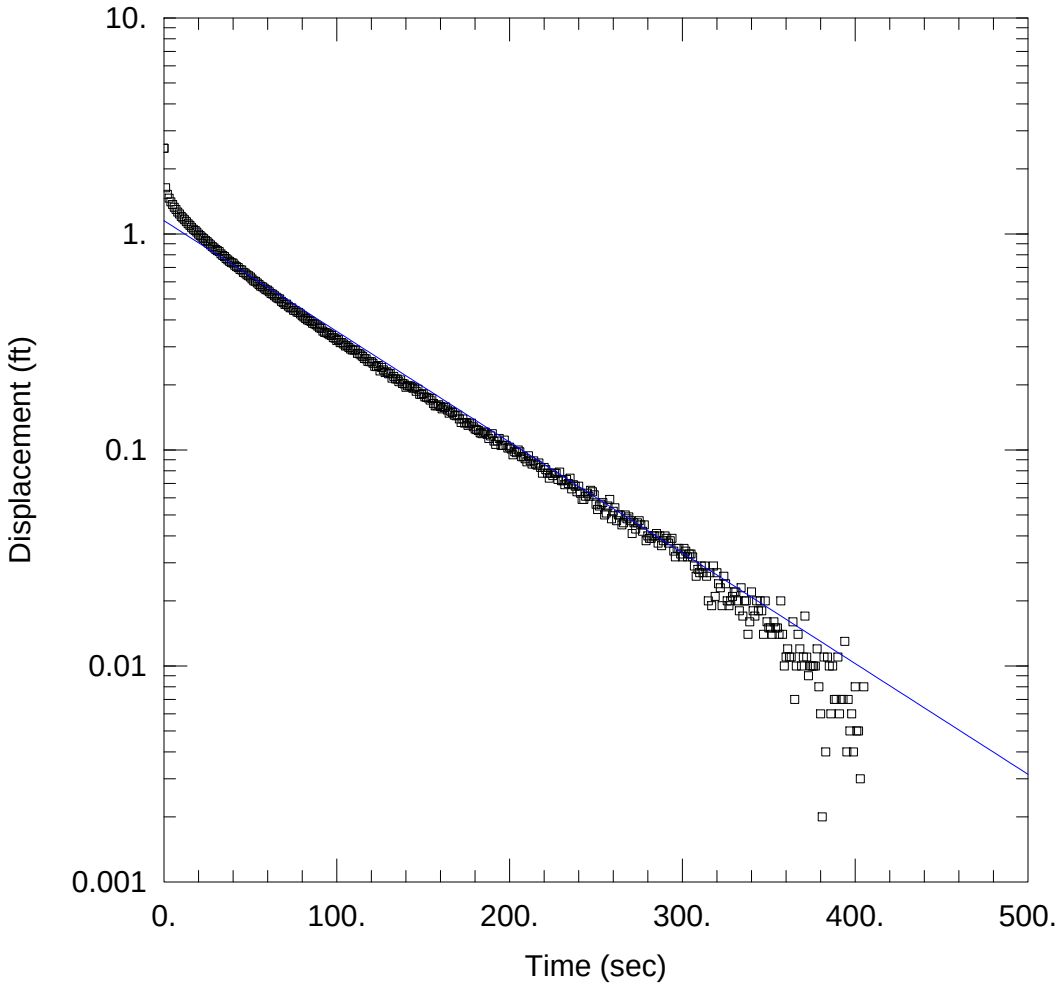
Saturated Thickness: 19.93 ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-01D)

Initial Displacement: 1.324 ft Static Water Column Height: 25.41 ft
Total Well Penetration Depth: 25.41 ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 2.145E-5 ft/sec y0 = 0.9029 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW1DTEST3.aqt
Date: 05/02/17 Time: 09:50:45

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

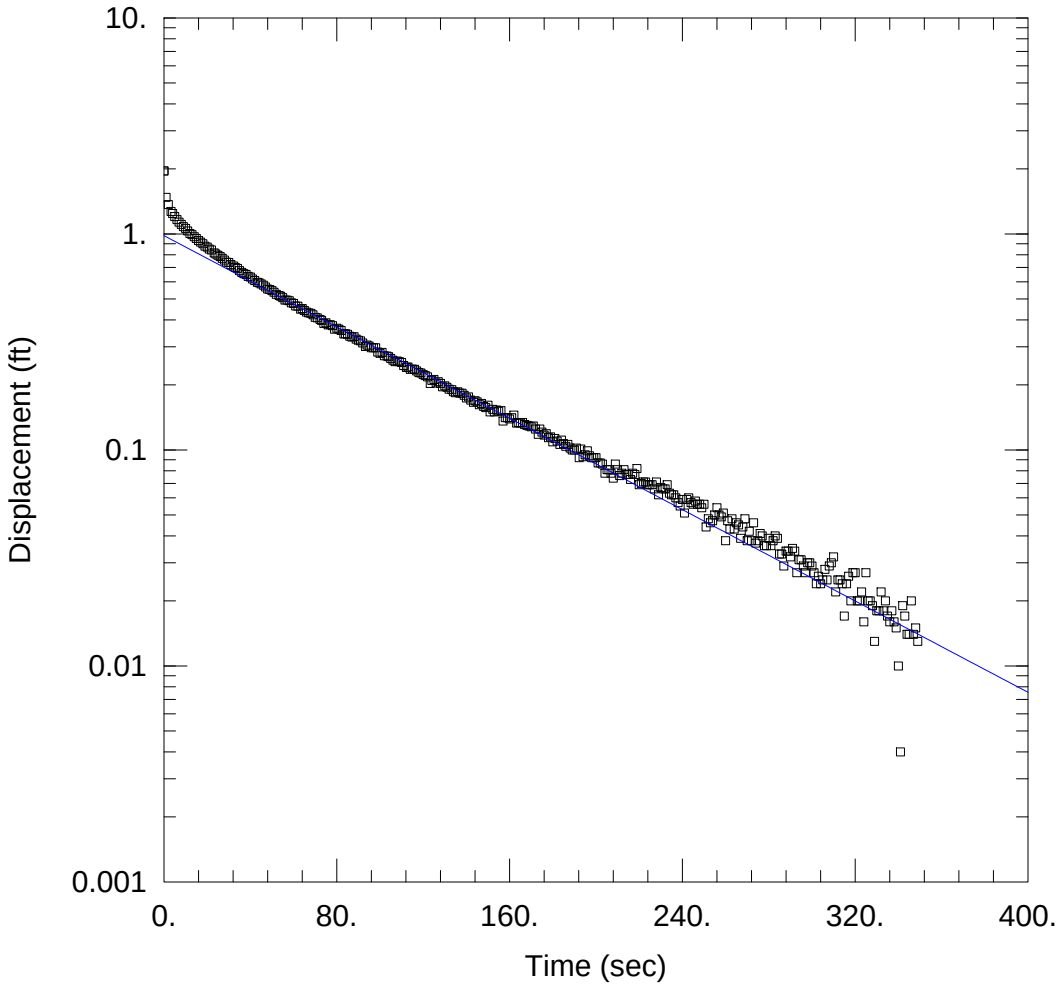
Saturated Thickness: 19.93 ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-01D)

Initial Displacement: 2.494 ft
Total Well Penetration Depth: 25.41 ft
Casing Radius: 0.083 ft
Static Water Column Height: 25.41 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.795E-5 ft/sec
y0 = 1.152 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW1DTEST4.aqt
Date: 05/02/17 Time: 09:50:55

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 19.93 ft Anisotropy Ratio (Kz/Kr): 0.1

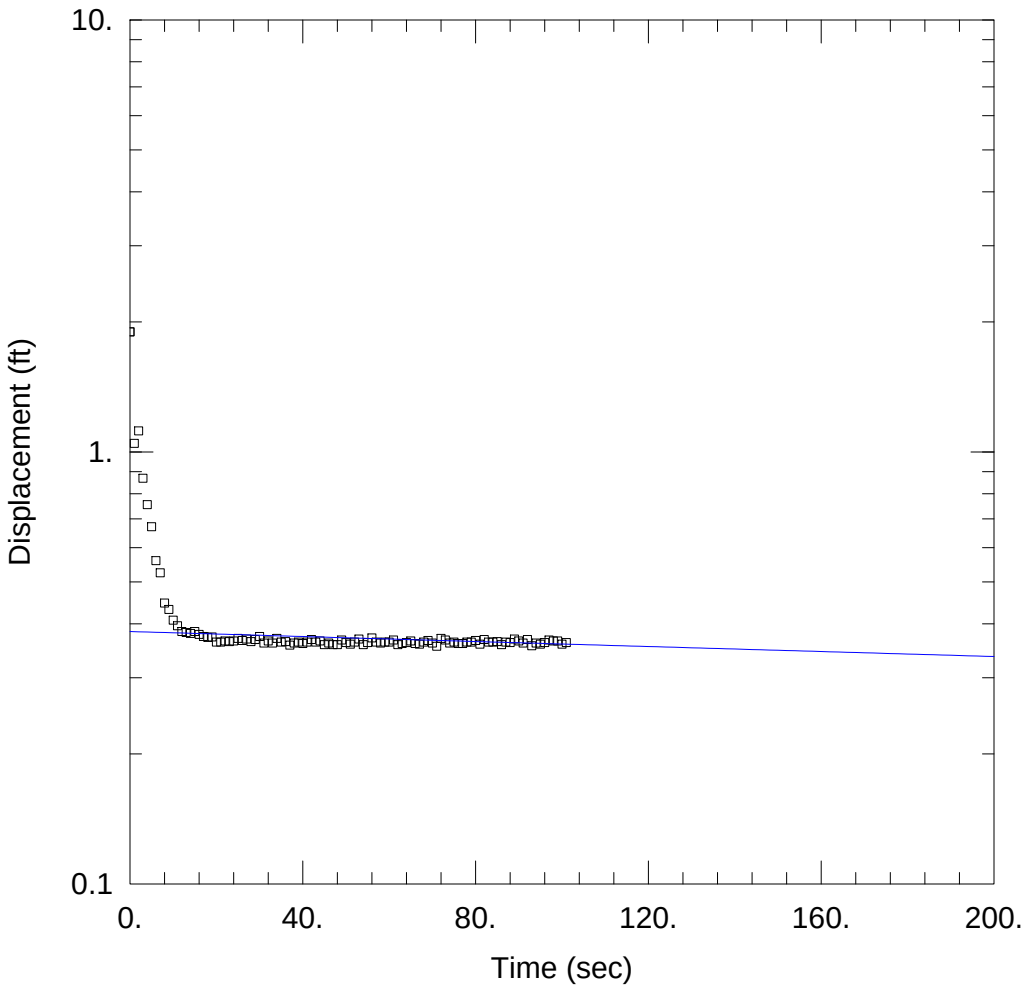
WELL DATA (MW-01D)

Initial Displacement: 1.956 ft
Total Well Penetration Depth: 25.41 ft
Casing Radius: 0.083 ft
Static Water Column Height: 25.41 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.851E-5 ft/sec y0 = 0.9821 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW04TEST1.aqt
Date: 05/02/17 Time: 09:51:08

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 32.14 ft Anisotropy Ratio (Kz/Kr): 0.1

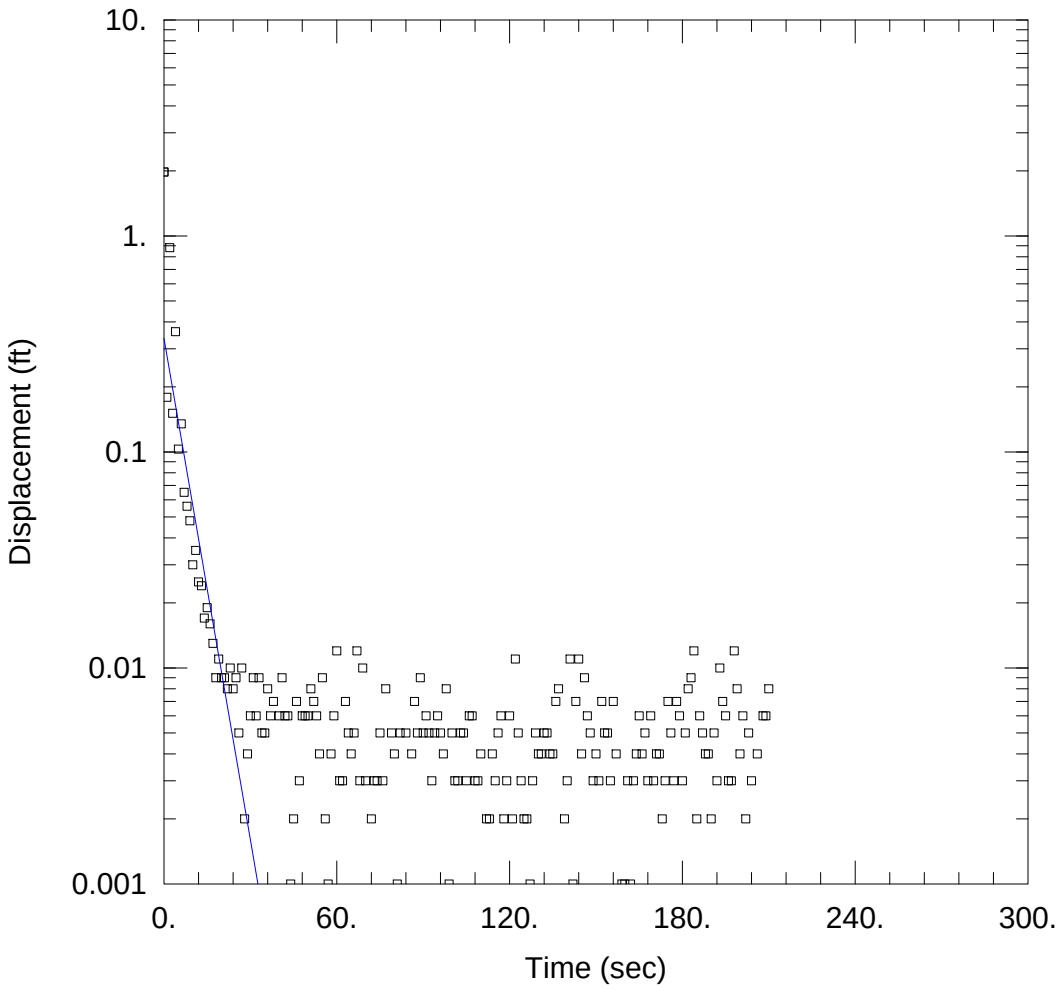
WELL DATA (MW-04)

Initial Displacement: 1.896 ft
Total Well Penetration Depth: 13.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.91 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 8.212E-7 ft/sec y0 = 0.3839 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW04TEST2.aqt
Date: 05/02/17 Time: 09:51:21

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 32.14 ft Anisotropy Ratio (Kz/Kr): 0.1

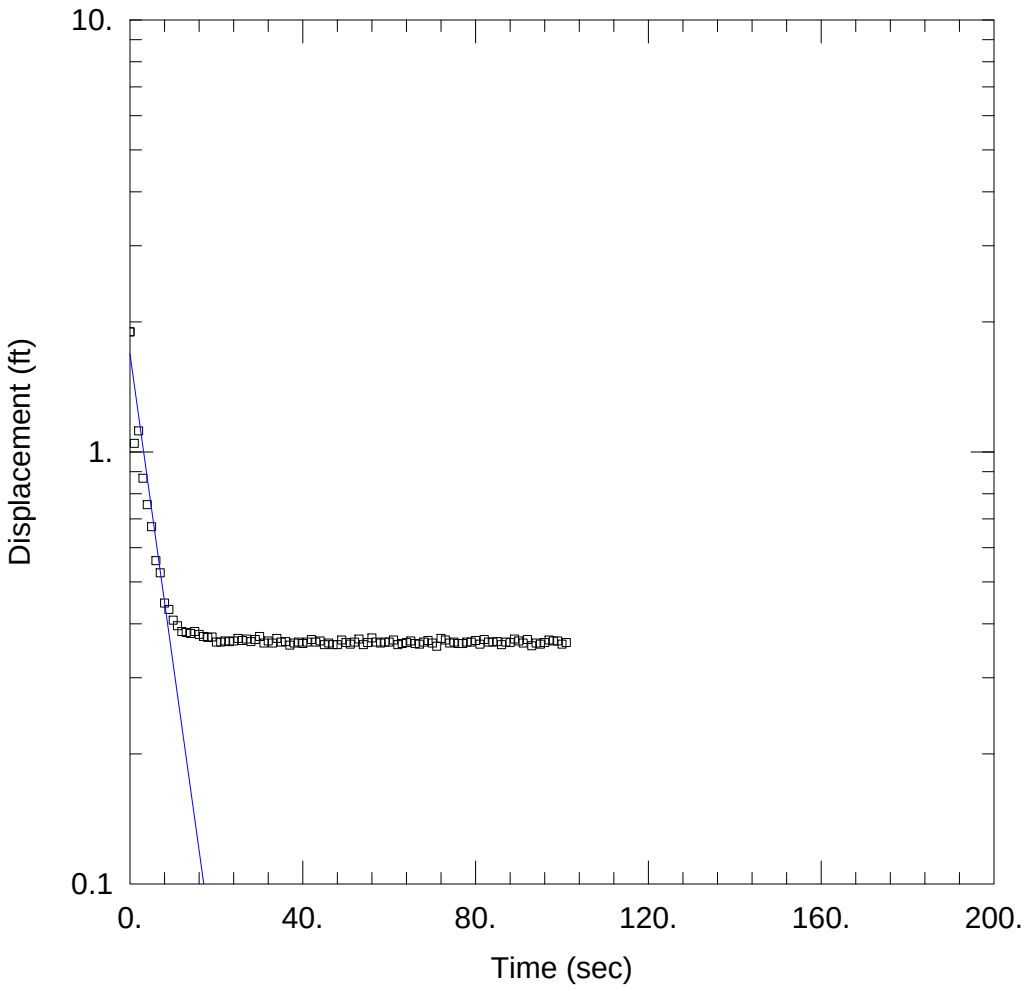
WELL DATA (MW-04)

Initial Displacement: 1.976 ft
Total Well Penetration Depth: 13.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.91 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002196 ft/sec y0 = 0.3351 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW04TEST3.aqt
Date: 05/02/17 Time: 09:51:29

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 32.14 ft Anisotropy Ratio (Kz/Kr): 0.1

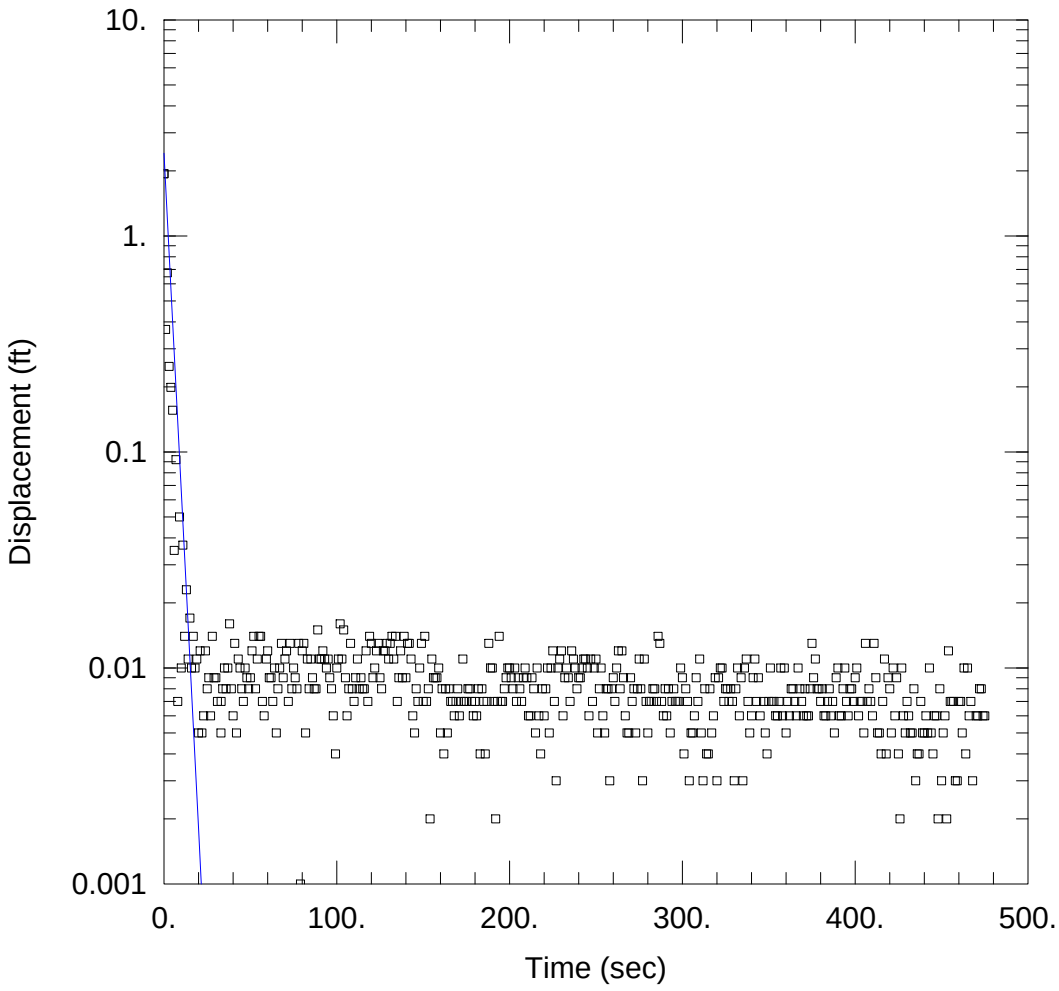
WELL DATA (MW-04)

Initial Displacement: 1.896 ft
Total Well Penetration Depth: 13.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.91 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002039 ft/sec y0 = 1.686 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW04TEST4.aqt
Date: 05/02/17 Time: 09:51:40

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-01D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 32.14 ft Anisotropy Ratio (Kz/Kr): 0.1

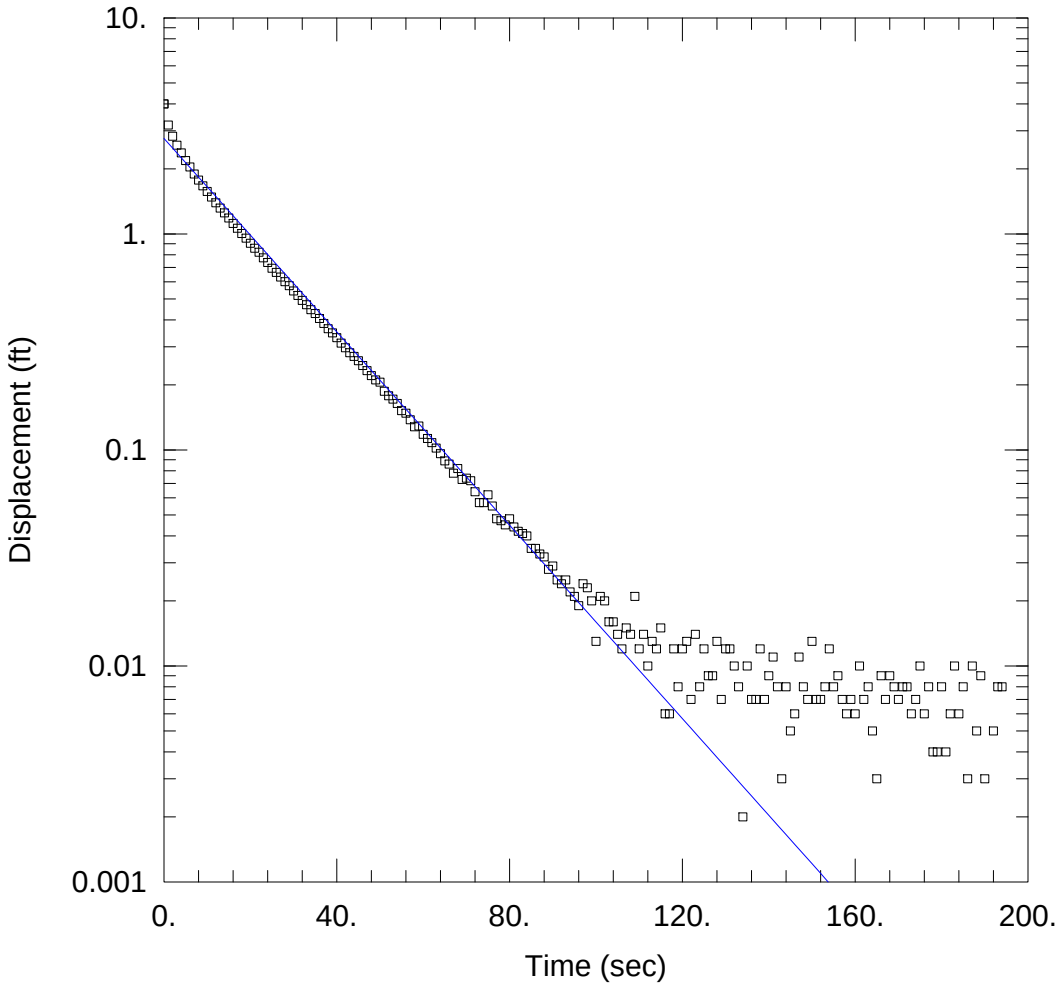
WELL DATA (MW-04)

Initial Displacement: 1.941 ft
Total Well Penetration Depth: 13.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.91 ft
Screen Length: 10. ft
Well Radius: 0.167 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0004436 ft/sec y0 = 2.413 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34DTEST1.aqt
Date: 05/02/17 Time: 09:52:58

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 17.72 ft Anisotropy Ratio (Kz/Kr): 0.1

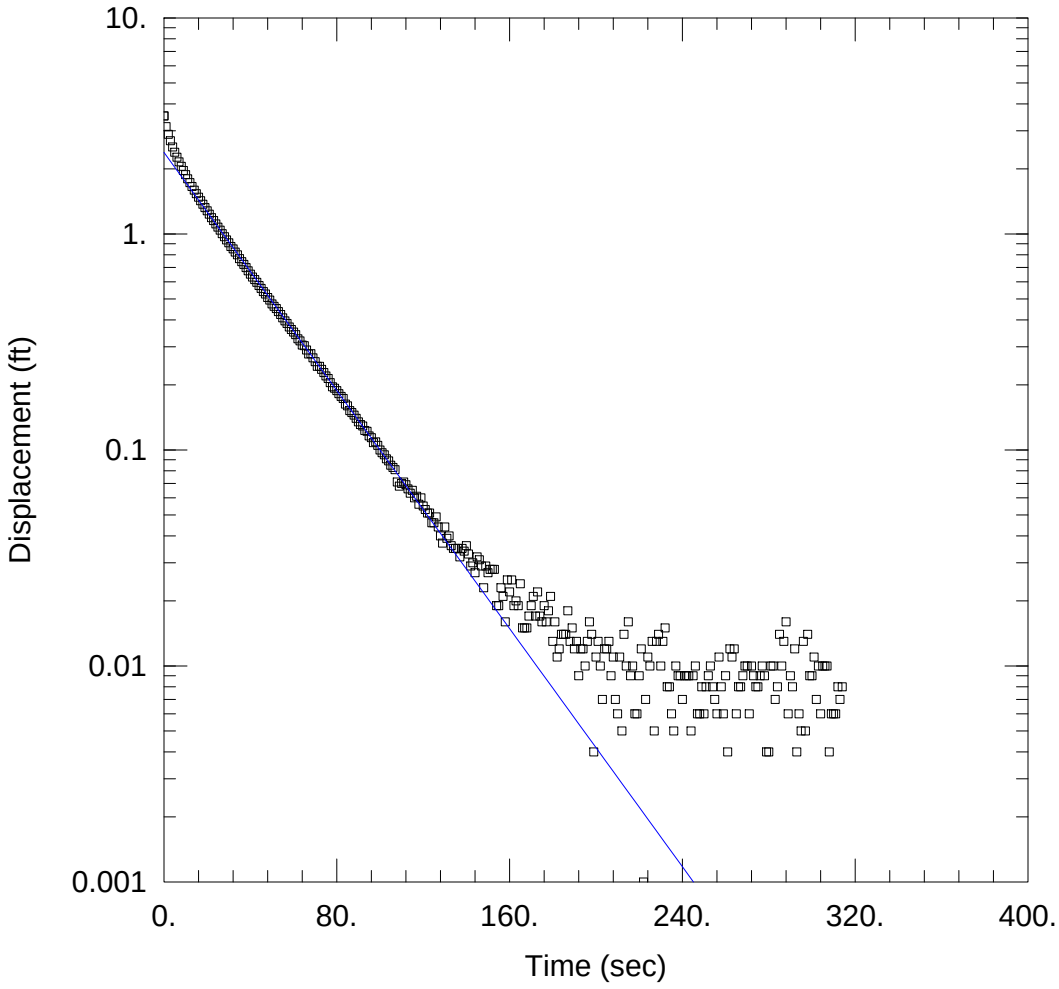
WELL DATA (MW-34D)

Initial Displacement: 3.997 ft
Total Well Penetration Depth: 18.26 ft
Casing Radius: 0.063 ft
Static Water Column Height: 18.26 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 8.666E-5 ft/sec y0 = 2.767 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34DTEST2.aqt
Date: 05/02/17 Time: 09:53:08

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 17.72 ft Anisotropy Ratio (Kz/Kr): 0.1

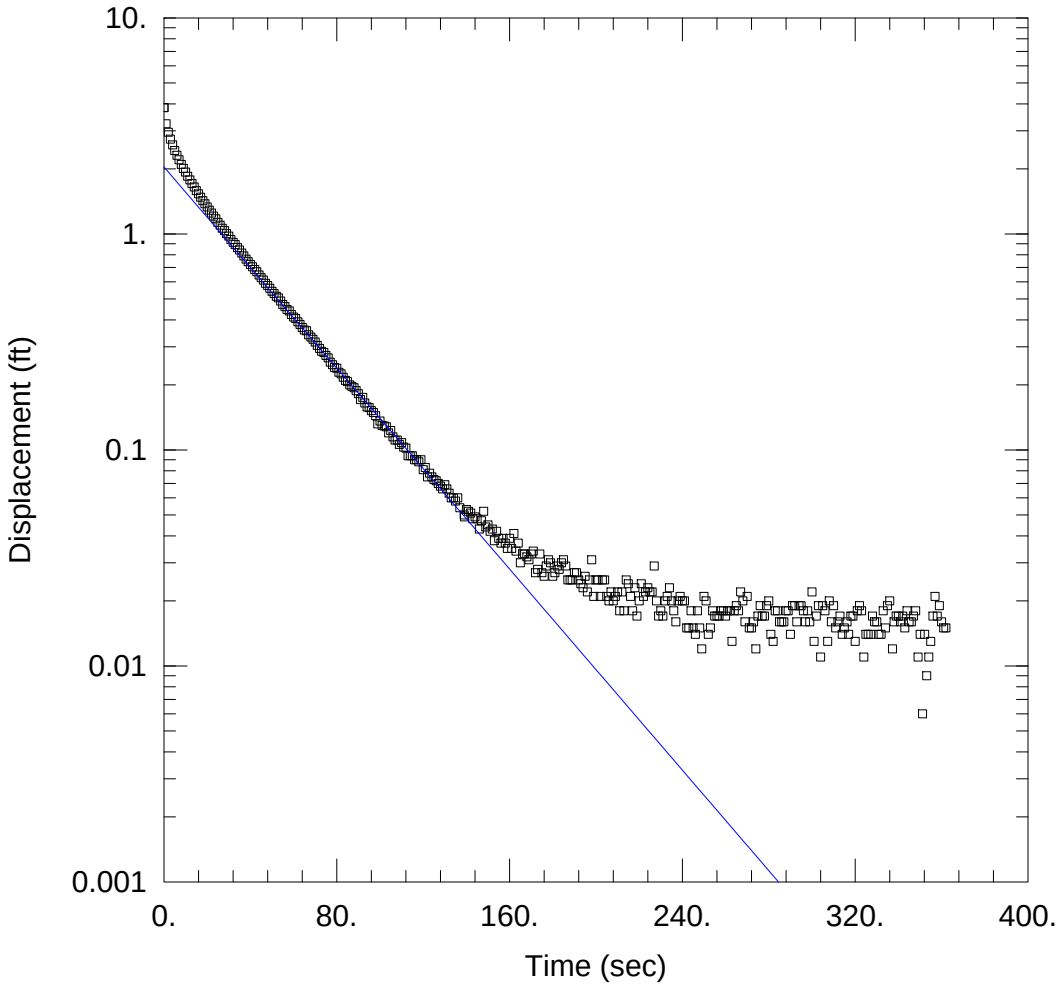
WELL DATA (MW-34D)

Initial Displacement: 3.519 ft
Total Well Penetration Depth: 18.26 ft
Casing Radius: 0.063 ft
Static Water Column Height: 18.26 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 5.335E-5 ft/sec y0 = 2.383 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34DTEST3.aqt
Date: 05/02/17 Time: 09:53:17

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 17.72 ft Anisotropy Ratio (Kz/Kr): 0.1

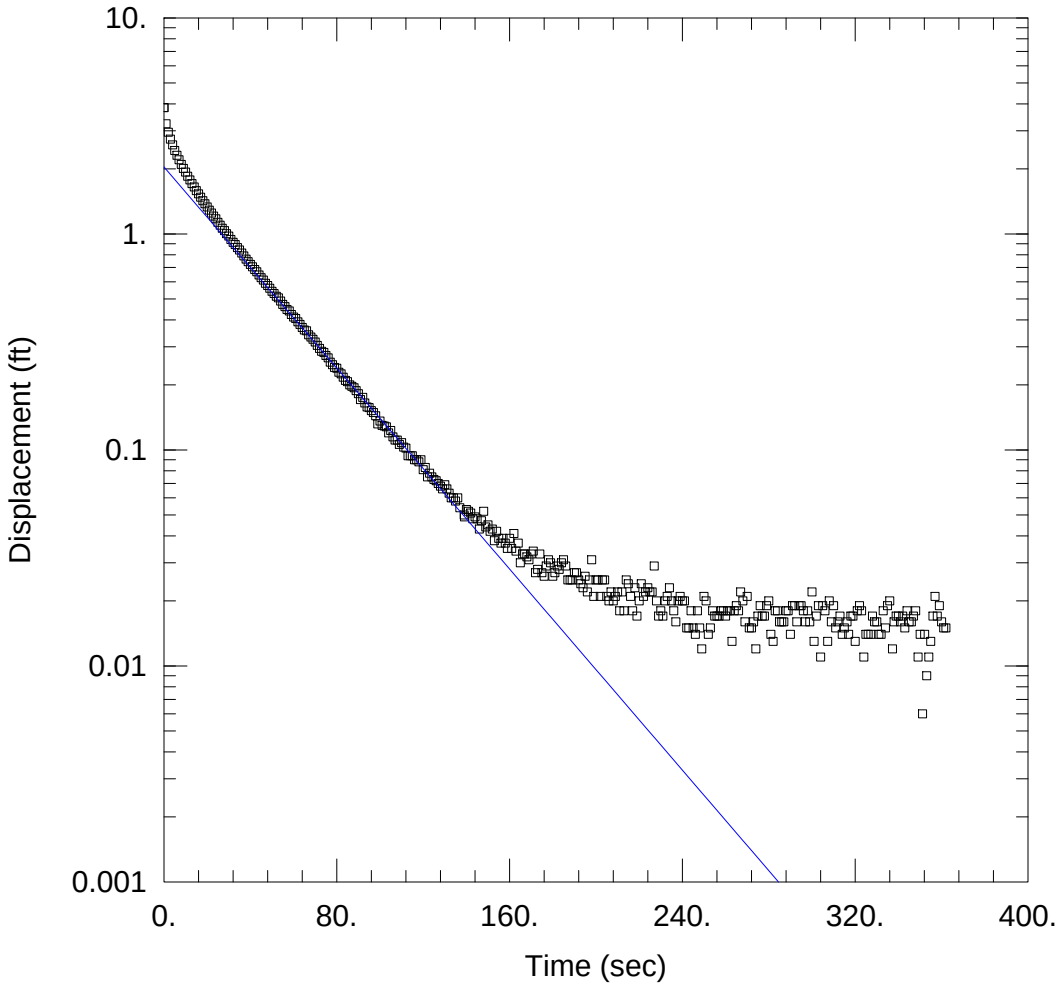
WELL DATA (MW-34D)

Initial Displacement: 3.845 ft
Total Well Penetration Depth: 18.26 ft
Casing Radius: 0.063 ft
Static Water Column Height: 18.26 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 4.505E-5 ft/sec y0 = 2.041 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34DTEST4.aqt
Date: 05/02/17 Time: 09:53:25

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 17.72 ft Anisotropy Ratio (Kz/Kr): 0.1

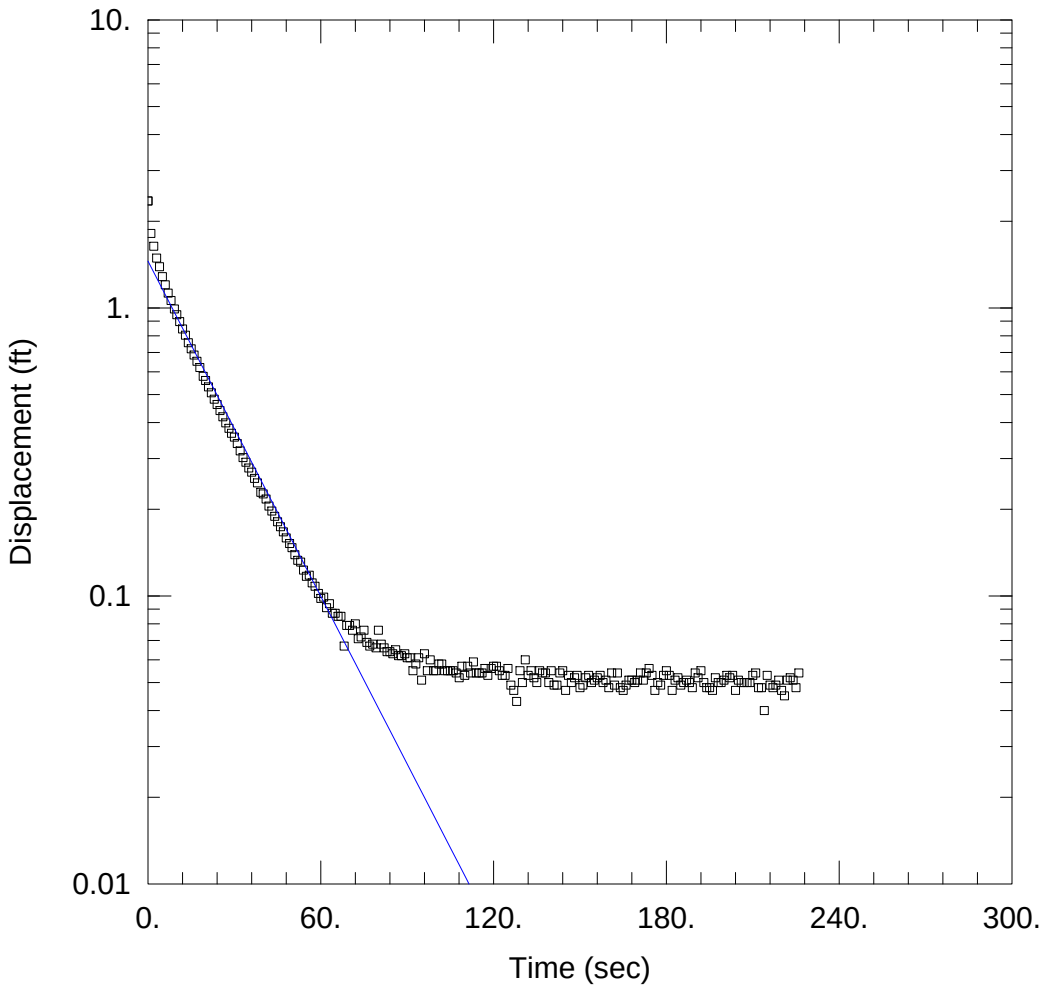
WELL DATA (MW-34D)

Initial Displacement: 3.845 ft
Total Well Penetration Depth: 18.26 ft
Casing Radius: 0.063 ft
Static Water Column Height: 18.26 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 4.505E-5 ft/sec y0 = 2.041 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34STEST1.aqt
Date: 05/02/17 Time: 09:53:34

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34S
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 9.16 ft Anisotropy Ratio (Kz/Kr): 0.1

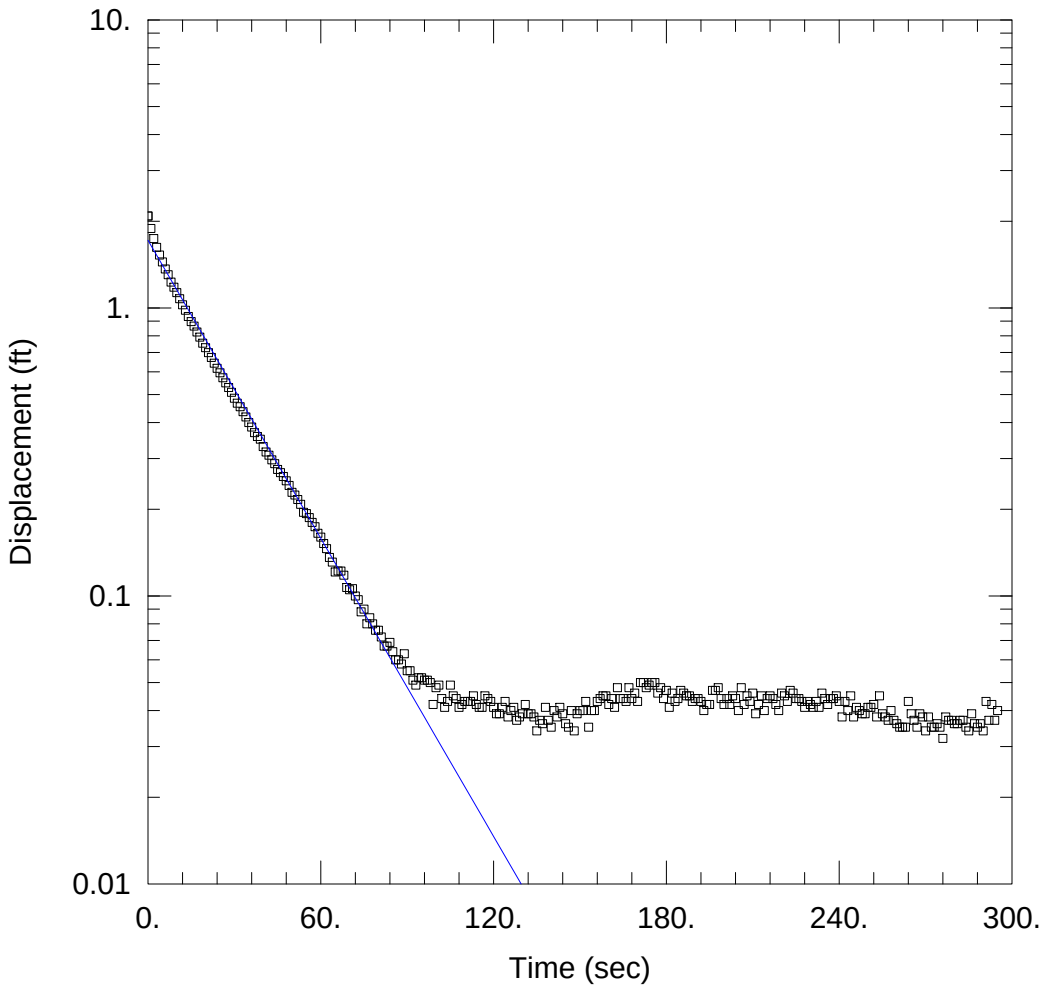
WELL DATA (MW-34S)

Initial Displacement: 2.351 ft
Total Well Penetration Depth: 7.65 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.65 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 6.097E-5 ft/sec y0 = 1.454 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34STEST2.aqt
Date: 05/02/17 Time: 09:53:41

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34S
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 9.16 ft Anisotropy Ratio (Kz/Kr): 0.1

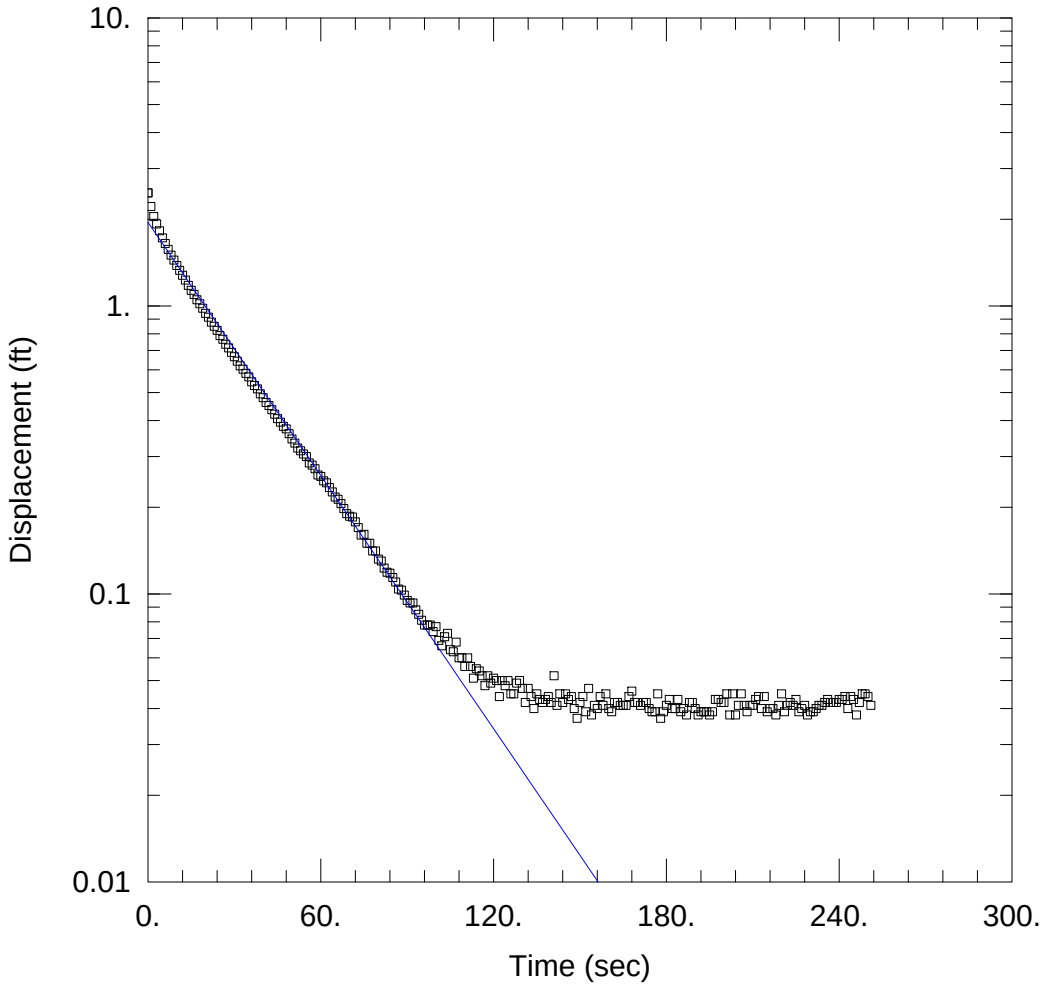
WELL DATA (MW-34S)

Initial Displacement: 2.085 ft
Total Well Penetration Depth: 7.65 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.65 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 5.421E-5 ft/sec y0 = 1.718 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34STEST3.aqt
Date: 05/02/17 Time: 09:53:48

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34S
Test Date: 7/9/15

AQUIFER DATA

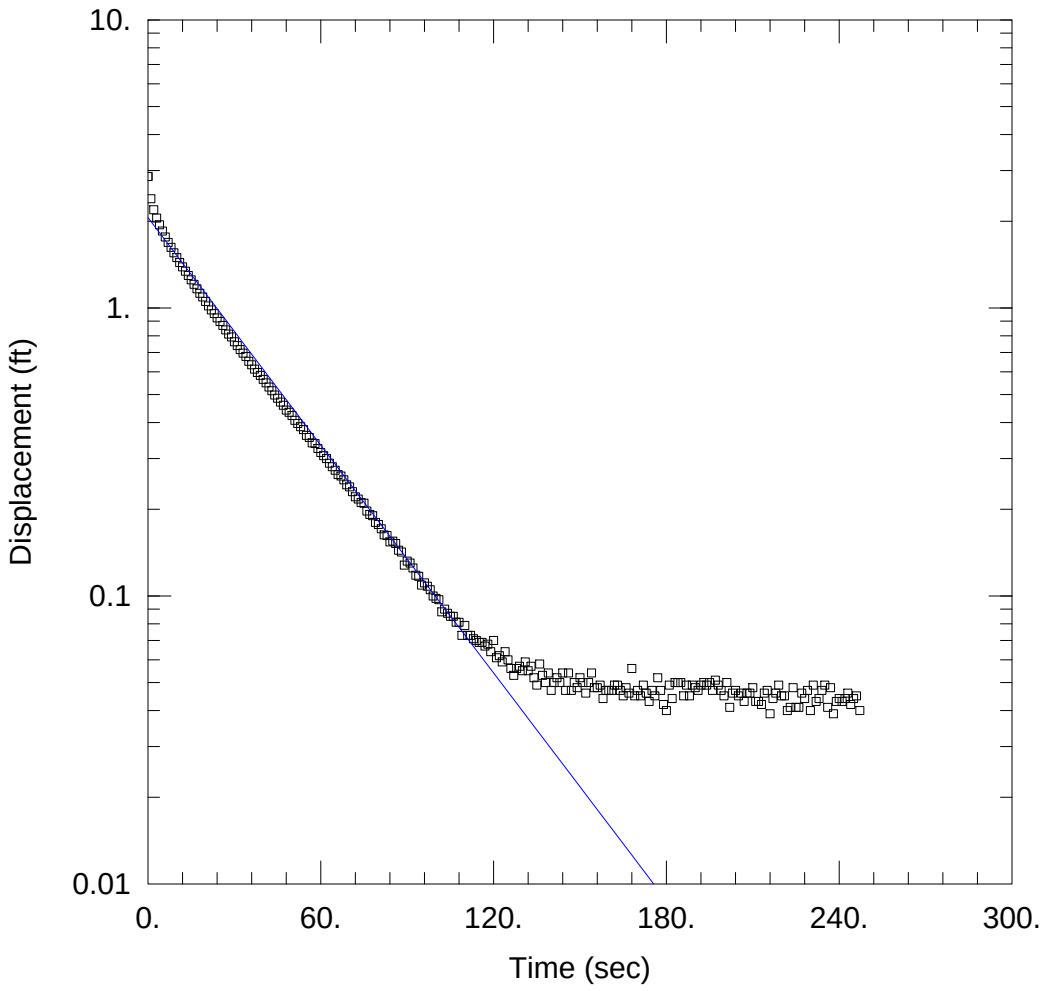
Saturated Thickness: 9.16 ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-34S)

Initial Displacement: 2.468 ft
Total Well Penetration Depth: 7.65 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.65 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.605E-5 ft/sec
y0 = 1.951 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW34STEST4.aqt
Date: 05/02/17 Time: 09:53:56

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-34S
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 9.16 ft Anisotropy Ratio (Kz/Kr): 0.1

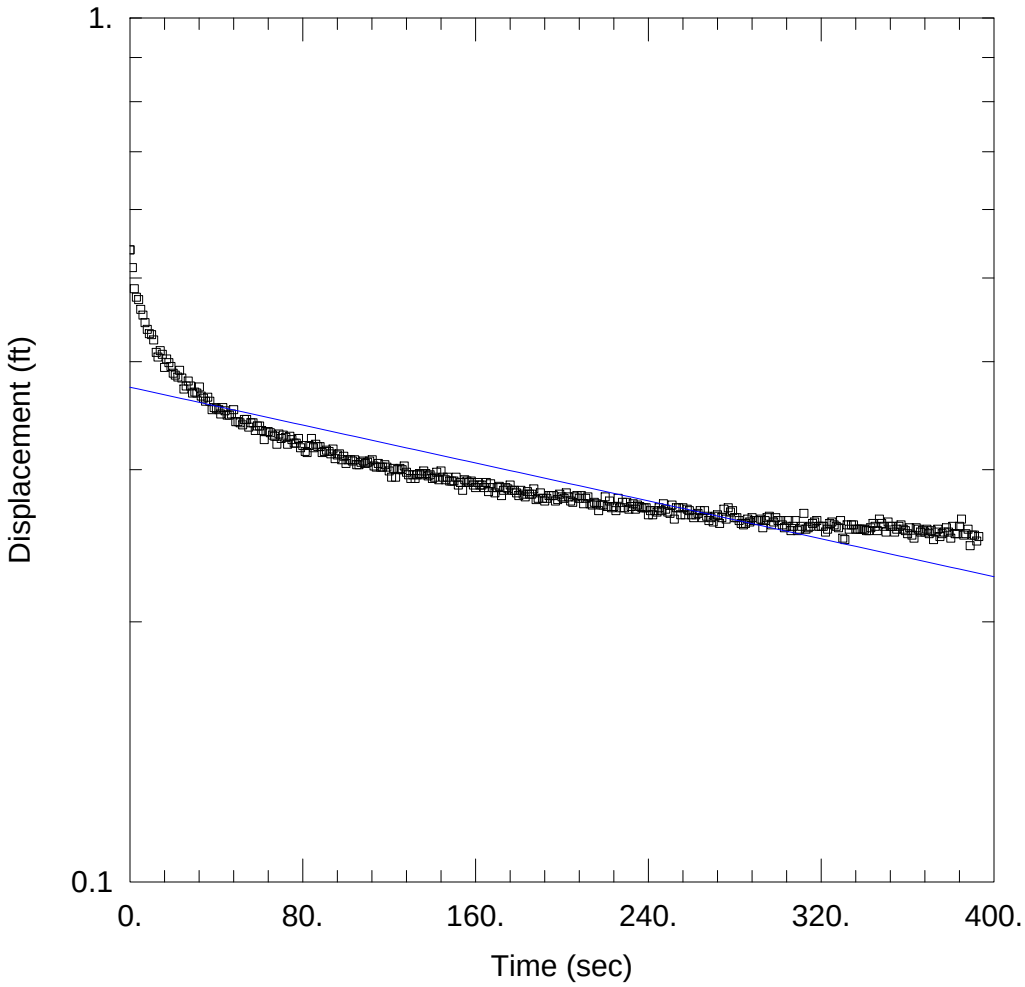
WELL DATA (MW-34S)

Initial Displacement: 2.86 ft Static Water Column Height: 7.65 ft
Total Well Penetration Depth: 7.65 ft Screen Length: 5. ft
Casing Radius: 0.063 ft Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 4.141E-5 ft/sec y0 = 2.059 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW37TEST1.aqt
Date: 05/02/17 Time: 09:54:09

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-37
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 3.7 ft Anisotropy Ratio (Kz/Kr): 0.1

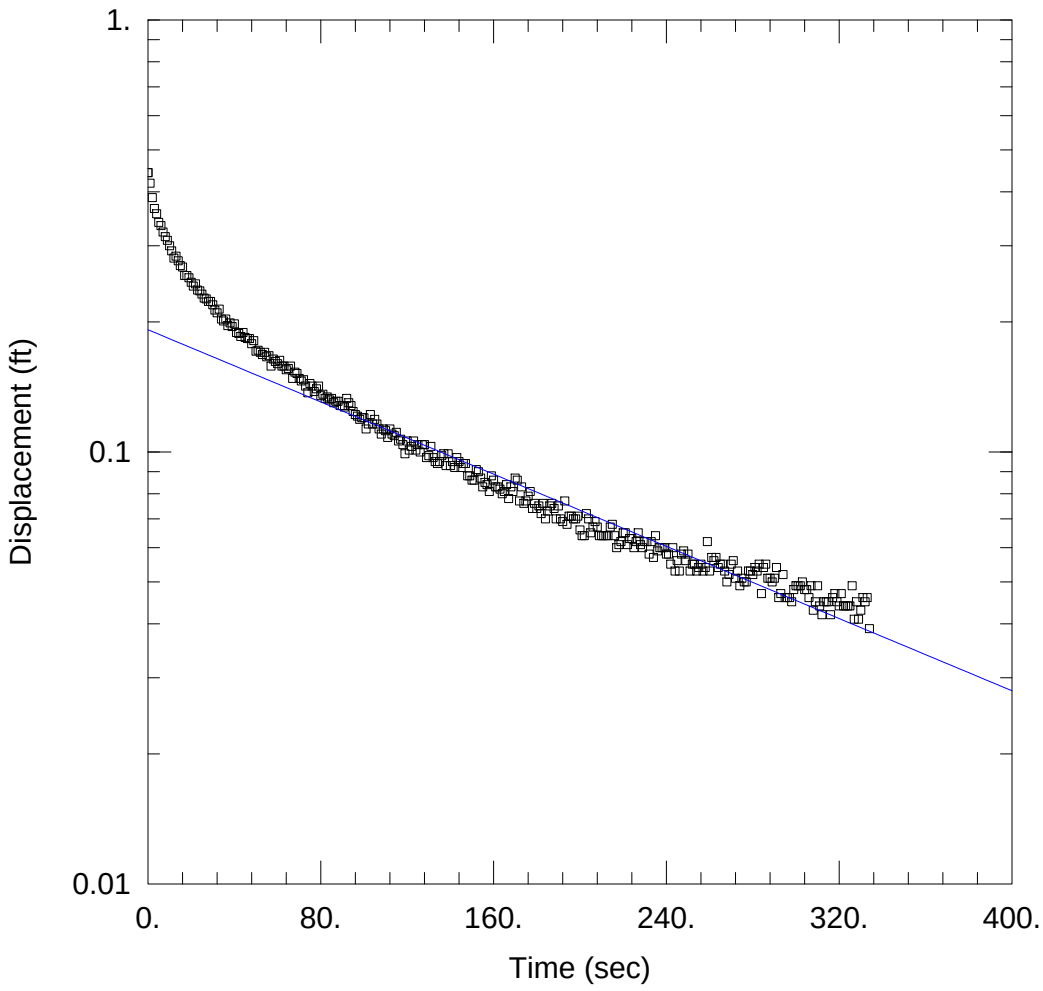
WELL DATA (MW-37)

Initial Displacement: 0.539 ft
Total Well Penetration Depth: 7.12 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.12 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.899E-6 ft/sec y0 = 0.3738 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW37TEST2.aqt
Date: 05/02/17 Time: 09:54:17

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-37
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 3.7 ft Anisotropy Ratio (Kz/Kr): 0.1

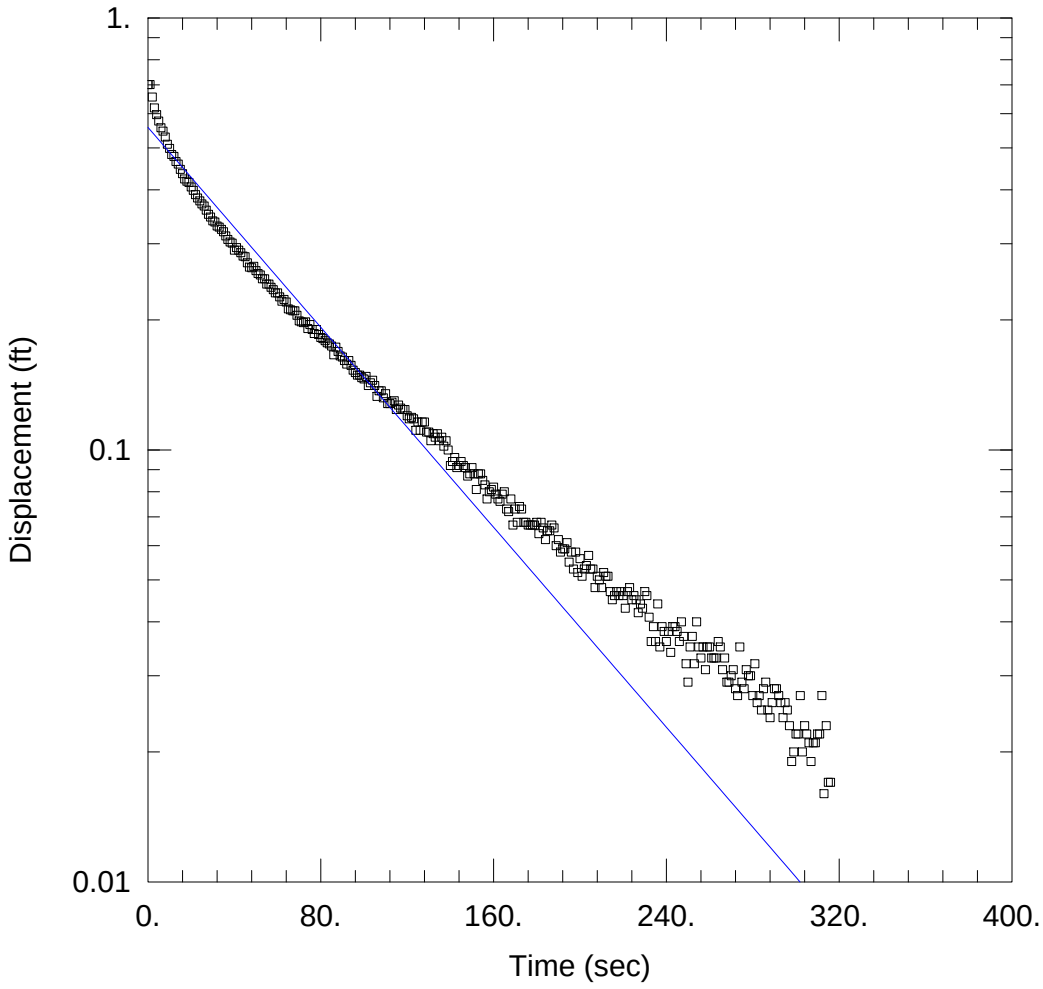
WELL DATA (MW-37)

Initial Displacement: 0.443 ft
Total Well Penetration Depth: 7.12 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.12 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 7.235E-6 ft/sec y0 = 0.1918 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW37TEST3.aqt
Date: 05/02/17 Time: 09:54:25

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-37
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 3.7 ft Anisotropy Ratio (Kz/Kr): 0.1

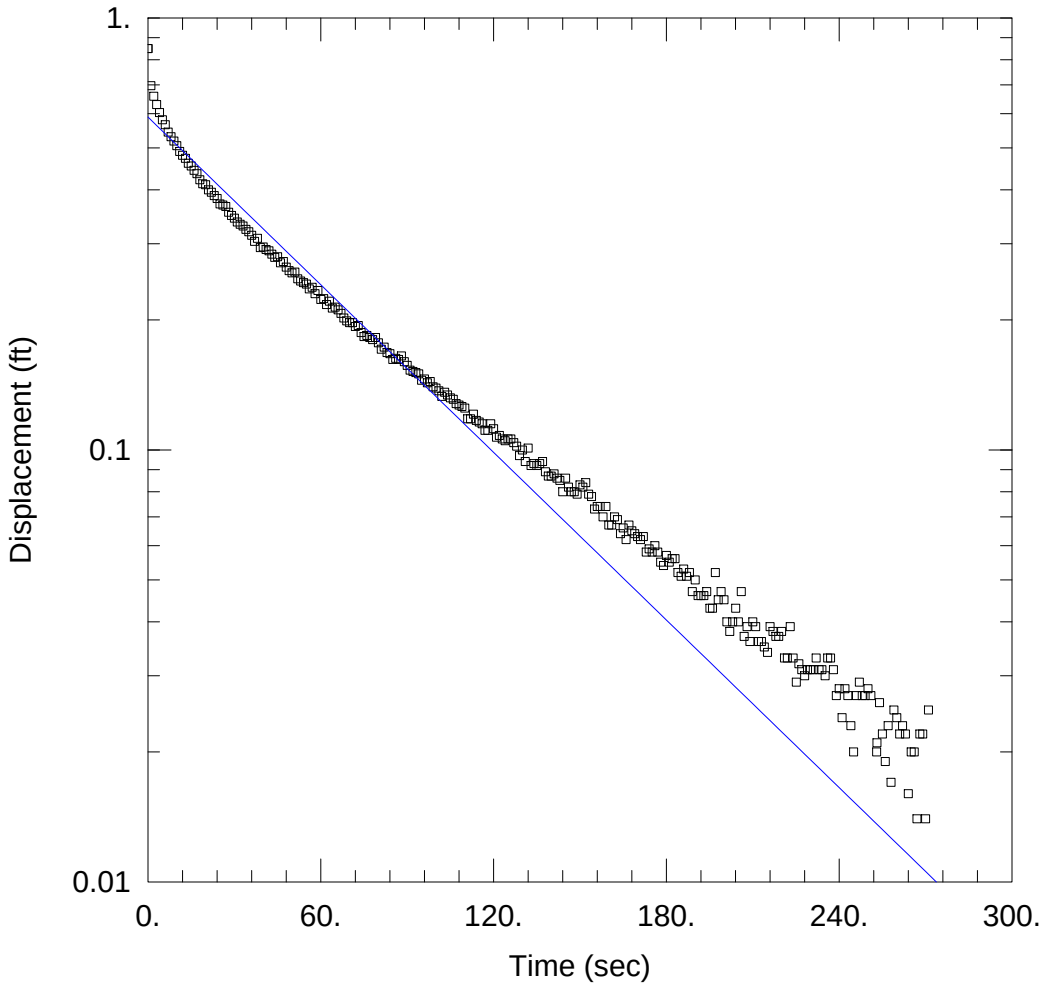
WELL DATA (MW-37)

Initial Displacement: 0.701 ft
Total Well Penetration Depth: 7.12 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.12 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.003E-5 ft/sec y0 = 0.5578 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW37TEST4.aqt
Date: 05/02/17 Time: 09:54:32

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-37
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 3.7 ft Anisotropy Ratio (Kz/Kr): 0.1

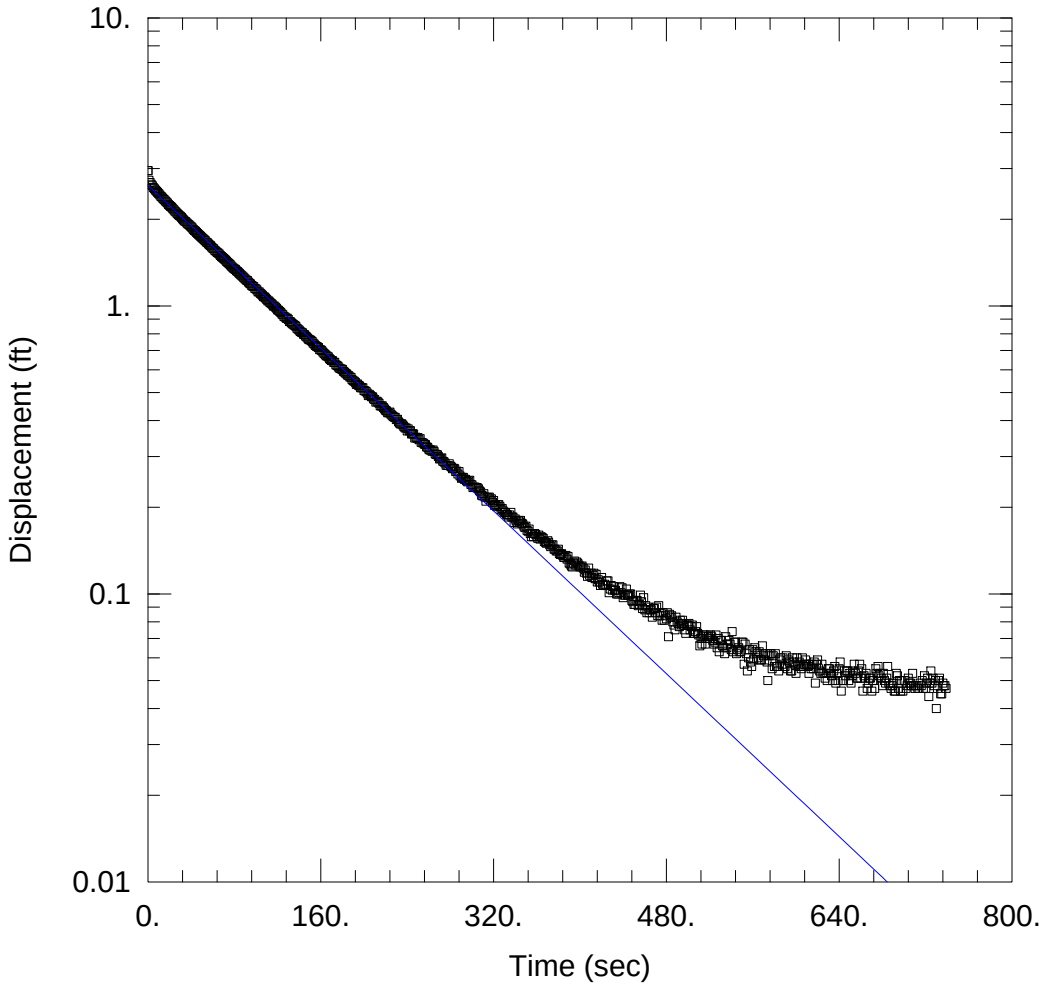
WELL DATA (MW-37)

Initial Displacement: 0.849 ft
Total Well Penetration Depth: 7.12 ft
Casing Radius: 0.063 ft
Static Water Column Height: 7.12 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.24E-5 ft/sec y0 = 0.5894 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW38TEST1.aqt
Date: 05/02/17 Time: 09:54:41

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-38
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 7.55 ft Anisotropy Ratio (Kz/Kr): 0.1

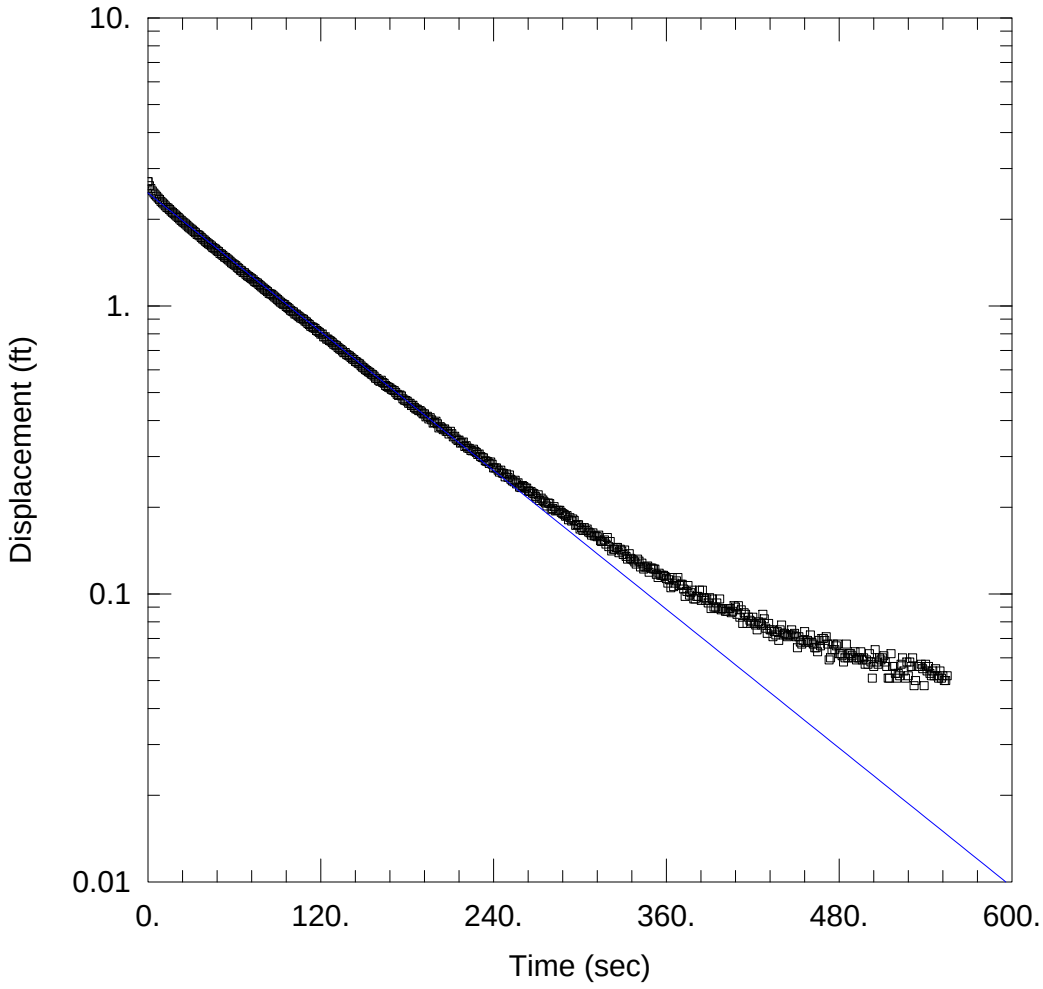
WELL DATA (MW-38)

Initial Displacement: 2.951 ft
Total Well Penetration Depth: 7.05 ft
Casing Radius: 0.63 ft
Static Water Column Height: 9.19 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001252 ft/sec y0 = 2.625 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW38TEST2.aqt
Date: 05/02/17 Time: 09:54:49

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-38
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 7.55 ft Anisotropy Ratio (Kz/Kr): 0.1

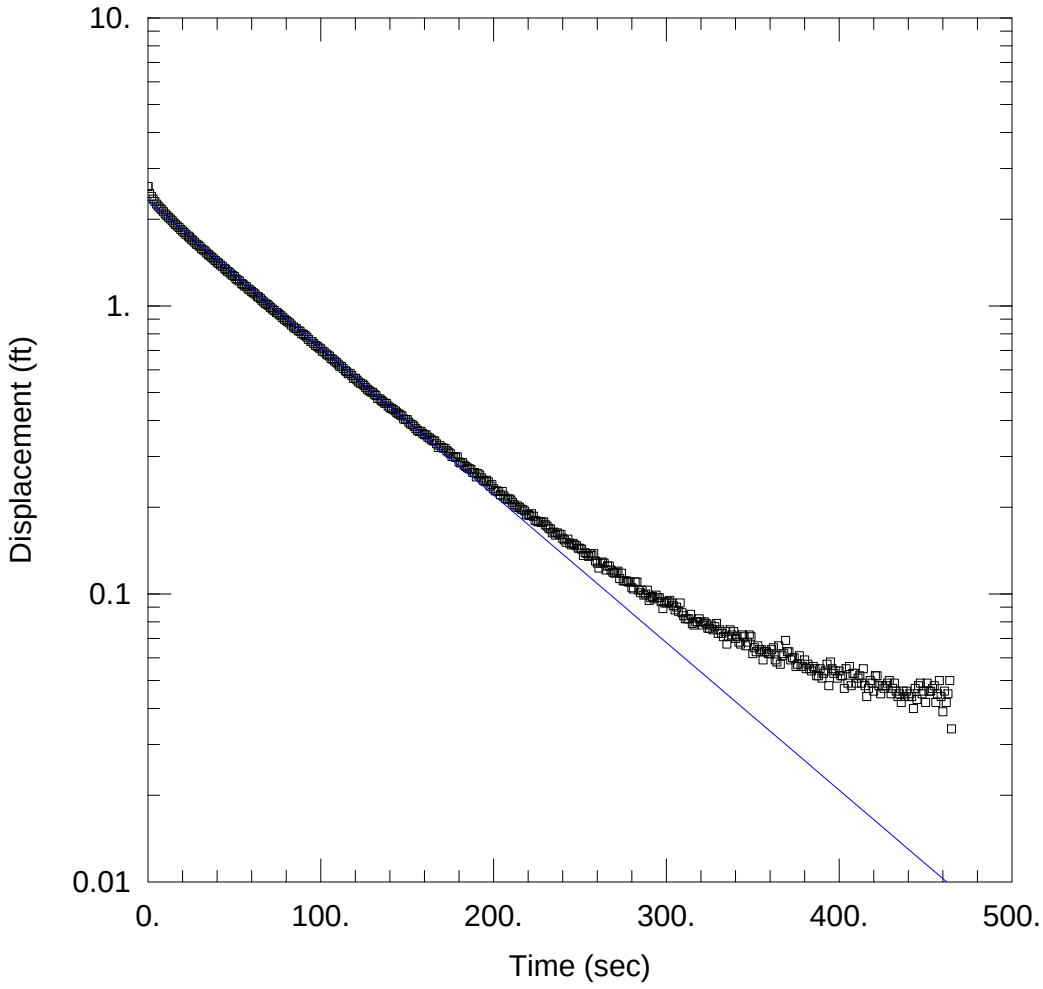
WELL DATA (MW-38)

Initial Displacement: 2.7 ft
Total Well Penetration Depth: 7.05 ft
Casing Radius: 0.63 ft
Static Water Column Height: 9.19 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001423 ft/sec y0 = 2.468 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW38TEST3.aqt
Date: 05/02/17 Time: 09:54:56

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-38
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 7.55 ft Anisotropy Ratio (Kz/Kr): 0.1

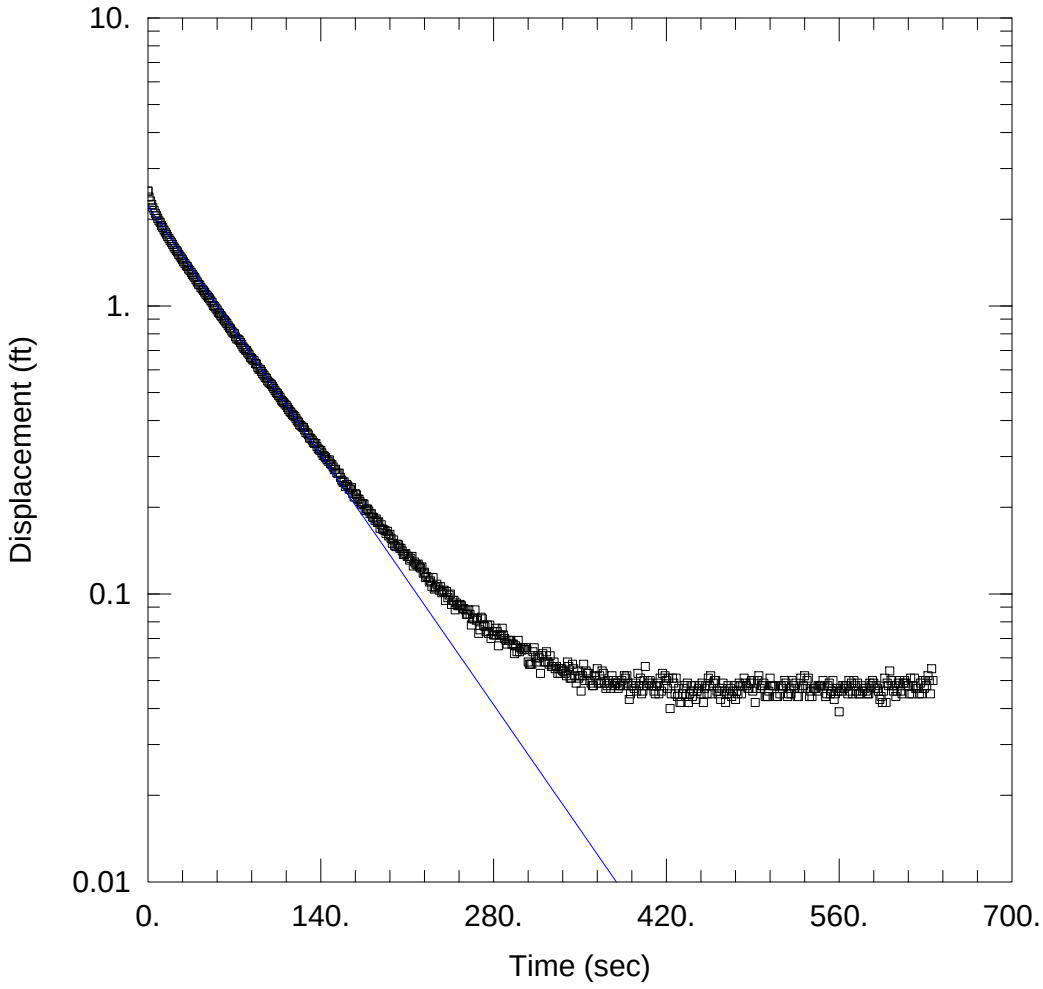
WELL DATA (MW-38)

Initial Displacement: 2.599 ft
Total Well Penetration Depth: 7.05 ft
Casing Radius: 0.63 ft
Static Water Column Height: 9.19 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001815 ft/sec y0 = 2.33 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW38TEST4.aqt
Date: 05/02/17 Time: 09:55:04

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-38
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 7.55 ft Anisotropy Ratio (Kz/Kr): 0.1

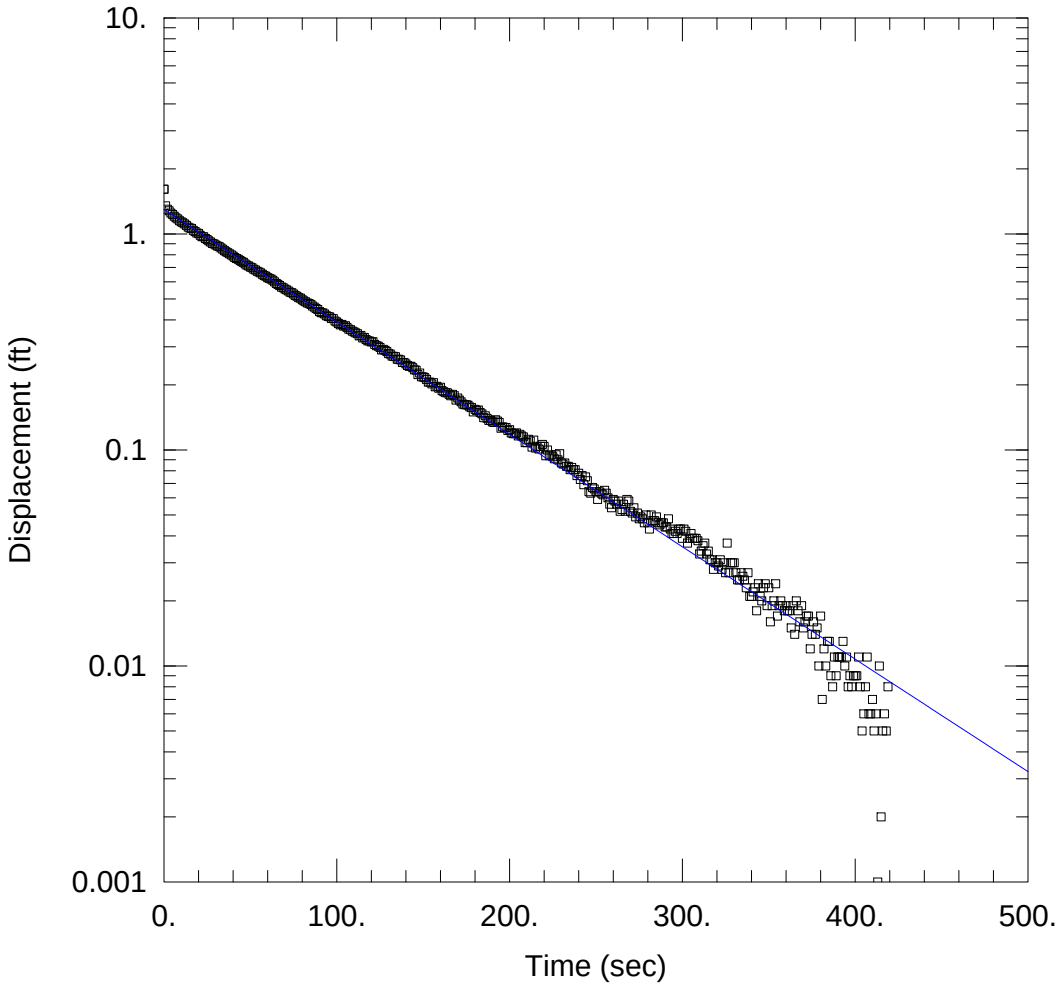
WELL DATA (MW-38)

Initial Displacement: 2.505 ft
Total Well Penetration Depth: 7.05 ft
Casing Radius: 0.63 ft
Static Water Column Height: 9.19 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.002191 ft/sec y0 = 2.22 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW41DTEST1.aqt
Date: 05/02/17 Time: 09:55:11

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-41D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 18.49 ft Anisotropy Ratio (Kz/Kr): 0.1

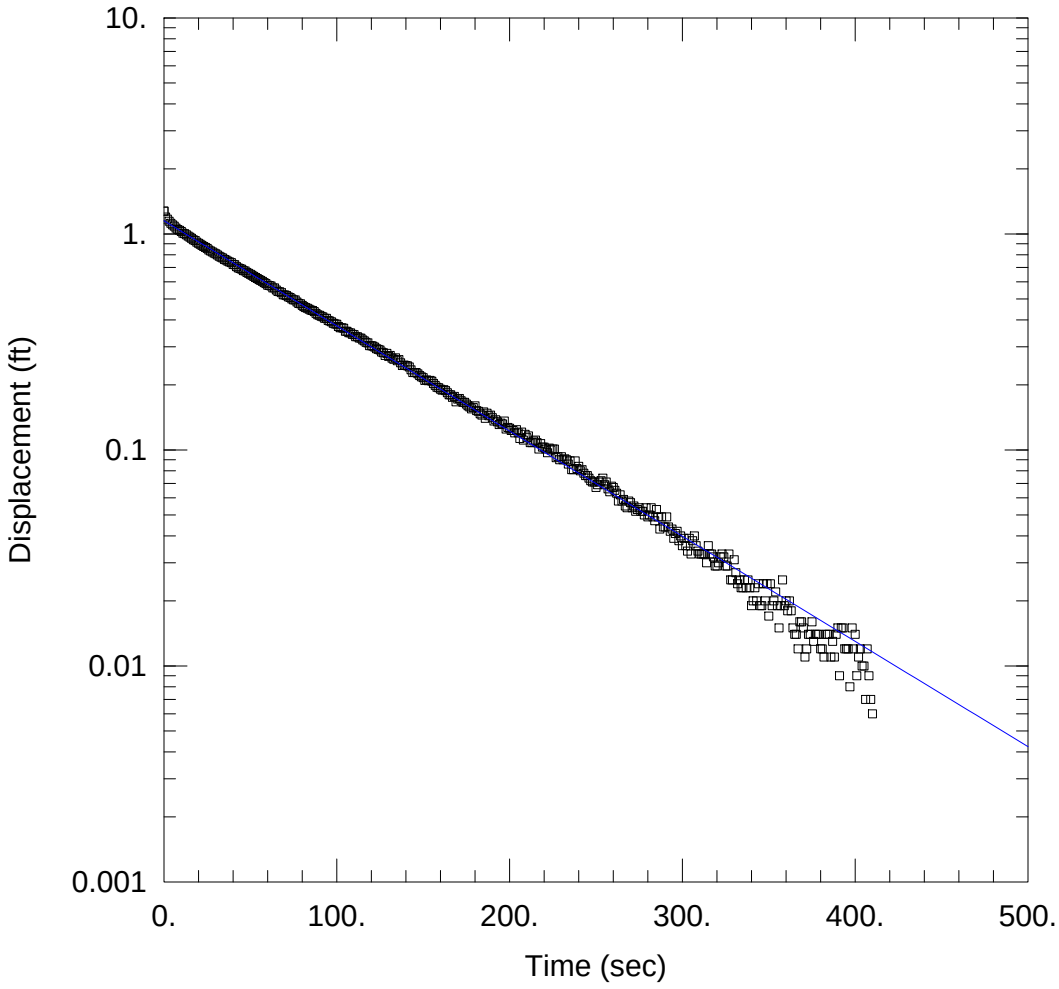
WELL DATA (MW-41D)

Initial Displacement: 1.61 ft
Total Well Penetration Depth: 14.49 ft
Casing Radius: 0.063 ft
Static Water Column Height: 14.49 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.736E-5 ft/sec y0 = 1.298 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW41DTEST2.aqt
Date: 05/02/17 Time: 09:55:20

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-41D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 18.49 ft Anisotropy Ratio (Kz/Kr): 0.1

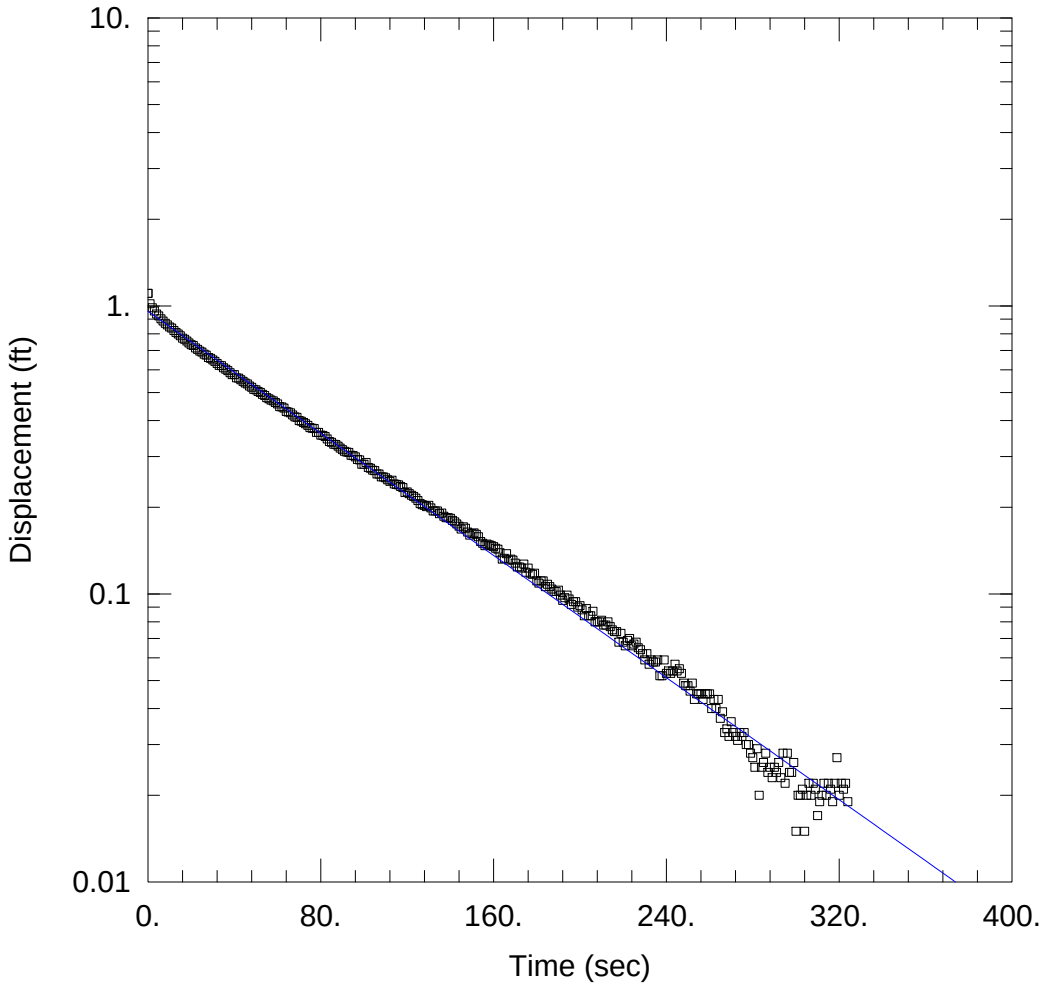
WELL DATA (MW-41D)

Initial Displacement: 1.275 ft
Total Well Penetration Depth: 14.49 ft
Casing Radius: 0.063 ft
Static Water Column Height: 14.49 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.624E-5 ft/sec y0 = 1.151 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW41DTEST3.aqt
Date: 05/02/17 Time: 09:55:27

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-41D
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 18.49 ft Anisotropy Ratio (Kz/Kr): 0.1

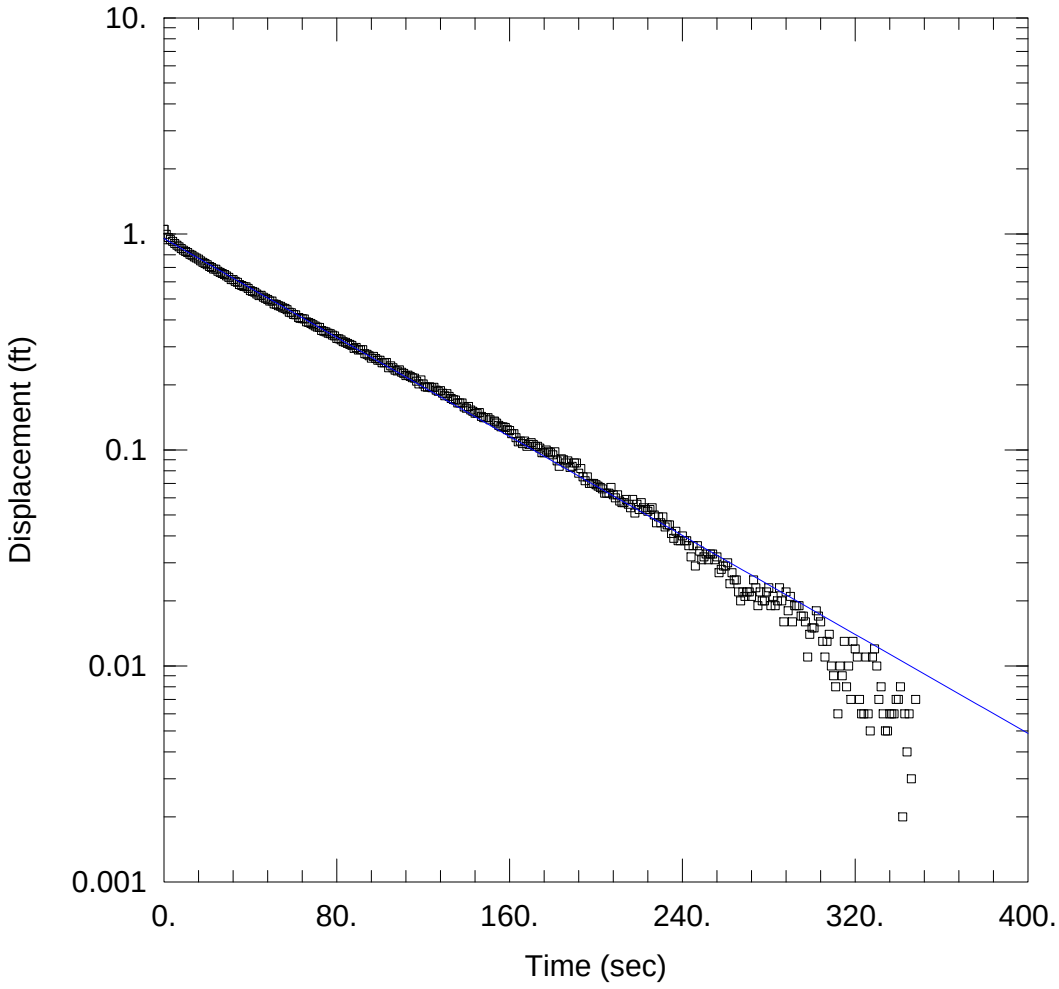
WELL DATA (MW-41D)

Initial Displacement: 1.106 ft
Total Well Penetration Depth: 14.49 ft
Casing Radius: 0.063 ft
Static Water Column Height: 14.49 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.768E-5 ft/sec y0 = 0.9583 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW41DTEST4.aqt
Date: 05/02/17 Time: 09:55:35

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-41D
Test Date: 7/9/15

AQUIFER DATA

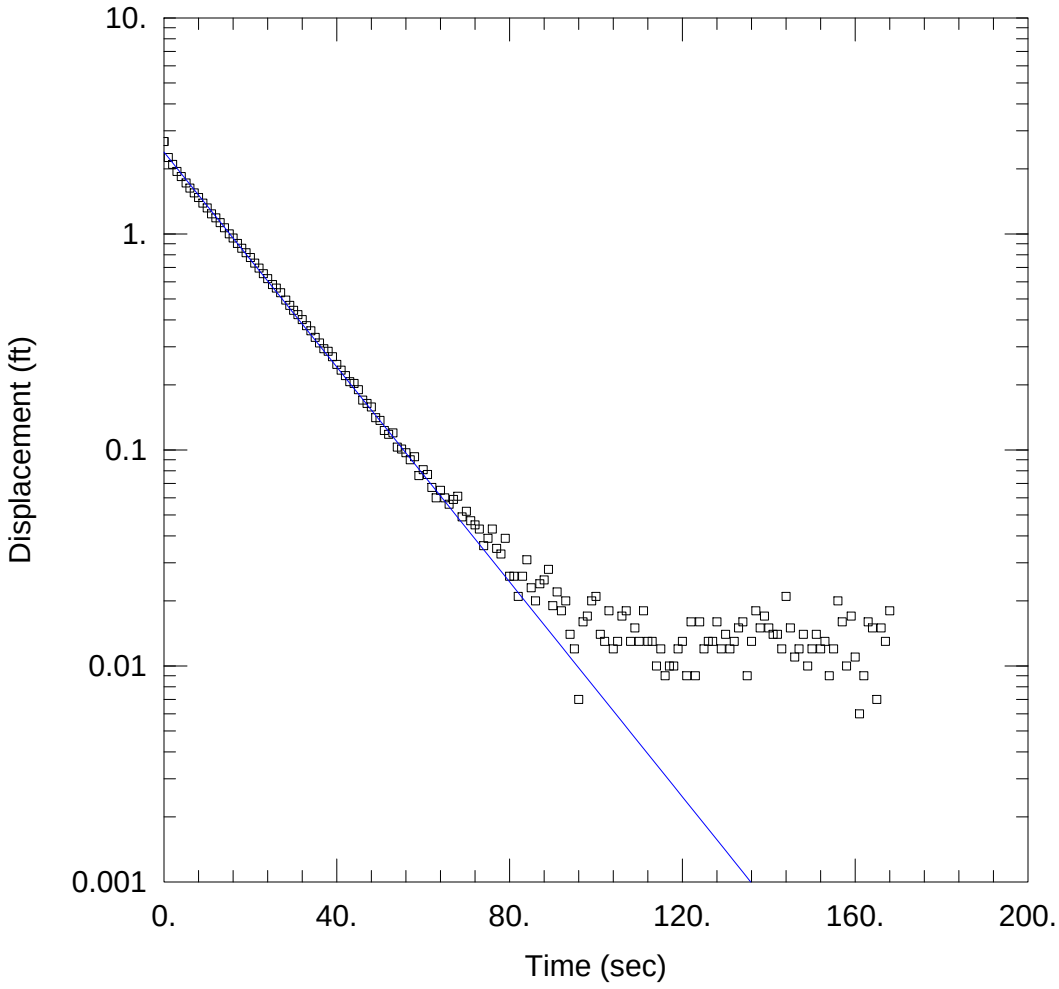
Saturated Thickness: 18.49 ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-41D)

Initial Displacement: 1.049 ft
Total Well Penetration Depth: 14.49 ft
Casing Radius: 0.063 ft
Static Water Column Height: 14.49 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.91E-5 ft/sec
y0 = 0.9518 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW42TEST1.aqt
Date: 05/02/17 Time: 09:55:43

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-42
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 14.42 ft Anisotropy Ratio (Kz/Kr): 0.1

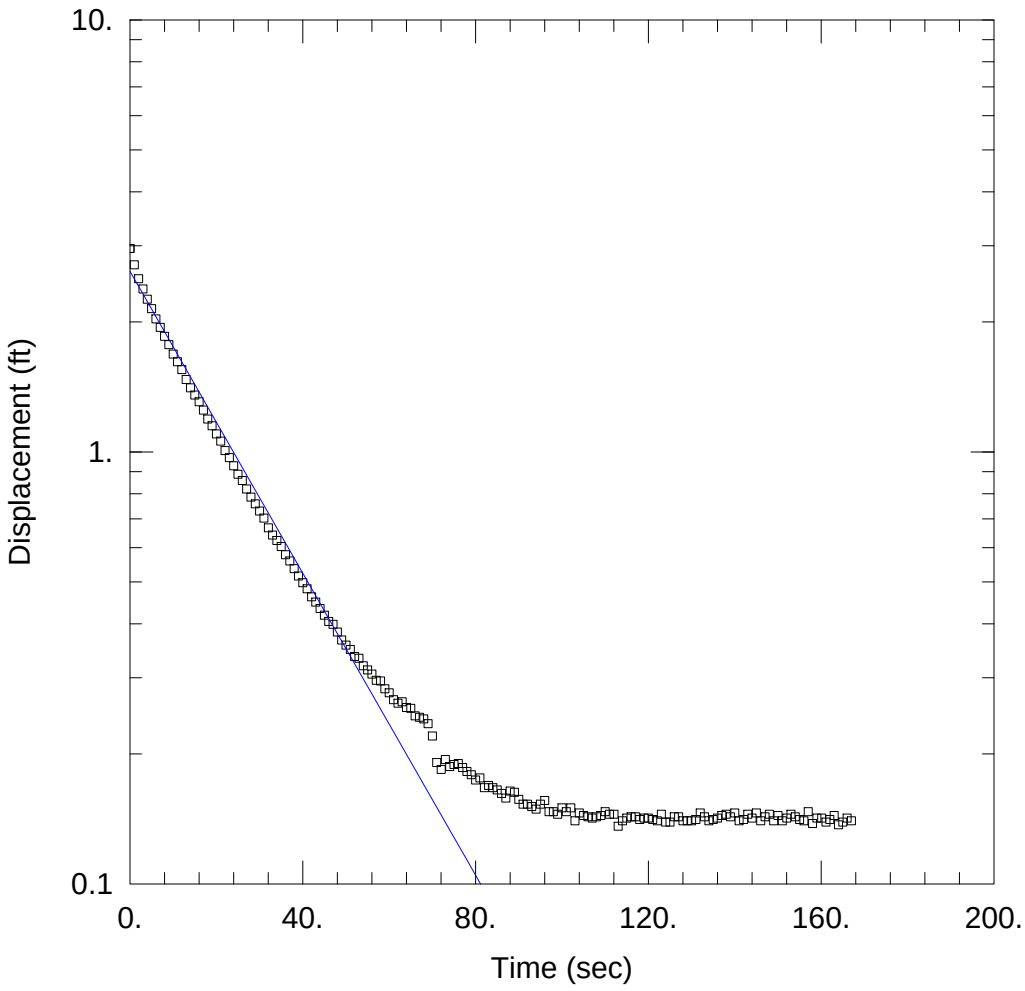
WELL DATA (MW-42)

Initial Displacement: 2.678 ft
Total Well Penetration Depth: 8.42 ft
Casing Radius: 0.063 ft
Static Water Column Height: 8.42 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 7.666E-5 ft/sec y0 = 2.391 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW42TEST2.aqt
Date: 05/02/17 Time: 09:55:50

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-42
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 14.42 ft Anisotropy Ratio (Kz/Kr): 0.1

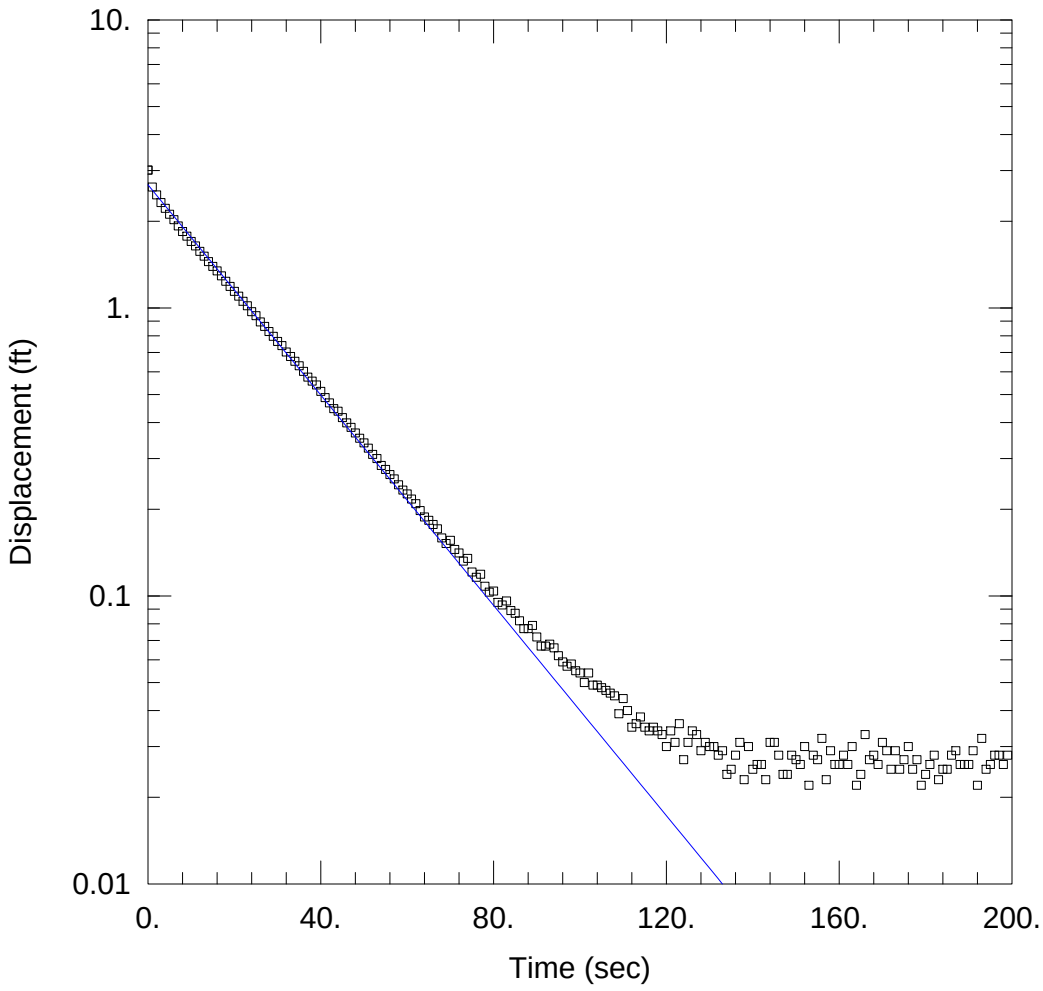
WELL DATA (MW-42)

Initial Displacement: 2.957 ft
Total Well Penetration Depth: 8.42 ft
Casing Radius: 0.063 ft
Static Water Column Height: 8.42 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 5.385E-5 ft/sec y0 = 2.619 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW42TEST3.aqt
Date: 05/02/17 Time: 09:55:58

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-42
Test Date: 7/9/15

AQUIFER DATA

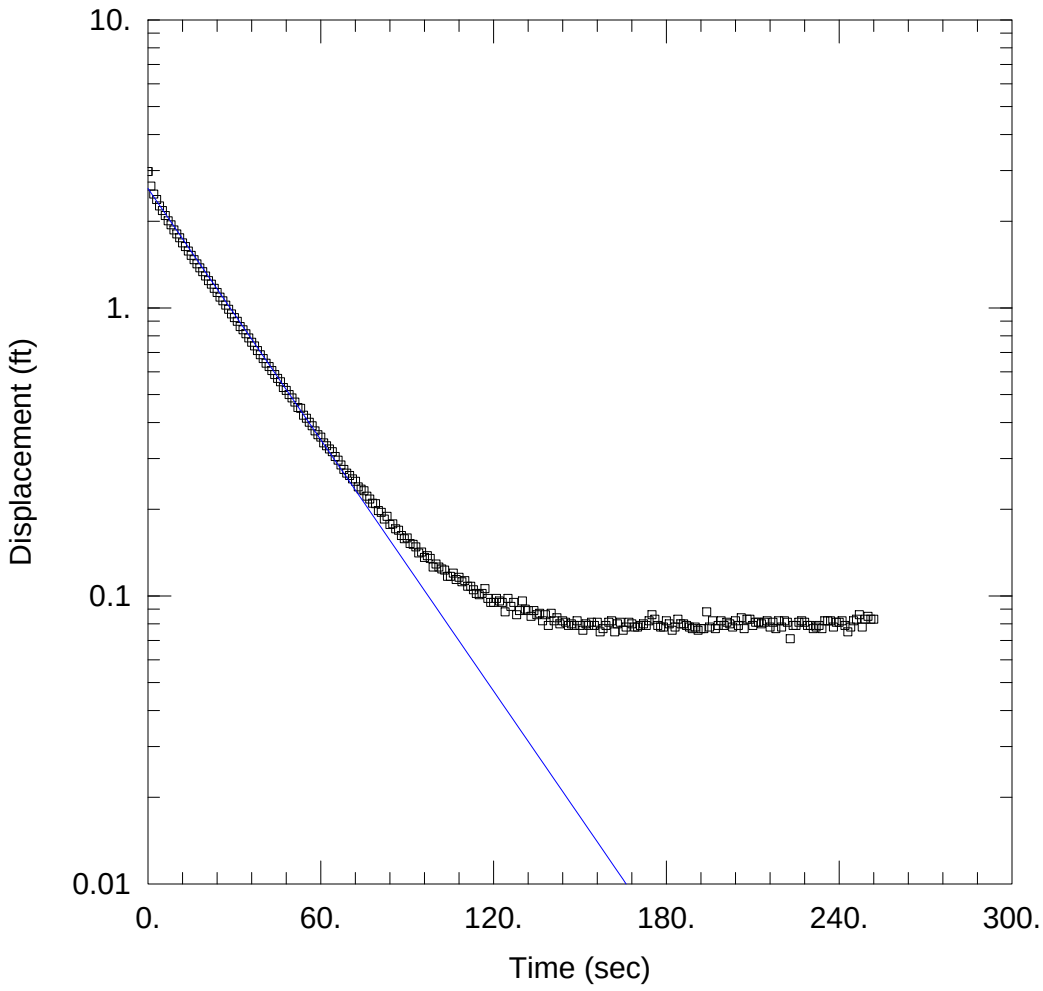
Saturated Thickness: 14.42 ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-42)

Initial Displacement: 3.009 ft
Total Well Penetration Depth: 8.42 ft
Casing Radius: 0.063 ft
Static Water Column Height: 8.42 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.626E-5 ft/sec
y0 = 2.675 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW42TEST4.aqt
Date: 05/02/17 Time: 09:56:07

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-42
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 14.42 ft Anisotropy Ratio (Kz/Kr): 0.1

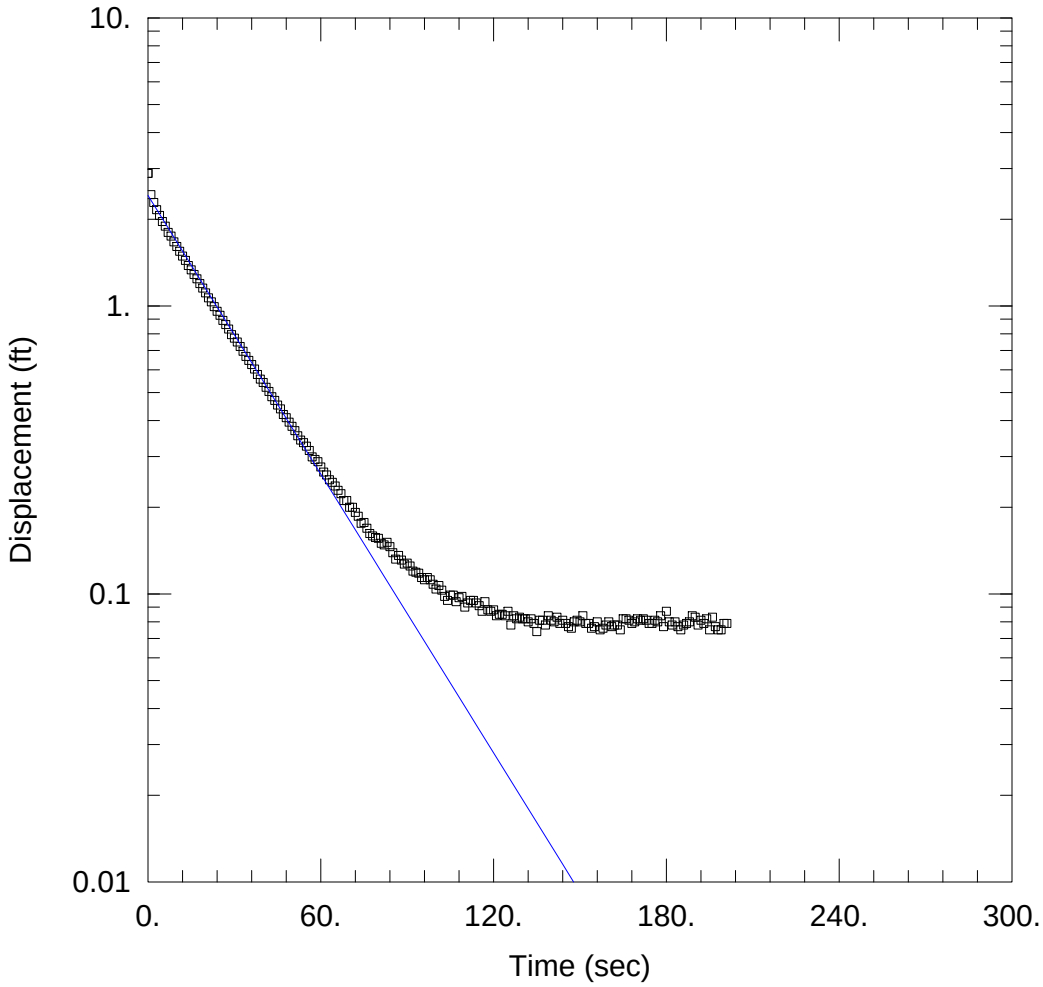
WELL DATA (MW-42)

Initial Displacement: 2.974 ft
Total Well Penetration Depth: 8.42 ft
Casing Radius: 0.063 ft
Static Water Column Height: 8.42 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 4.482E-5 ft/sec y0 = 2.598 ft



WELL TEST ANALYSIS

Data Set: S:\...\MW42TEST5.aqt
Date: 05/02/17 Time: 09:56:16

PROJECT INFORMATION

Company: Tetra Tech, Inc.
Client: EPA
Project: 112g03943
Location: Lower Darby Creek Area
Test Well: MW-42
Test Date: 7/9/15

AQUIFER DATA

Saturated Thickness: 14.42 ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-42)

Initial Displacement: 2.887 ft
Total Well Penetration Depth: 8.42 ft
Casing Radius: 0.063 ft
Static Water Column Height: 8.42 ft
Screen Length: 5. ft
Well Radius: 0.104 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 4.971E-5 ft/sec y0 = 2.419 ft

Monitoring Wells Included in the Model and Their Water Levels

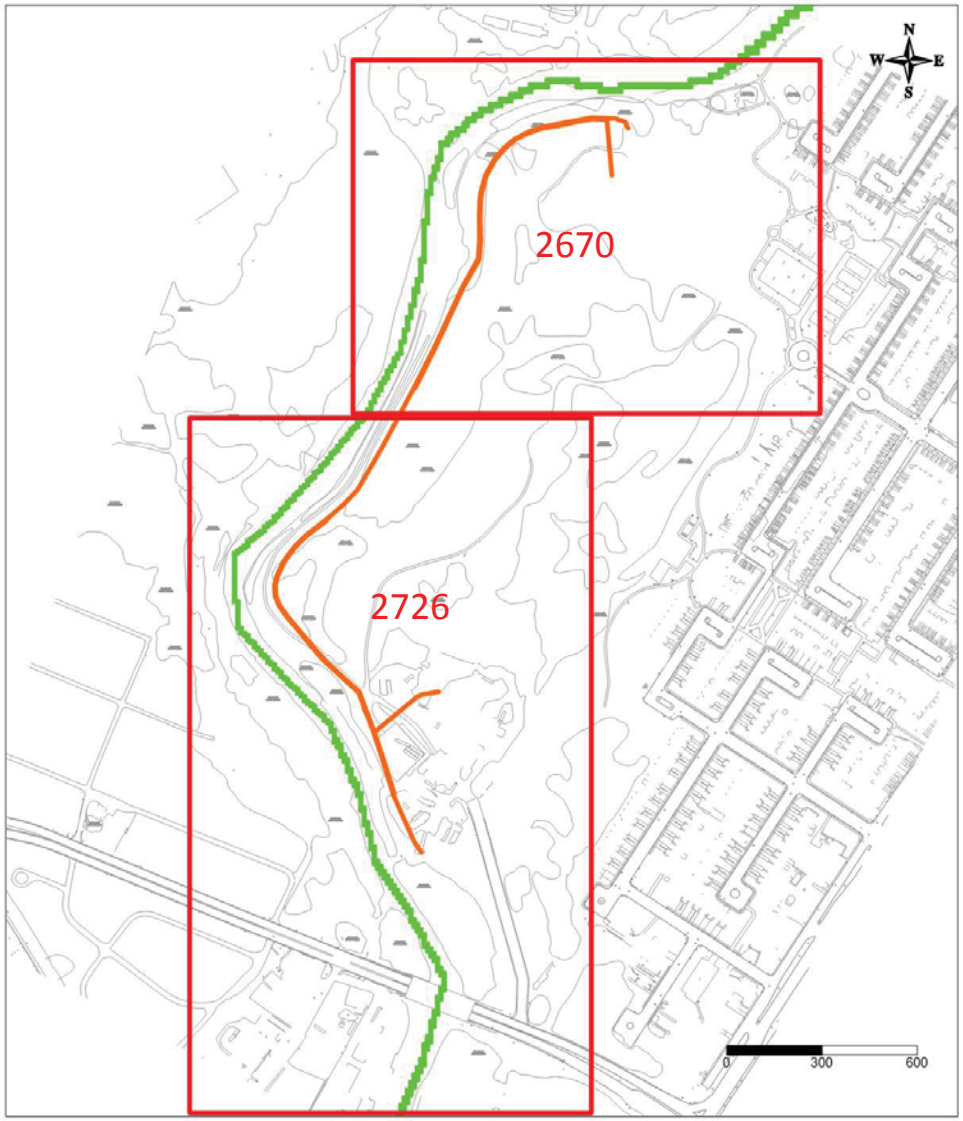
Well ID	X-Coordinate	Y-Coordinate	Aquifer	Observed Water Level, ft msl (A)	Computed Water Level, ft msl (B)	Residual (A – B)
MW-01D	2669105.701	217191.6111	shallow	-0.99	4.30	-5.29
MW-01S	2669123.111	217196.5811	shallow	7.02	6.21	0.81
MW-02	2668976.341	216695.5711	shallow	-1.98	-0.04	-1.94
MW-03	2668353.961	216200.2611	shallow	-1.26	2.45	-3.71
MW-04	2668459.881	216459.8211	shallow	7.8	3.00	4.80
MW-05D	2667926.371	217215.2611	shallow	0.87	5.63	-4.76
MW-05S	2667933.811	217228.4711	shallow	4.05	5.63	-1.58
MW-06	2668278.821	217645.1411	shallow	5.69	5.68	0.01
MW-07D	2668574.141	218445.4011	shallow	2.61	5.16	-2.55
MW-07S	2668547.791	218461.9711	shallow	1.64	5.13	-3.49
MW-08	2669480.041	218882.8511	shallow	3.01	2.48	0.53
MW-09	2669553.921	217959.7311	shallow	6.17	8.59	-2.42
MW-10	2668838.461	217744.7611	Deep	22.85	26.07	-3.22
MW-11	2668552.331	217310.2111	shallow	20.23	21.12	-0.89
MW-12	2668569.101	216841.0511	shallow	10.16	8.45	1.71
MW-13D	2668662.961	215647.8011	Deep	1.16	-0.46	1.62
MW-13I	2668662.961	215647.8011	Deep	-0.65	-0.69	0.04
MW-13S	2668672.431	215650.9811	shallow	-0.46	-0.47	0.01
MW-14D	2669511.501	218757.9211	Deep	0.63	0.41	0.22
MW-14S	2669515.351	218746.9611	shallow	0.85	2.45	-1.60
MW-15D	2669703.471	217761.9311	Deep	-2.28	-2.25	-0.03
MW-15S	2669709.501	217760.7511	shallow	-1.91	2.60	-4.51
MW-16D	2669658.271	217109.3911	Deep	-2.71	-2.65	-0.06
MW-16S	2669652.731	217117.5811	shallow	-3	0.51	-3.51
MW-17D	2667467.501	216998.7711	Deep	7.33	7.52	-0.19
MW-17S	2667469.471	217004.5911	shallow	9.02	9.95	-0.93
MW-18D	2668733.531	218882.0011	Deep	5.55	4.66	0.89
MW-18S	2668743.151	218882.9511	shallow	5.14	5.10	0.04
MW-19	2668750.911	215899.1411	Deep	-0.67	-0.43	-0.24
MW-20D	2668110.701	216811.0611	Deep	1.01	1.86	-0.85
MW-20I	2668110.701	216811.0611	Deep	1.87	1.75	0.12
MW-20S	2668115.531	216812.4011	Deep	1.63	1.74	-0.11
MW-21D	2668389.611	214906.8811	Deep	-1.24	-0.92	-0.32
MW-21S	2668389.611	214906.8811	shallow	-1.14	0.36	-1.50
MW-22	2669532.921	215439.2711	Deep	-6.38	-5.20	-1.18
MW-23D	2666695.641	217119.8911	Deep	13.85	13.94	-0.09
MW-23I	2666695.641	217119.8911	Deep	20.31	20.04	0.27
MW-23S	2666695.641	217119.8911	shallow	25.18	24.03	1.15
MW-24	2667802.621	215178.7111	shallow	3.64	4.39	-0.75

Well ID	X-Coordinate	Y-Coordinate	Aquifer	Observed Water Level, ft msl (A)	Computed Water Level, ft msl (B)	Residual (A – B)
MW-25	2667938.421	215364.2211	shallow	4.16	3.90	0.26
MW-26D	2668242.171	214923.6711	shallow	-1.07	1.17	-2.24
MW-26S	2668244.251	214930.0311	shallow	3.86	1.21	2.65
MW-27	2668403.411	214497.4911	shallow	-1.73	-1.87	0.14
MW-28	2670951.281	217010.4111	shallow	-10.15	-8.17	-1.98
MW-29	2671864.031	217477.3311	shallow	-11.24	-9.36	-1.88
MW-30	2671914.721	217241.7211	shallow	-11.3	-9.44	-1.86
MW-31	2672266.541	215889.3111	shallow	-10.44	-10.10	-0.34
MW-32	2672545.801	216611.6711	shallow	-11.49	-10.77	-0.72
MW-34D	2669131.931	218366.3711	shallow	-0.26	5.26	-5.52
MW-34S	2669134.411	218368.8511	shallow	9.29	5.34	3.95
MW-35	2670210.281	214981.6811	shallow	-8.59	-8.02	-0.57
MW-36	2668791.271	216621.9811	shallow	-3.1	0.26	-3.36
MW-37	2668638.181	216281.2011	shallow	1.41	2.19	-0.78
MW-38	2668748.531	215905.2811	shallow	-0.5	-0.12	-0.38
MW-39	2668987.521	215284.2311	shallow	-0.74	-1.65	0.91
MW-40	2670809.301	215506.8311	shallow	-9.31	-8.29	-1.02
MW-41D	2669417.491	217276.3811	shallow	-2.95	3.41	-6.36
MW-41S	2669411.071	217271.4811	shallow	5.25	3.72	1.53
MW-42	2670664.751	217304.4711	shallow	-9.72	-5.52	-4.20
MW-43	2671325.361	216587.6111	shallow	-10.4	-8.57	-1.83
MW-46	2670339.041	216221.3211	shallow	-8.75	-6.91	-1.84
MW-47	2672649.261	216428.5811	shallow	-11.74	-11.09	-0.65

APPENDIX B

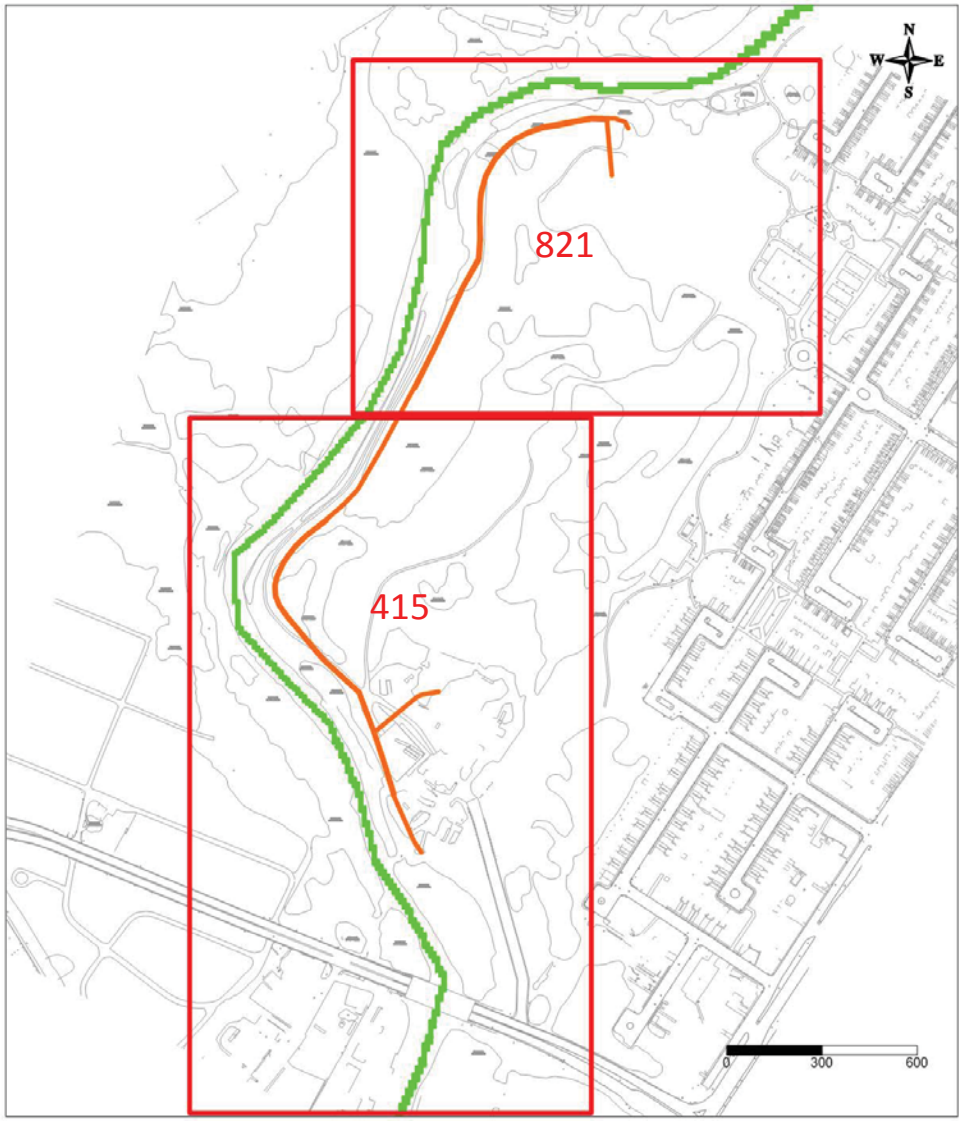
LDCA Leachate Volume Estimation

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – High Tide



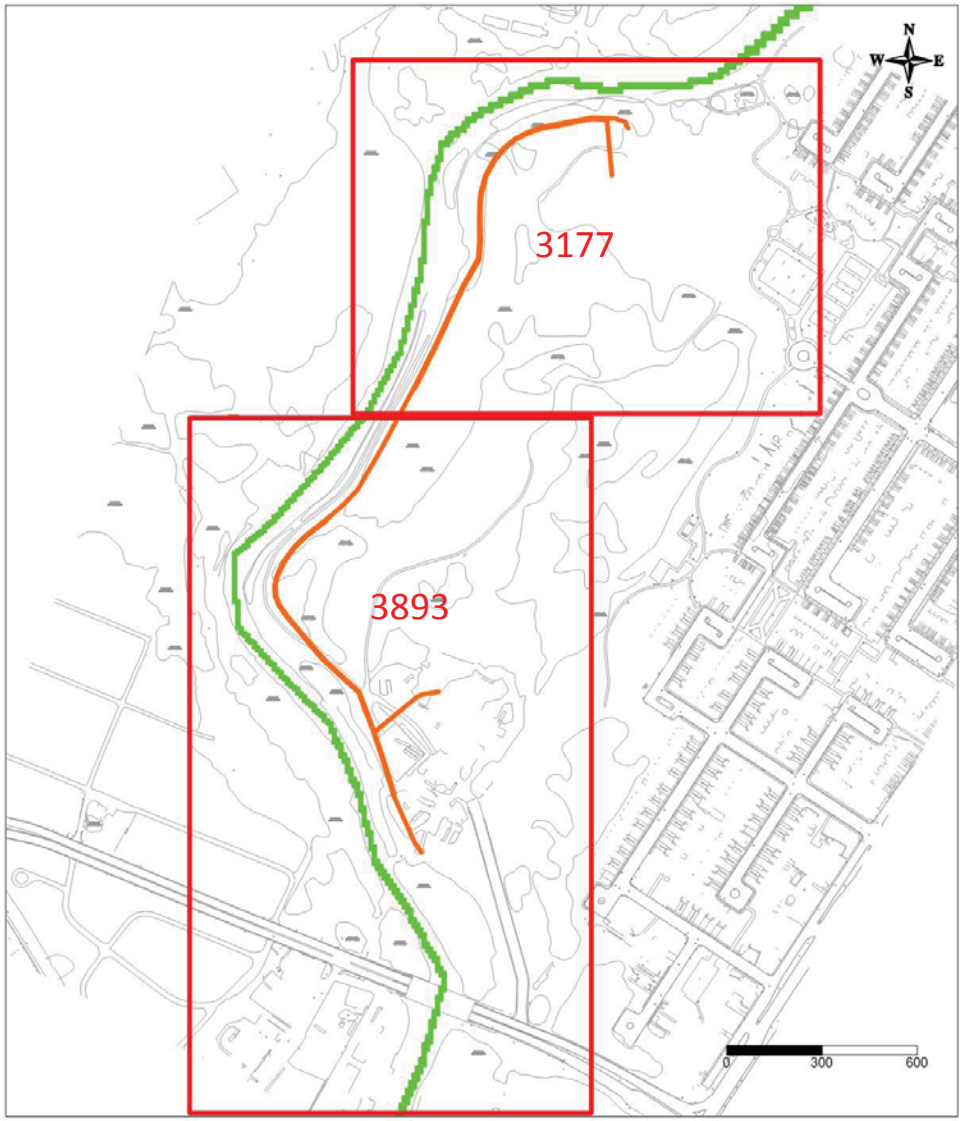
Spring

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – High Tide



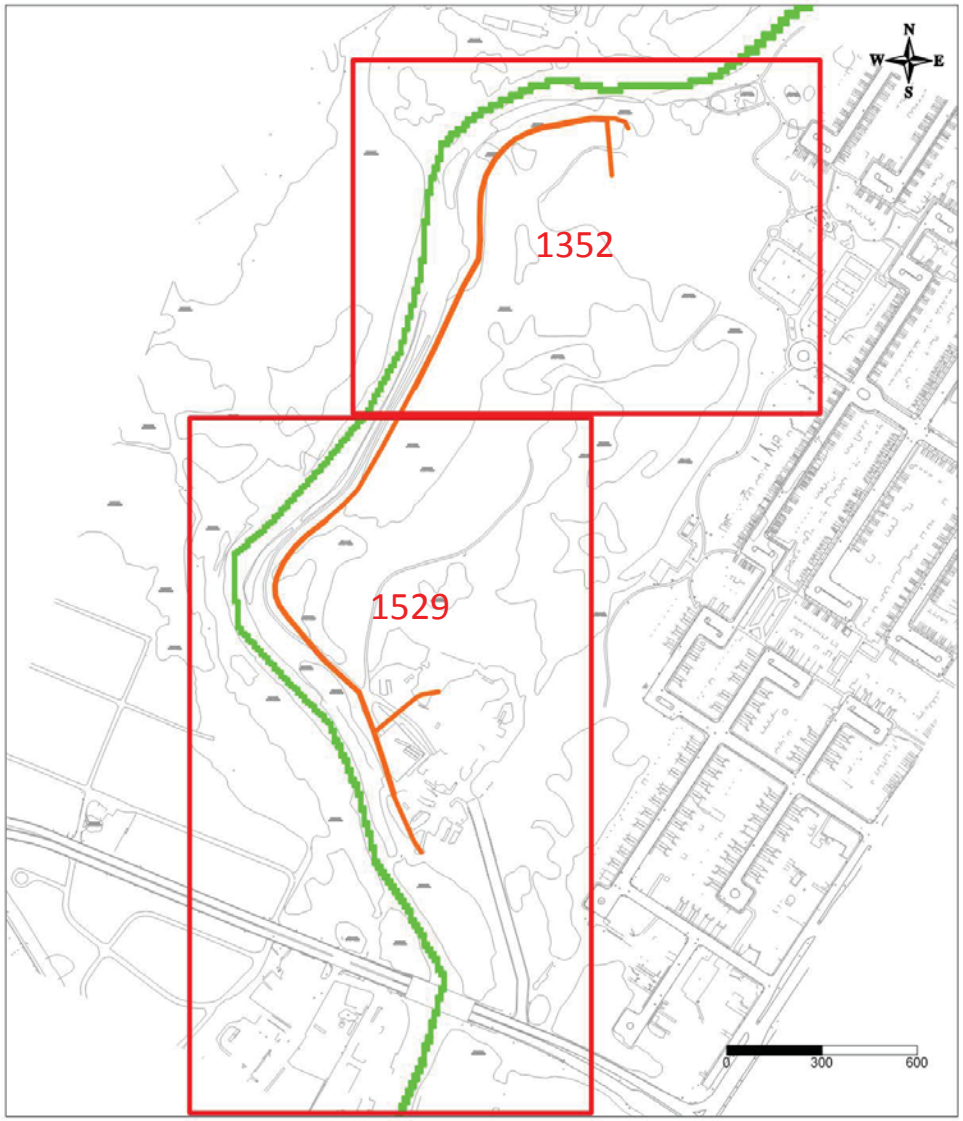
Spring

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – Low Tide



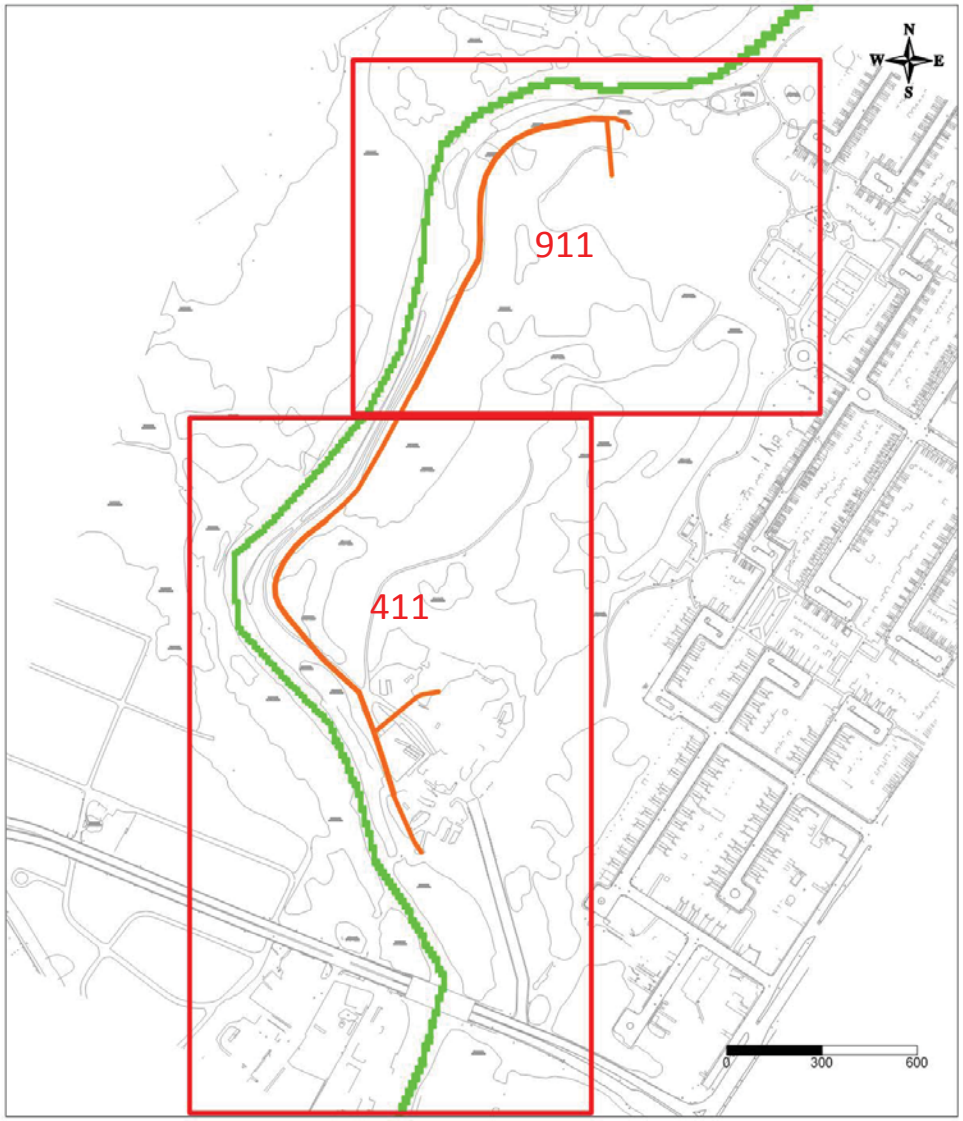
Spring

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – Low Tide



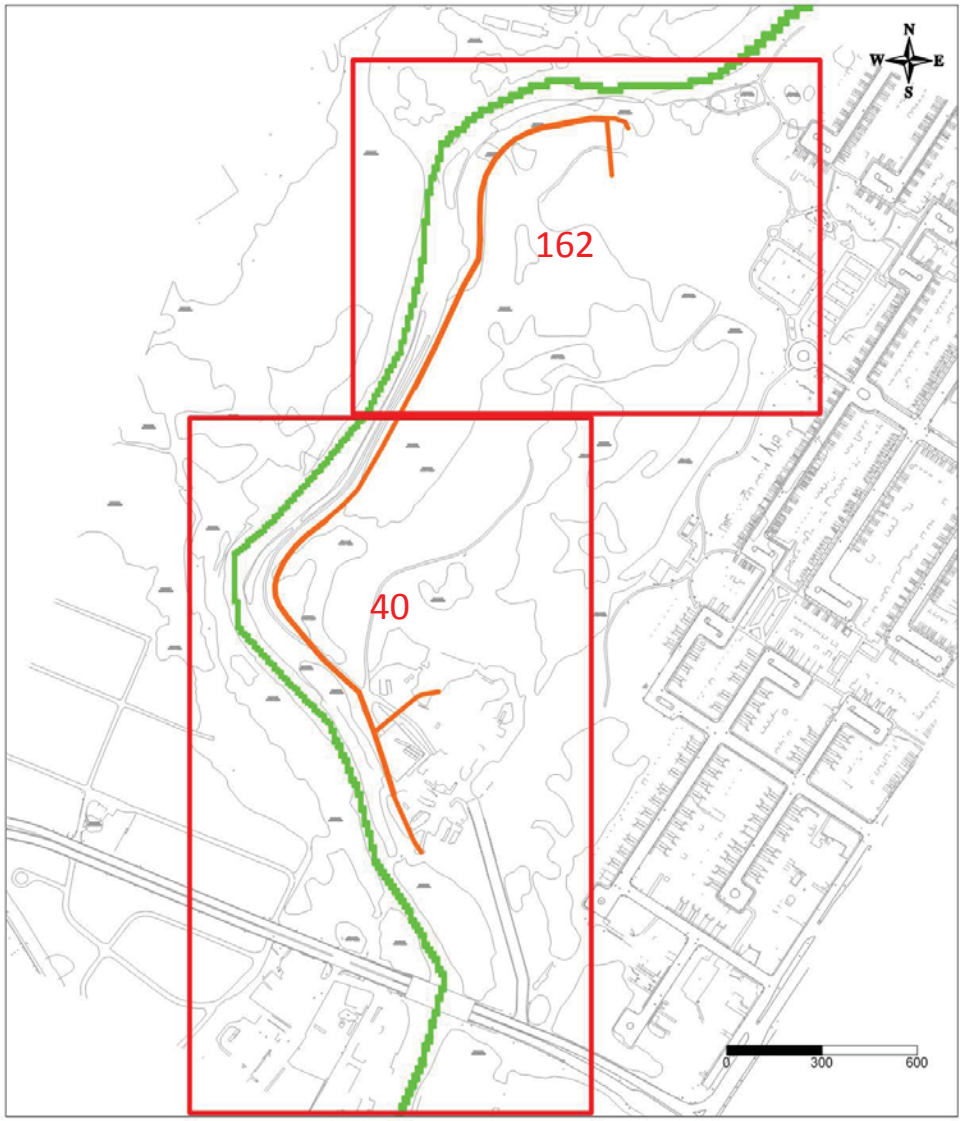
Spring

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – High Tide



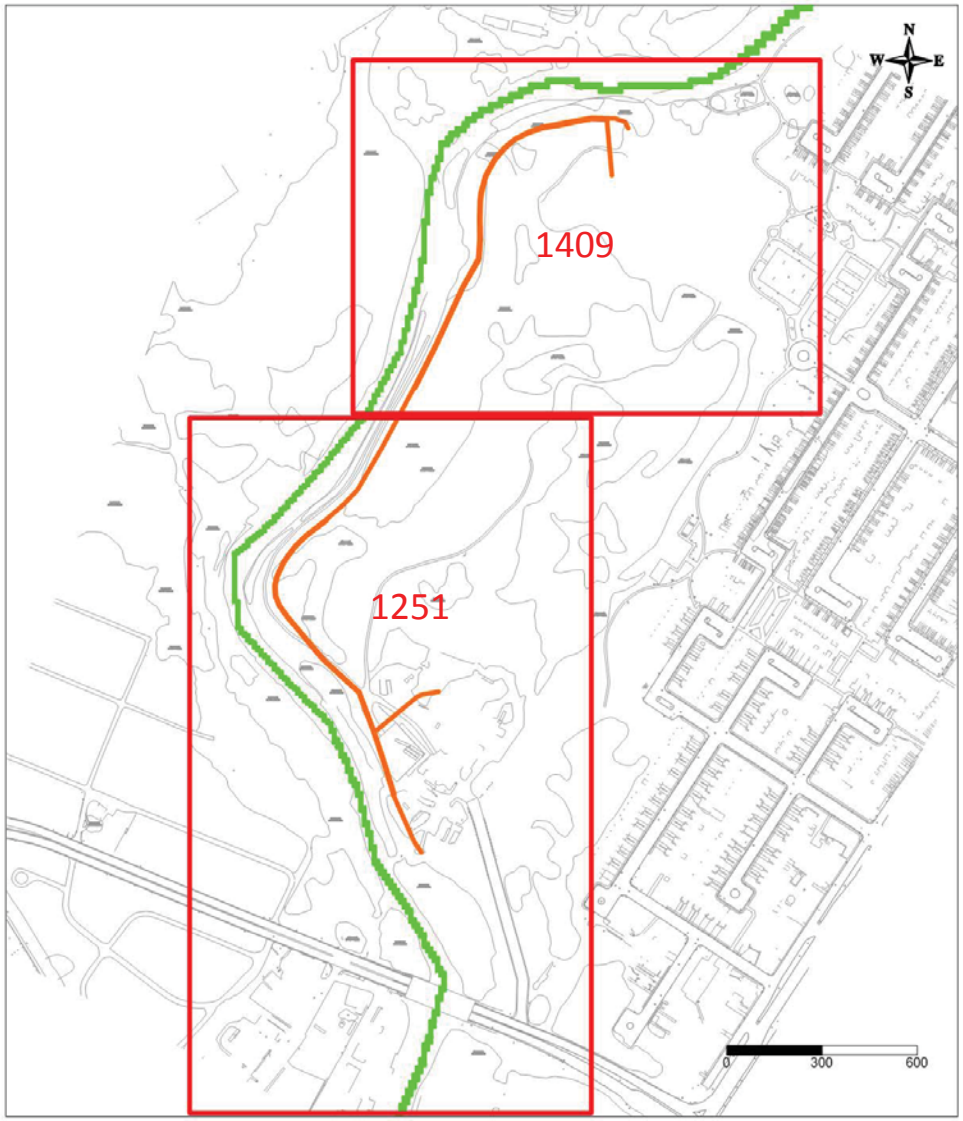
Summer

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – High Tide



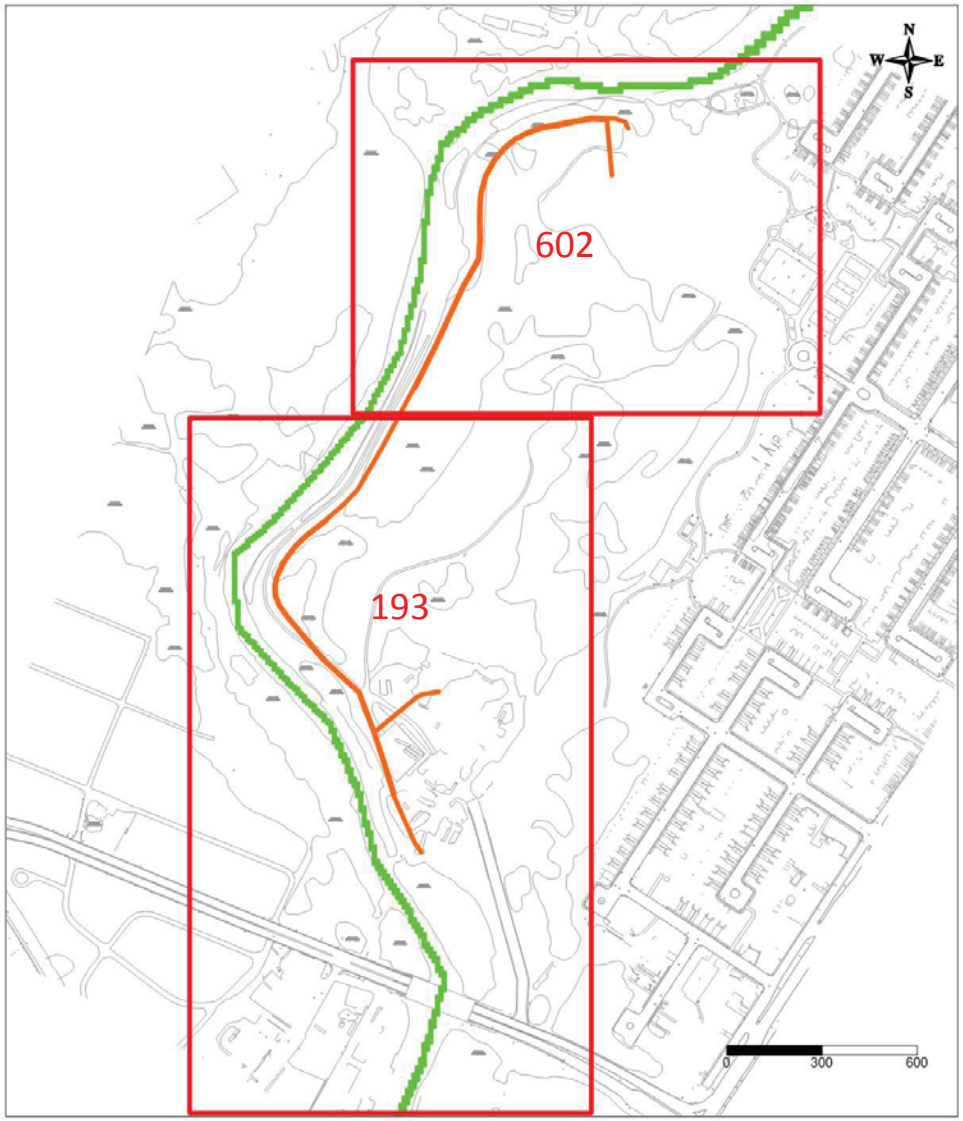
Summer

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – Low Tide



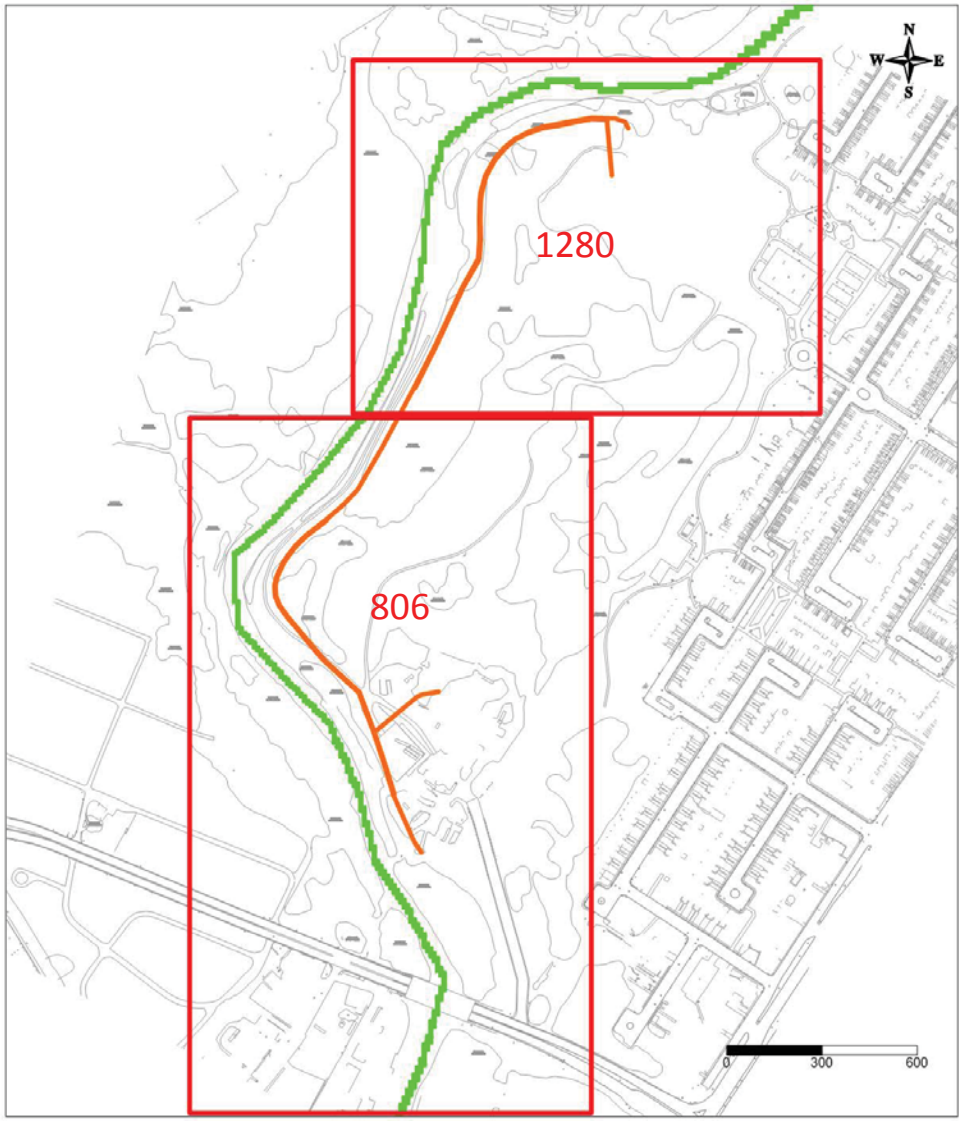
Summer

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – Low Tide



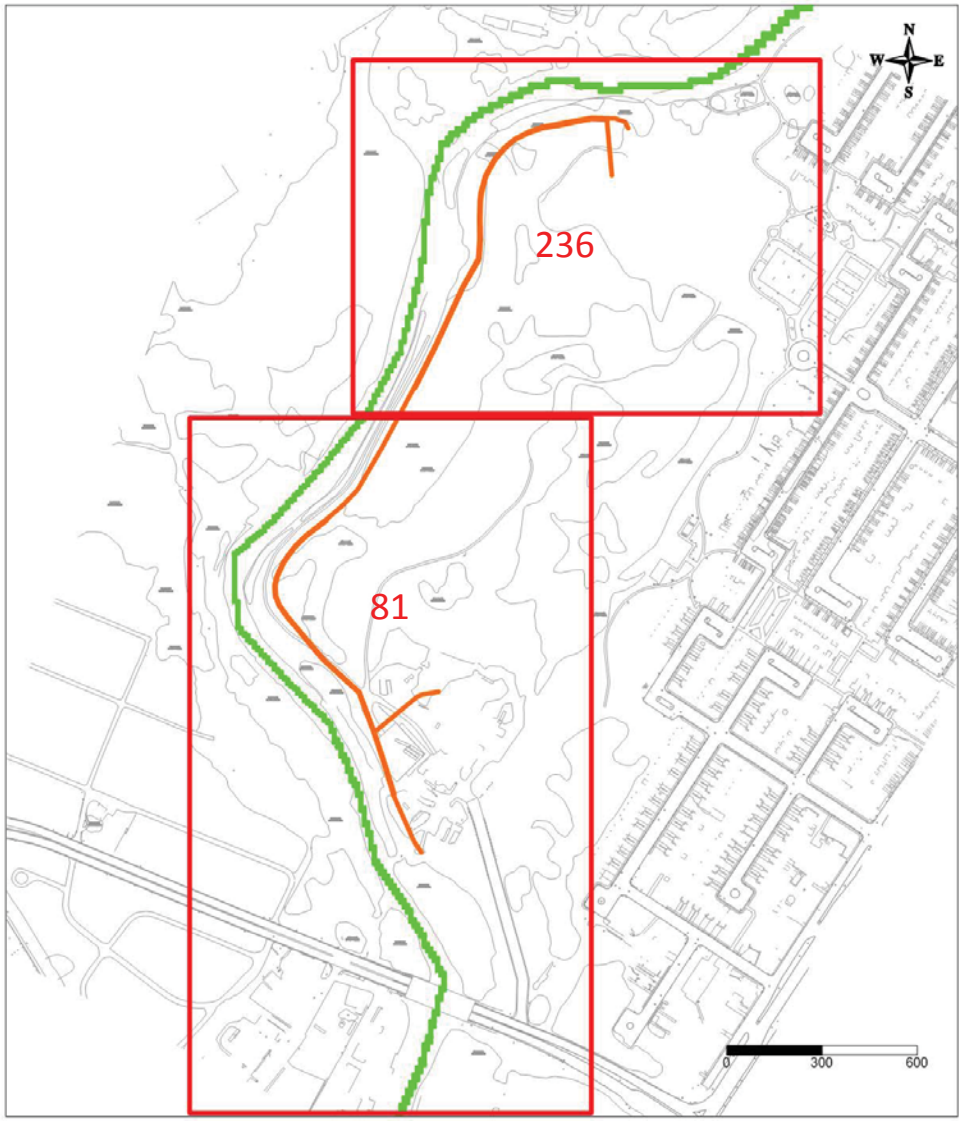
Summer

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – High Tide



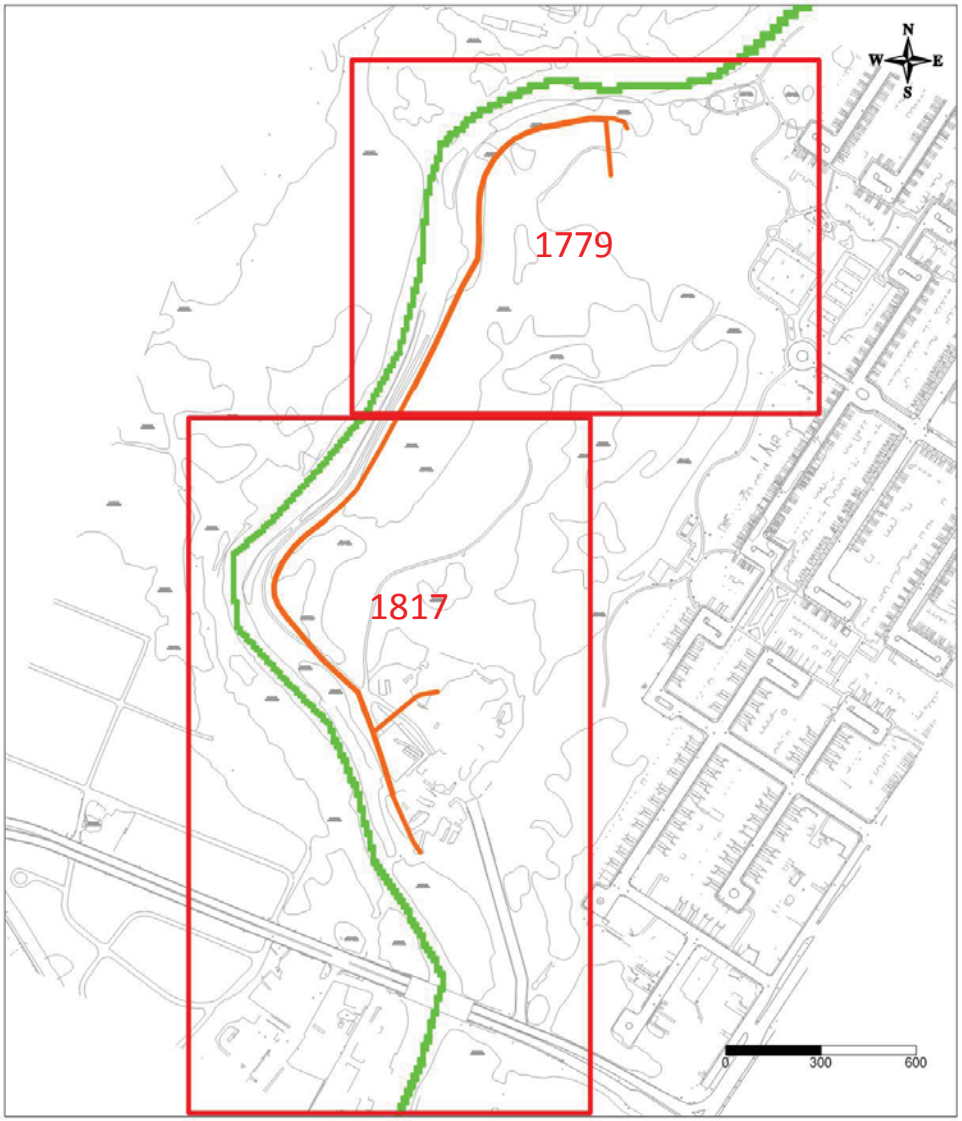
Fall

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – High Tide



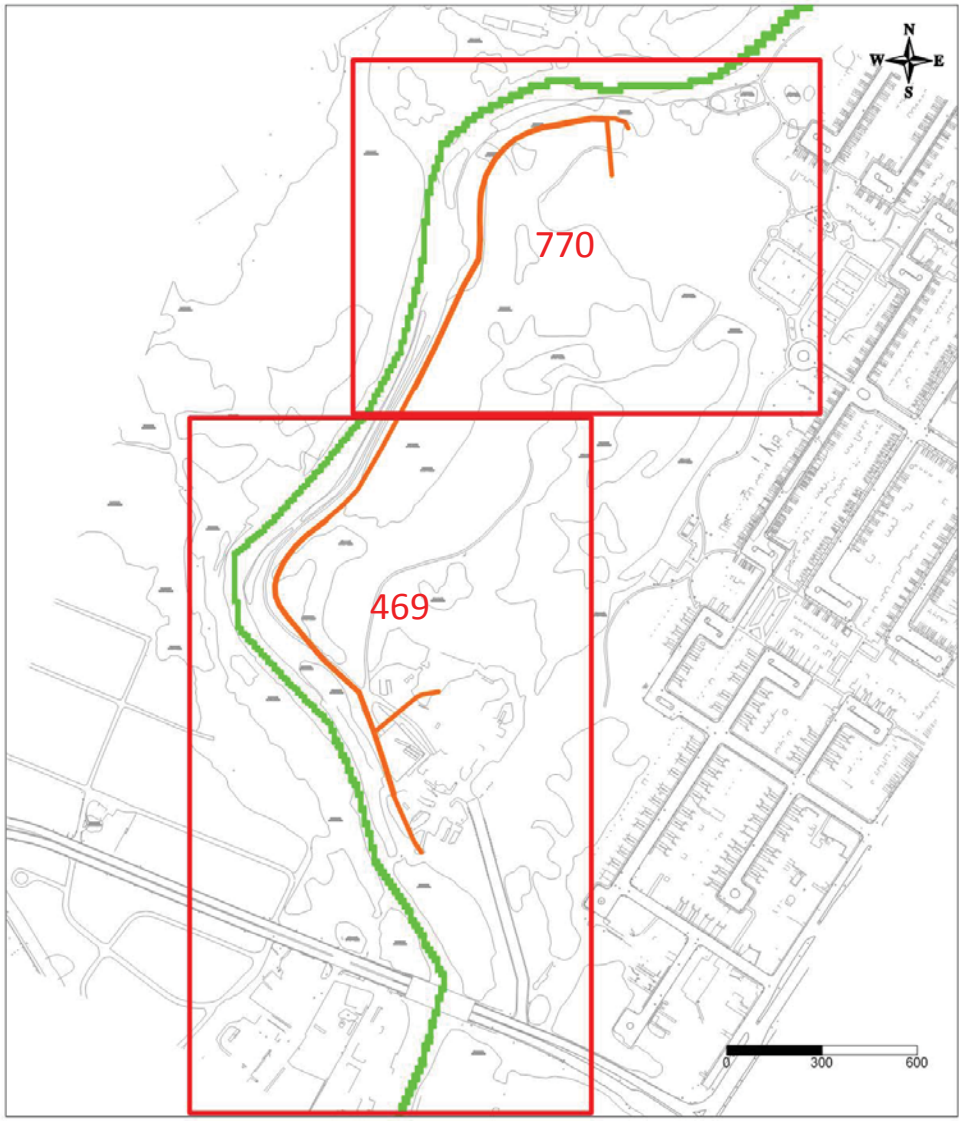
Fall

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – Low Tide



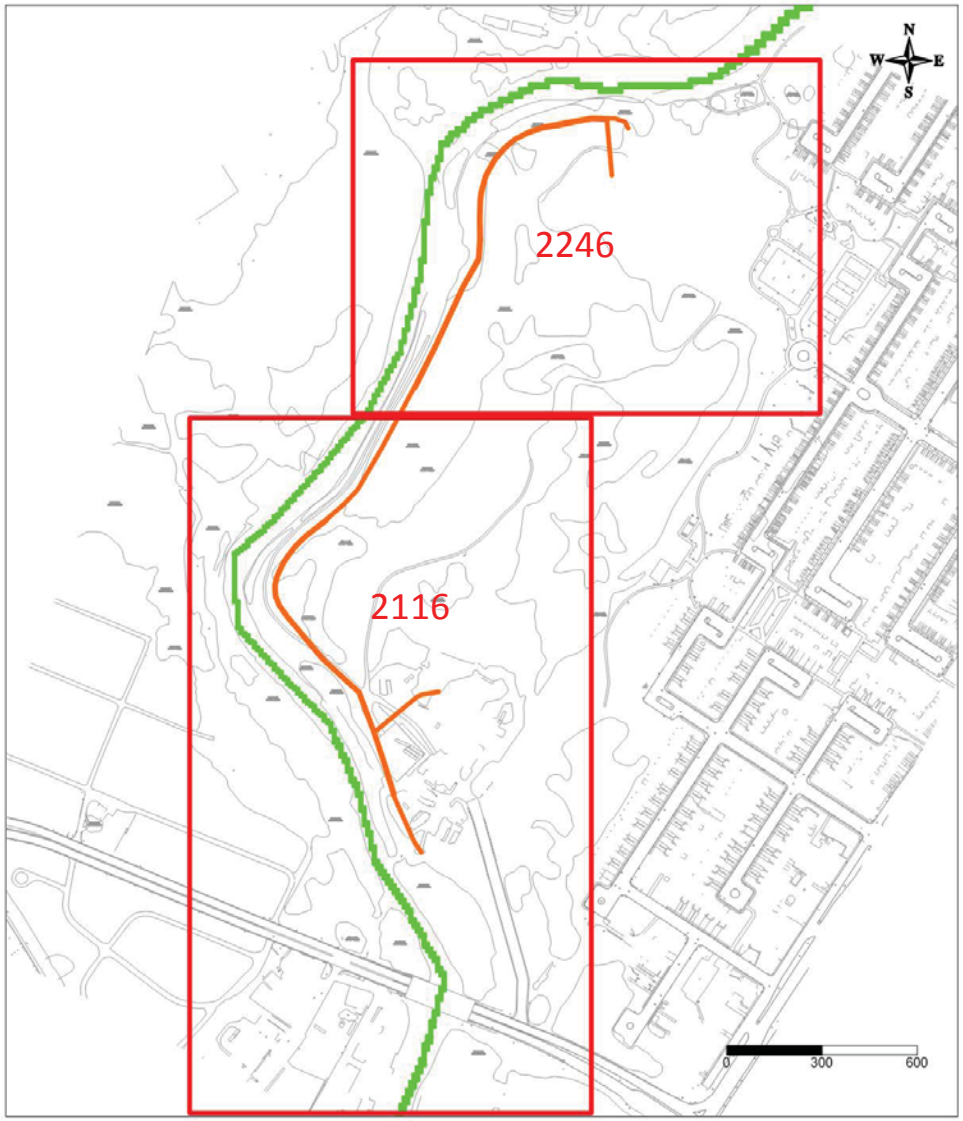
Fall

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – Low Tide



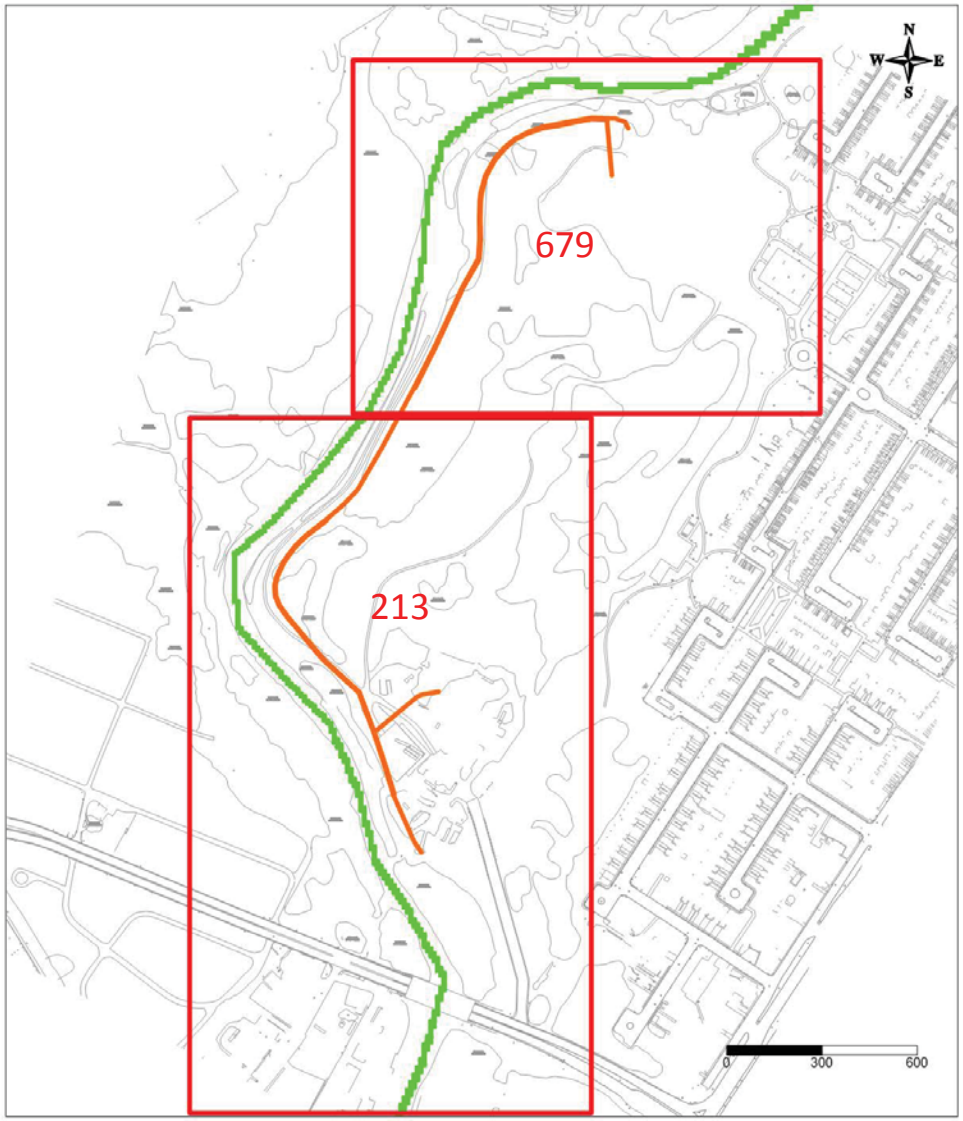
Fall

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – High Tide



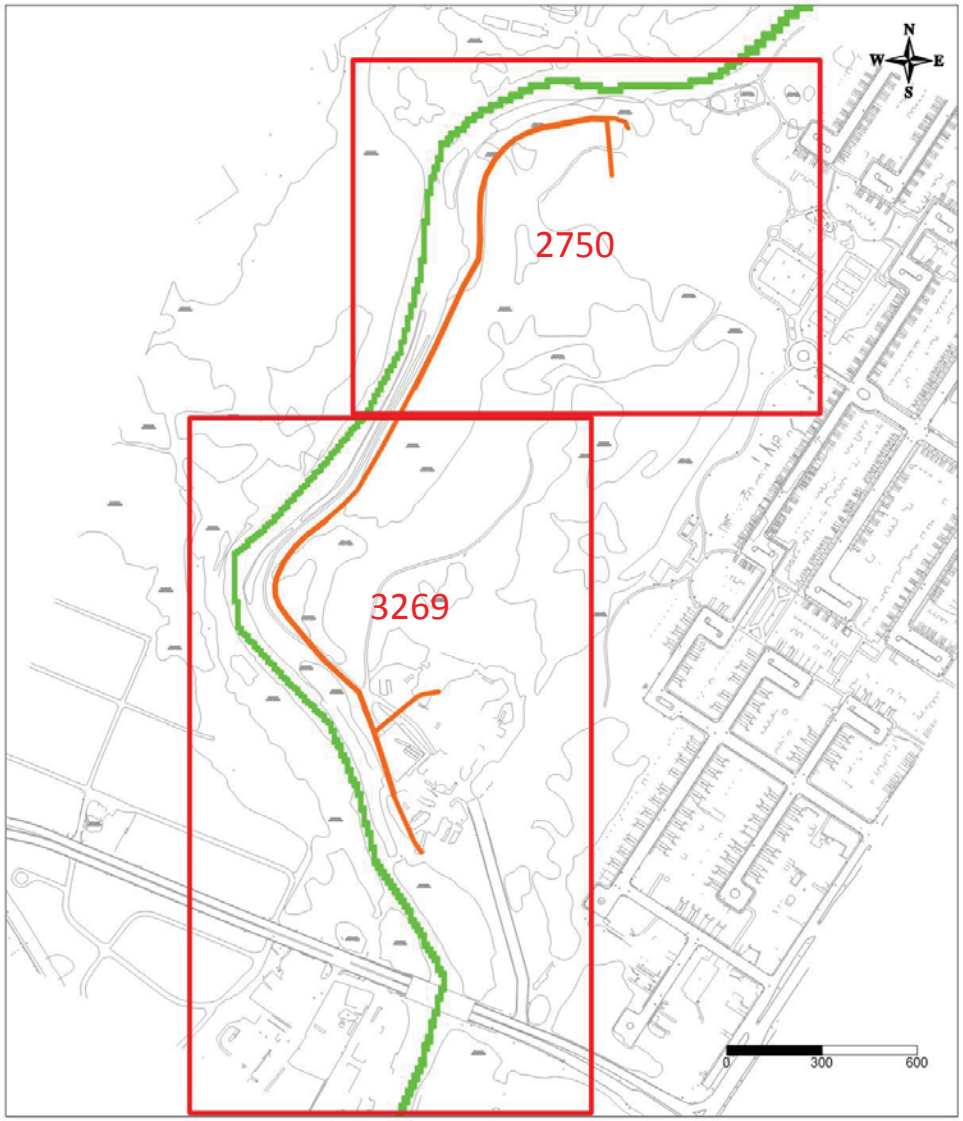
Winter

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – High Tide



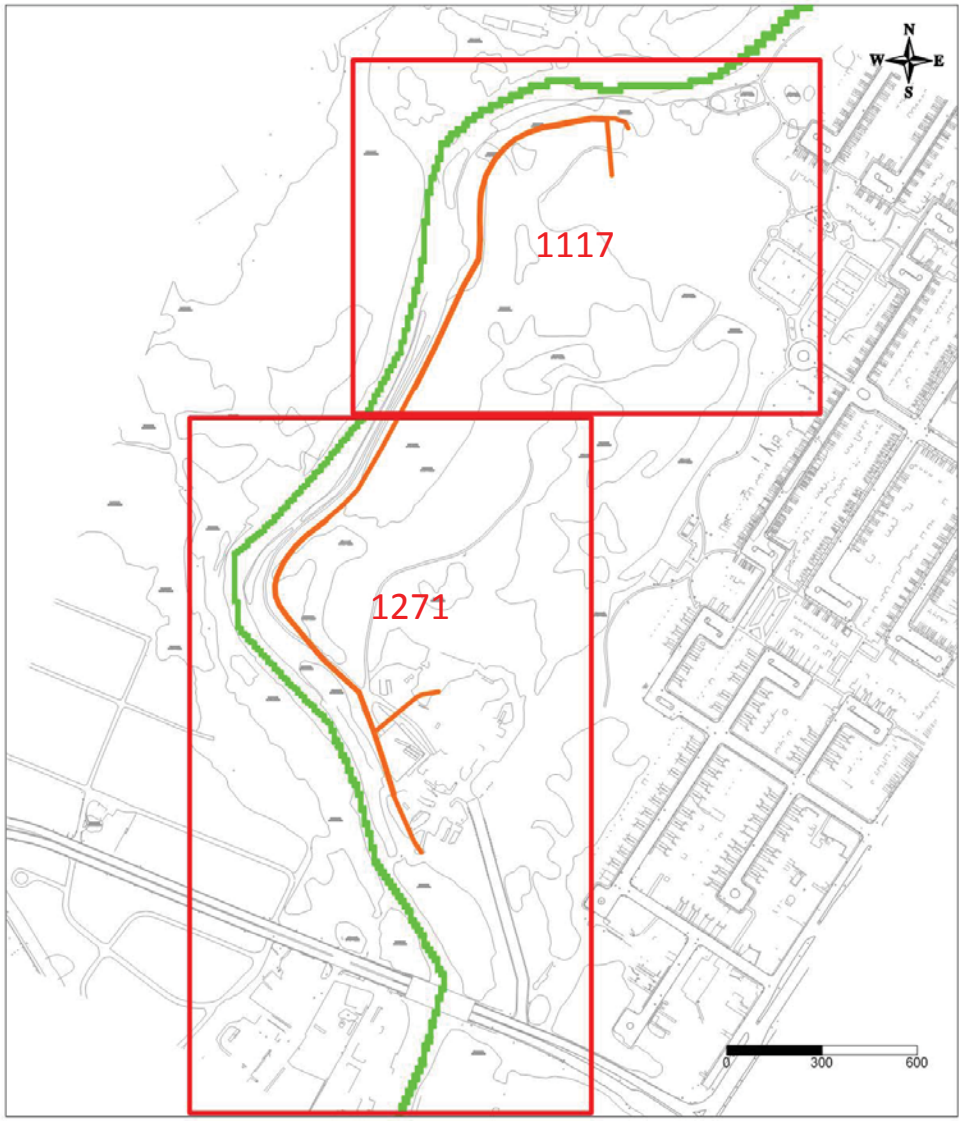
Winter

Leachate Volume (Poor Stand of Tree Conditions), ft^3/day – Low Tide



Winter

Leachate Volume (Good/Excellent Stand of Tree Conditions), ft^3/day – Low Tide



Winter

APPENDIX C

Pipe and Pump Data Sheets

GRUNDFOS

Company name:
Created by:
Phone:

Date: 16/10/2017

Position	Qty.	Description
	1	**25S05-3**

Note! Product picture may differ from actual product

Product No.: 51595035

Multi-stage submersible pump for raw water supply, groundwater lowering and pressure boosting. The pump is suitable for pumping clean, thin, non-agressive liquids without solid particles or fibres.

The pump is made entirely of Stainless steel DIN W.-Nr. DIN W.-Nr. 1.4301.

The motor is a 1-phase motor with sand shield, liquid-lubricated bearings and pressure equalizing diaphragm.

Liquid:

Pumped liquid:	Water
Maximum liquid temperature:	104 °F
Max liquid t at 0.15 m/sec:	104 °F
Liquid temperature during operation:	68 °F
Density:	62.29 lb/ft³
Kinematic viscosity:	1 cSt

Technical:

Speed for pump data:	3450 rpm
Actual calculated flow:	29.6 US GPM
Resulting head of the pump:	50.03 ft
Shaft seal for motor:	LIPSEAL
Approvals on nameplate:	CE,EAC,CSACOMP,UR
Curve tolerance:	ISO9906:2012 3B

Materials:

Pump:	Stainless steel DIN W.-Nr. 1.4301 AISI 304
Impeller:	Stainless steel DIN W.-Nr. 1.4301 AISI 304
Motor:	Stainless steel DIN W.-Nr. 1.4301 AISI 304

Installation:

Pump outlet:	1 1/2"NPT
Motor diameter:	4 inch

Electrical data:

Motor type:	MS402
Type of motor:	RSIR
Rated power - P2:	0.496 HP
Power (P2) required by pump:	0.644 HP
Mains frequency:	60 Hz
Rated voltage:	1 x 230 V

GRUNDFOS

Company name:
Created by:
Phone:

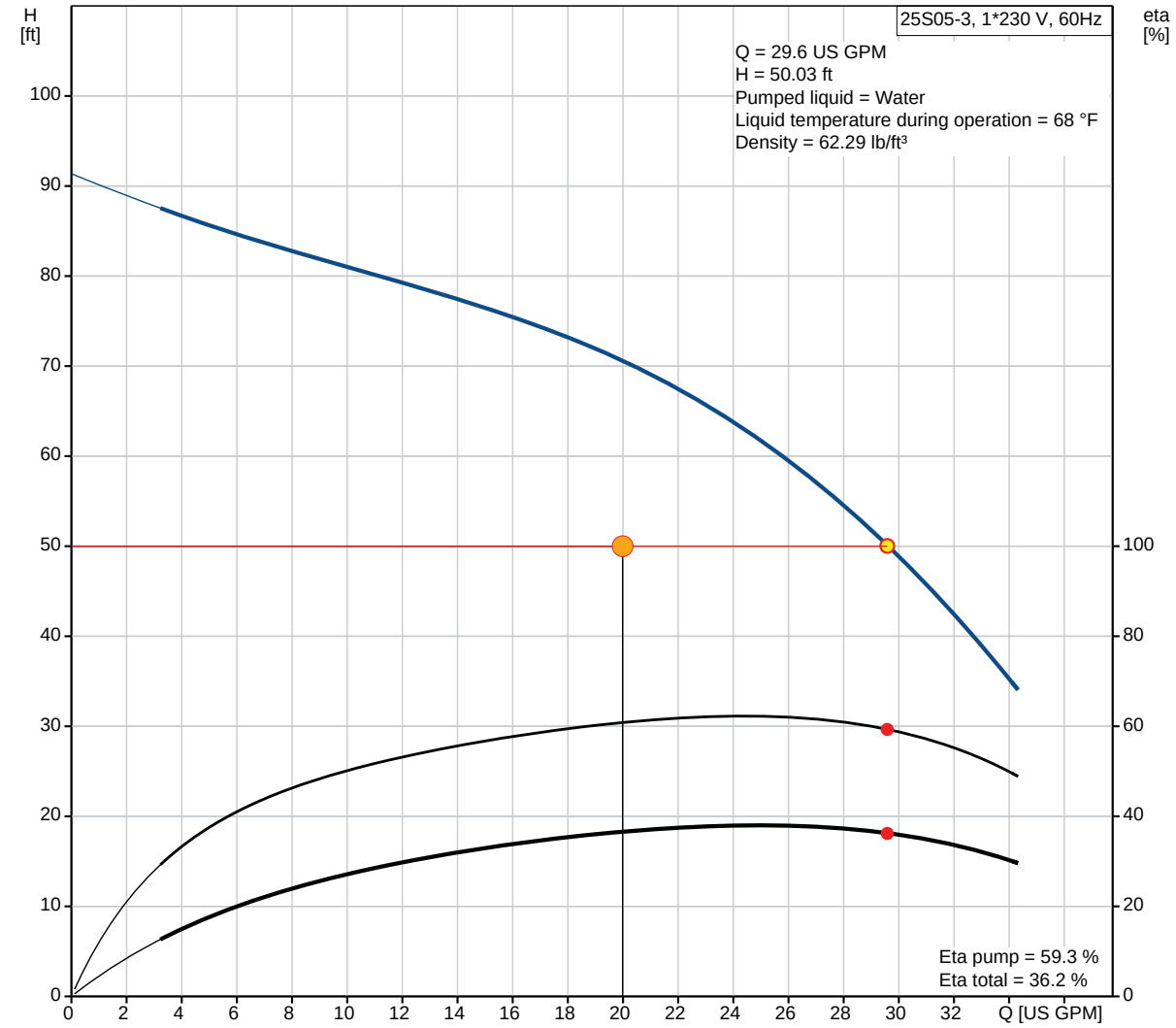
Date: 16/10/2017

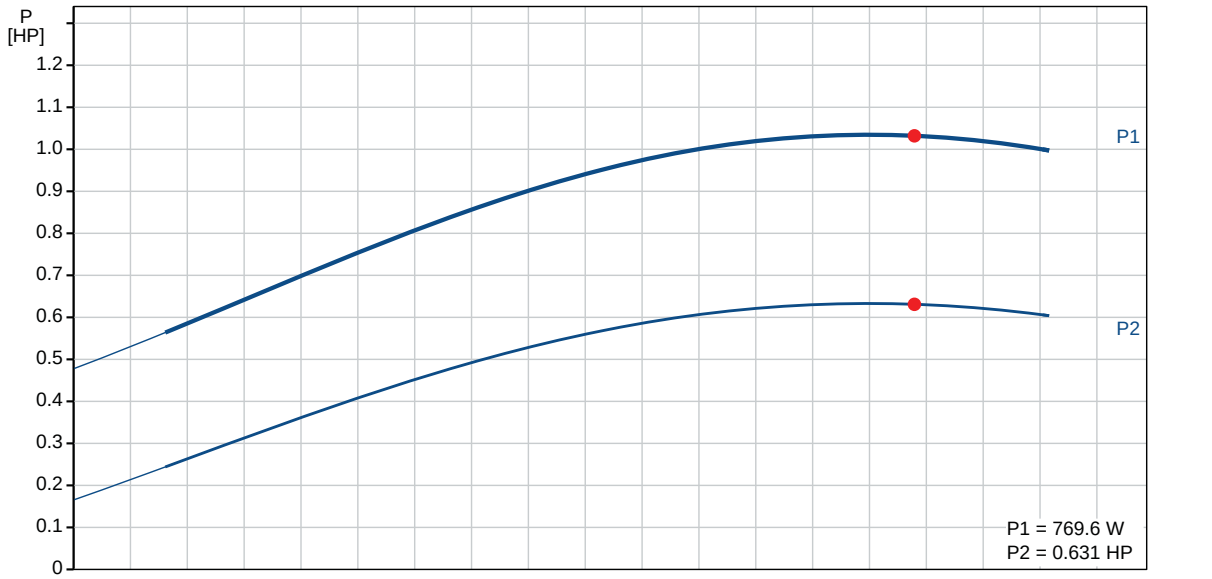
Position	Qty.	Description	
		Service factor:	1,6
		Rated current:	6 A
		Cos phi - power factor:	0,76
		Rated speed:	3450 rpm
		Start. method:	direct-on-line
		Enclosure class (IEC 34-5):	IP68
		Insulation class (IEC 85):	B
		Built-in temp. transmitter:	no
		Others:	
		Net weight:	21.6 lb
		Gross weight:	24 lb

Company name:
Created by:
Phone:

Date: 16/10/2017

51595035 25S05-3 60 Hz

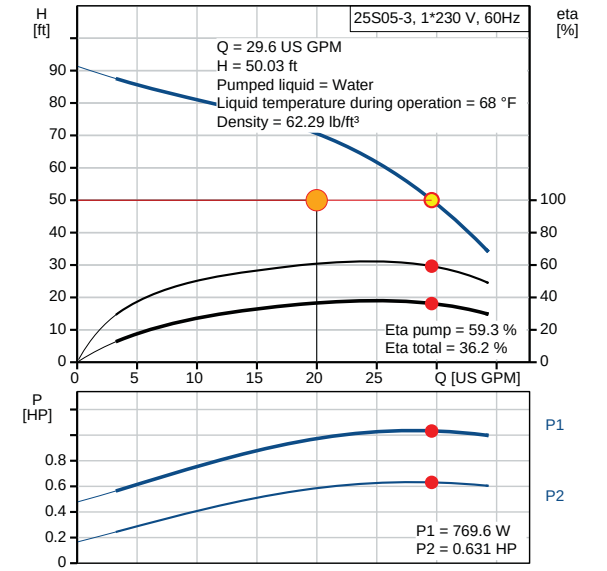


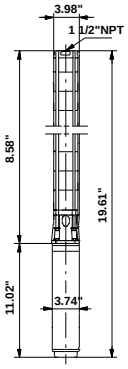


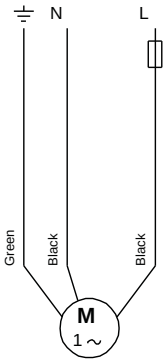
Company name:
Created by:
Phone:

Date: 16/10/2017

Description	Value
General information:	
Product name:	25S05-3
Product No:	51595035
EAN number:	5700394508421
Technical:	
Speed for pump data:	3450 rpm
Actual calculated flow:	29.6 US GPM
Resulting head of the pump:	50.03 ft
Shaft seal for motor:	LIPSEAL
Approvals on nameplate:	CE,EAC,CSACOMP,UR
Curve tolerance:	ISO9906:2012 3B
Pump No:	5010003
Stages:	3
Model:	A
Valve:	pump with built-in non-return valve
Materials:	
Pump:	Stainless steel
	DIN W.-Nr. 1.4301
	AISI 304
Impeller:	Stainless steel
	DIN W.-Nr. 1.4301
	AISI 304
Motor:	Stainless steel
	DIN W.-Nr. 1.4301
	AISI 304
Installation:	
Pump outlet:	1 1/2"NPT
Motor diameter:	4 inch
Liquid:	
Pumped liquid:	Water
Maximum liquid temperature:	104 °F
Max liquid t at 0.15 m/sec:	104 °F
Liquid temperature during operation:	68 °F
Density:	62.29 lb/ft³
Kinematic viscosity:	1 cSt
Electrical data:	
Motor type:	MS402
Type of motor:	RSIR
Applic. motor:	NEMA
Rated power - P2:	0.496 HP
Power (P2) required by pump:	0.644 HP
KVA code:	R
Mains frequency:	60 Hz
Rated voltage:	1 x 230 V
Service factor:	1,6
Rated current:	6 A
Cos phi - power factor:	0,76
Rated speed:	3450 rpm
Start. method:	direct-on-line
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	B
Motor protec:	CONTACT
Thermal protec:	internal







GRUNDFOS

Company name:
Created by:
Phone:

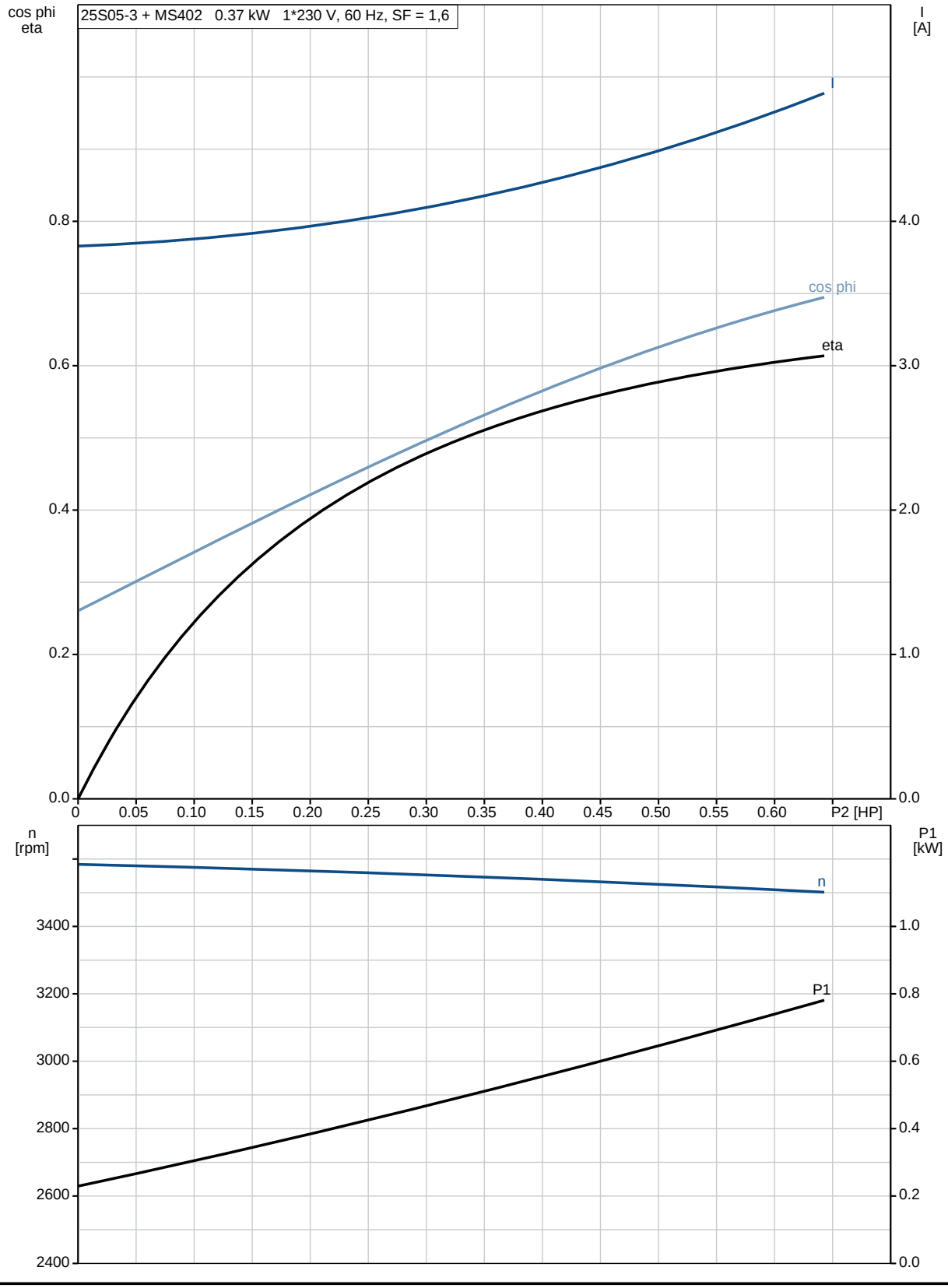
Date: 16/10/2017

Description	Value
Built-in temp. transmitter:	no
Motor No:	79952102
Others:	
Net weight:	21.6 lb
Gross weight:	24 lb
Sales region:	Namreg

Company name:
Created by:
Phone:

Date: 16/10/2017

51595035 25S05-3 60 Hz

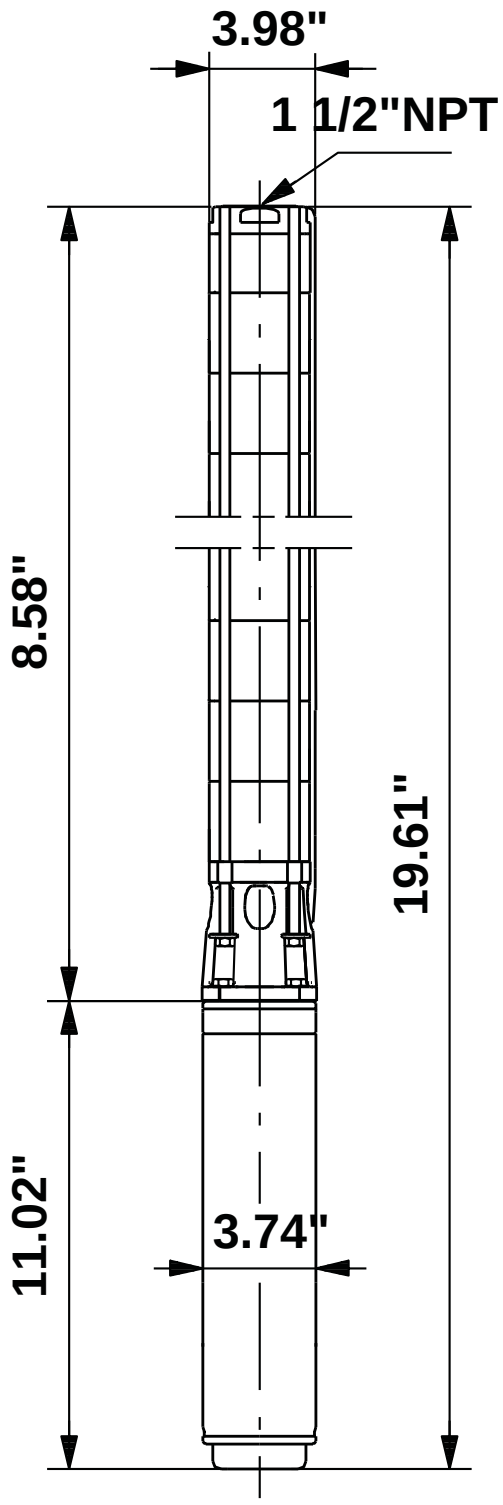


GRUNDFOS

Company name:
Created by:
Phone:

Date: 16/10/2017

51595035 25S05-3 60 Hz

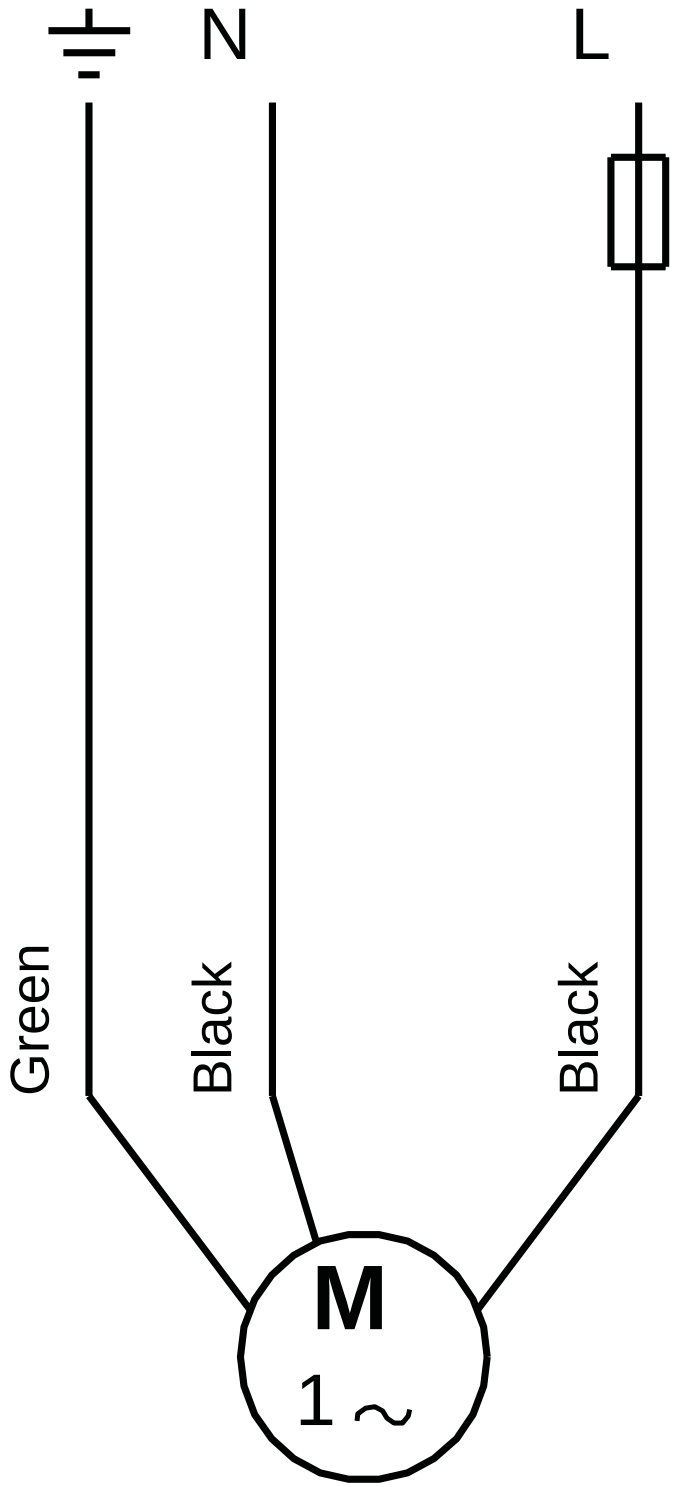


Note! All units are in [mm] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.

Company name:
Created by:
Phone:

Date: 16/10/2017

51595035 25S05-3 60 Hz



Note! All units are in [mm] unless others are stated.

Company name:
Created by:
Phone:

Date: 16/10/2017

51595035 25S05-3 60 Hz

Input

General

Application	Domestic water supply and rain water
Installation	Water supply from well > 8 m
Flow	20 US GPM
Head	50 ft
Prefer fast delivery	No

Your requirements

Dry running protection	No
Automatic restart	No

Operational conditions

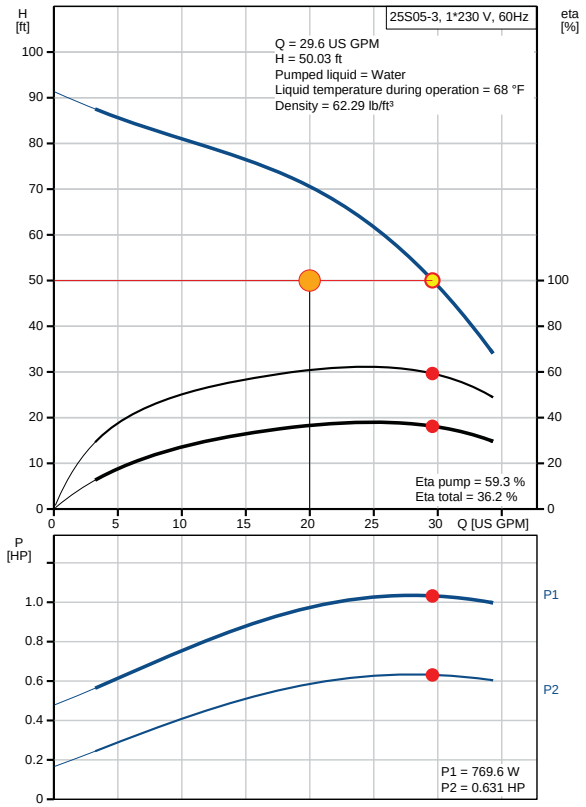
Frequency	60 Hz
Phase	1
Ambient temperature	68 °F
Pump operating time	1000 h/a
Energy price	0.12 USD/kWh
Increase of energy price	6 %
Calculation period	10 years

Load Profile

	1	
Flow	100	%
Head	100	%
P1	0.77	kW
Eta total	36.2	%
Time	1000	h/a
Energy consumption	519	kWh/Year
Quantity	1	

Sizing result

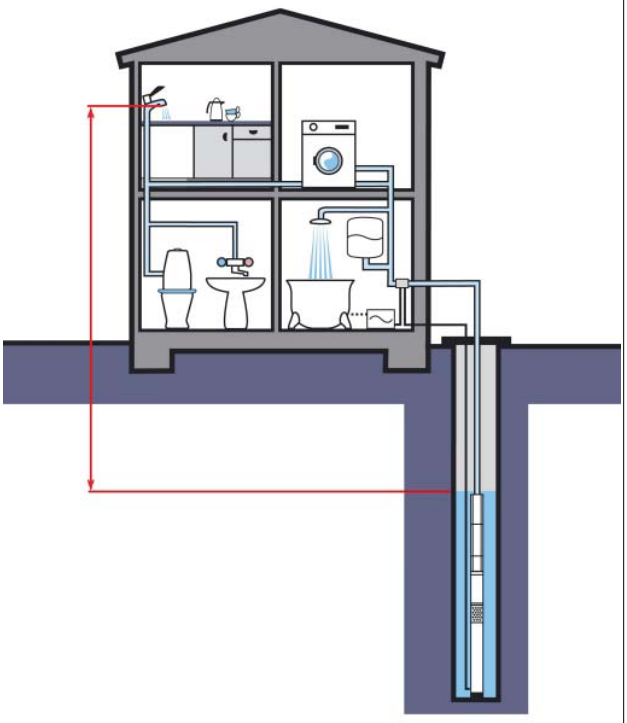
Type	25S05-3	
Quantity * Motor	1 * 0.496 HP	
Flow	29.6	US GPM (+48%)
H total	50.03	ft
Power P1	0.77	kW
Power P2 required in the duty point	0.631	HP
Eta pump	59.3	%
Eta motor	61.1	%
Eta pump+motor	36.2	% =Eta pump * Eta motor
Flow total	1199996	US gal/year
Energy consumption	519	kWh/Year
Price	On request	
Price + energy costs	On request	/10Years
Life cycle cost	USD 1949	/10Years



Company name:
Created by:
Phone:

Date: 16/10/2017

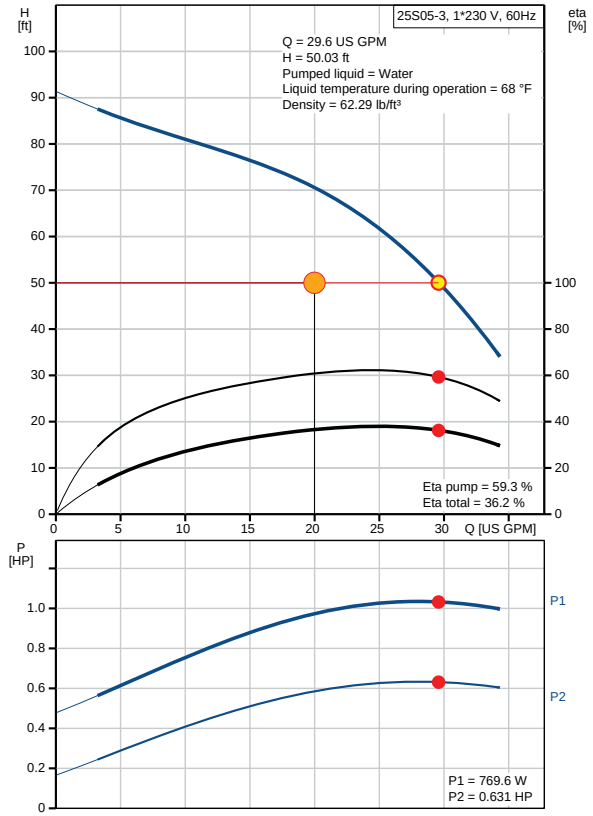
Installation and Input



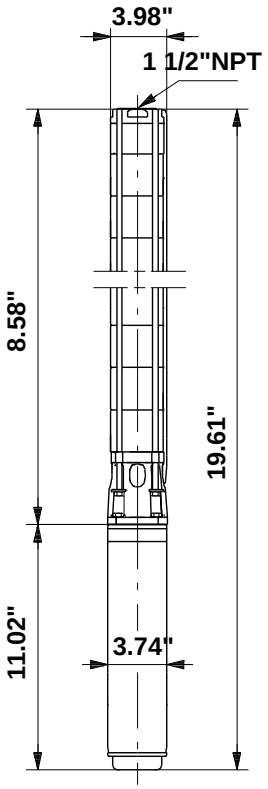
Sizing Results

Product number:	51595035
Type:	25S05-3
Installation type:	DomWell_gt8
Flow:	29.6 US GPM
H total:	50.03 ft
Power P1:	0.77 kW
Phase:	1
Voltage:	230 V
Eta pump:	59.3 %
Eta motor:	61.1 %

Pump Curve

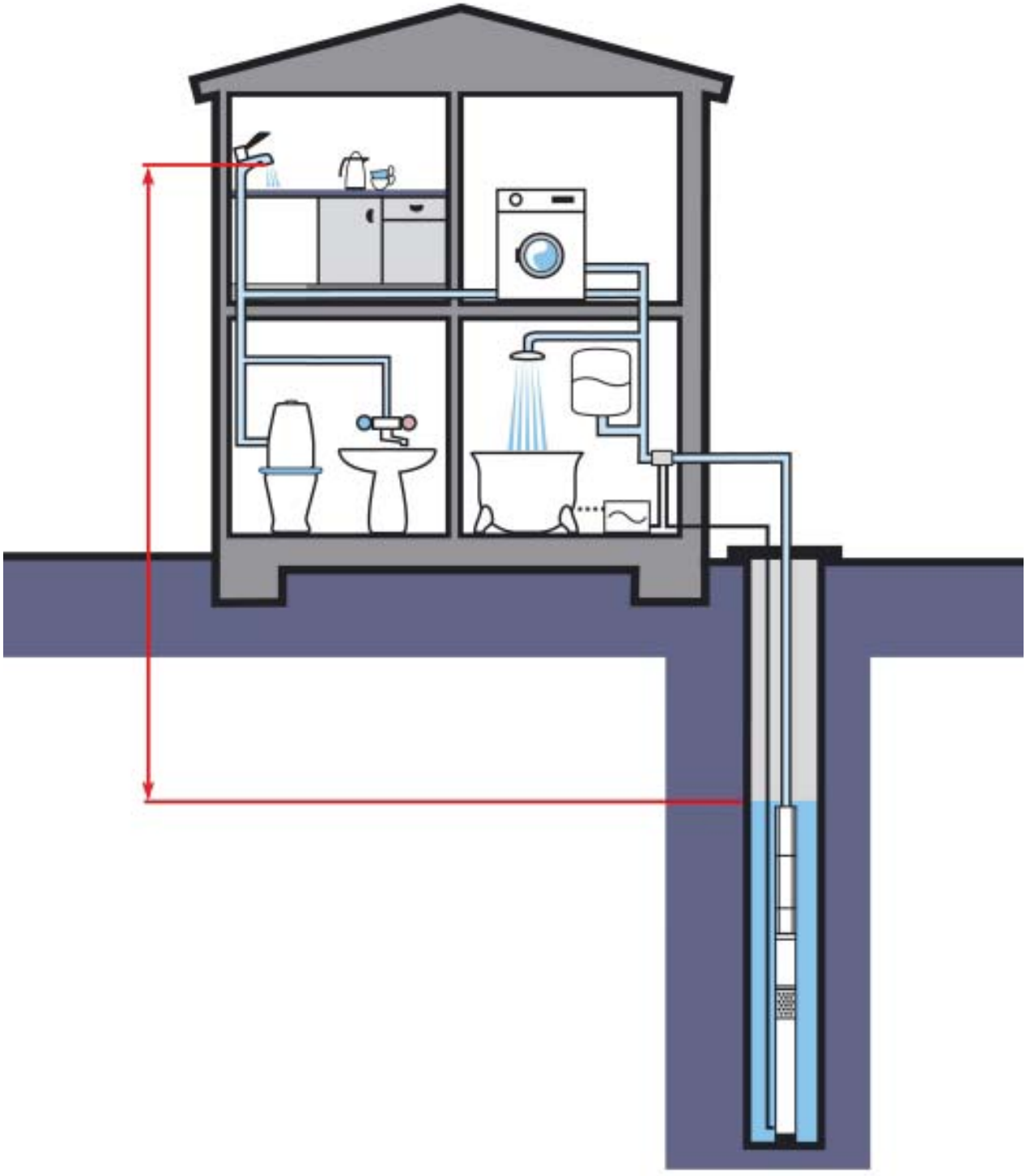


Dimensional Drawing



Company name:
Created by:
Phone:

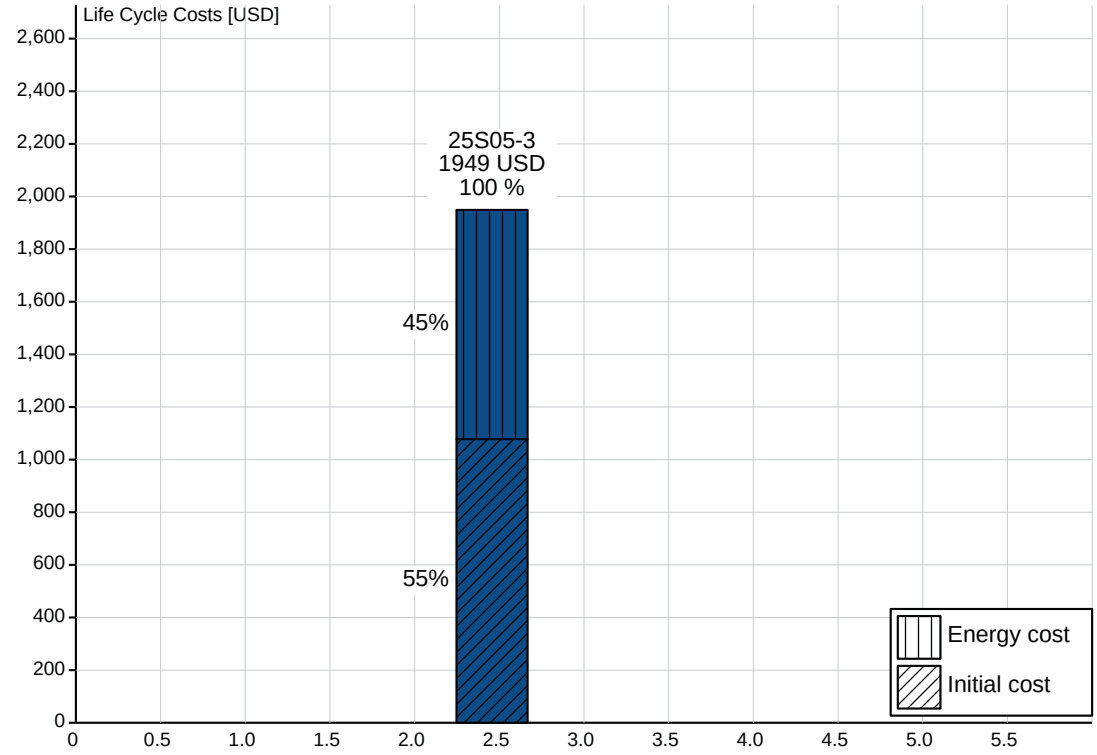
Date: 16/10/2017



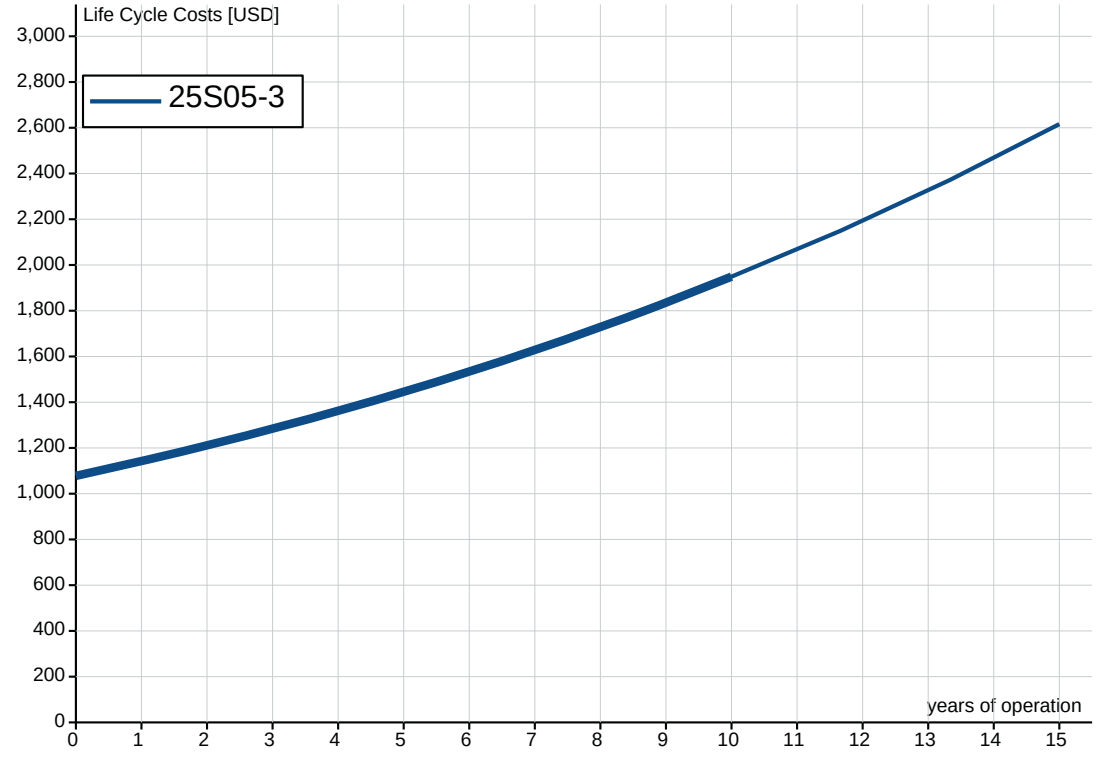
Company name:
Created by:
Phone:

Date: 16/10/2017

Life Cycle Costs - 10 years of operation



Payback Time



GRUNDFOS

Company name:
Created by:
Phone:

Date: 16/10/2017

Life Cycle Cost Report

Requirements:	***General inputs:***	
Flow: 29.6 US GPM	Energy price (high tariff): 0.12 USD/kWh	n - Life in years: 10
Capacity per year: 1199996 US gal/year		i - Interest rate: 0 %
Head: 50.03 ft		p - Inflation rate: 6 %

Inputs:	**A:**	
System:	25S05-3	
	per year	total (life)
Initial investment cost [USD]		
Pump system [USD]		
Further investment [USD]		
Installation and commissioning cost [USD]		
Energy cost [USD]	**62**	**871**
Energy consumption [kWh/Year]	519	
Specific Energy [kWh/1000 gal]		
Change of efficency per year [%/Year]		
Operating cost [USD/Year]		
[USD/Year]		
Routine maintenance cost [USD/Year]		
Repair cost [USD/Year]		
Other yearly costs [USD/Year]		
Downtime and loss of production cost [USD/Year]		
Environmental cost [USD]		
Decommisioning and disposal cost [USD]		

Output:

Net present LCC-value [USD]		**1949**
of which present energy cost is [USD]		871
and maintenance cost is [USD]		
of which net present energy cost % is [%]		44.7
and maintenance cost % is [%]		0.0

Company name:
Created by:
Phone:

Date: 16/10/2017

Order Data:

Product name: 25S05-3
Amount: 1
Product No: 51595035

Total: Price on request

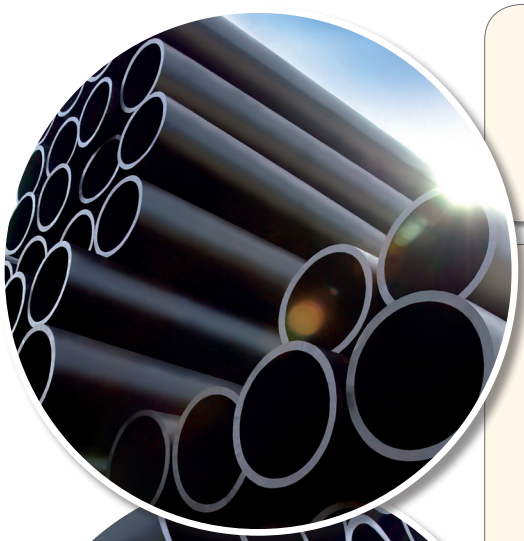
JM Eagle™

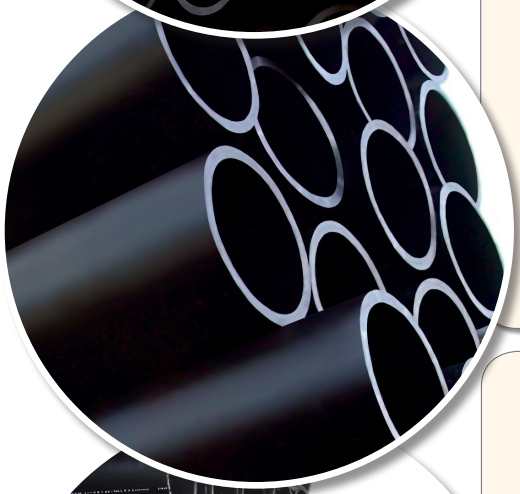
Building essentials for a better tomorrow™

HDPE WATER & SEWER

MEETS AWWA C901/C906, ASTM D2239, ASTM D2737, ASTM D3035, ASTM F714, CELL CLASS PER ASTM D3350, PPI LISTED MATERIAL (TR-4) PE 3408/3608/4710, AND ANSI/NSF-14.

QUALITY • PERFORMANCE • LONGEVITY
50-YEAR WARRANTY on JM Eagle Plastic Pipe
GUARANTEED





APPLICATIONS

JM Eagle's high-performance high-density polyethylene water pressure pipes are suitable for municipal and industrial transmission systems for potable water, sewer, drain, mining, irrigation, and reclaimed water.

DESCRIPTION

JM Eagle's high-density polyethylene water and sewer pipe is made from premium, highly engineered PE 3408/3608 or PE 4710 resin material for a maximum pressure rating to service today's water and sewer needs.

Products are available in ½-inch to 63-inch diameters.

The product's physical properties make it applicable to open-trench and slip-lining installations.

It can be manufactured with the color striping to identify application, such as a blue stripe for potable water, a green stripe for sewer applications and a purple stripe for reclaimed water.

PE 4710 resin surpasses PE 3408/3608 in the following high-performance designations:

- Density class 4 (0.947 – 0.955 g/cc) vs. density cell class 3 (>0.940 – 0.947 g/cc).
- SCG (slow crack growth) cell class 7 or PENT value of 500 hours vs. SCG cell class 4 or PENT value of 10 hours.
- 1,000 psi HDS (hydrostatic design stress) vs. 800 psi HDS.

BENEFITS

JM Eagle's HDPE pipe for water and sewer is manufactured for excellent performance and a long life expectancy.

- Its butt-fused joints eliminate potential leak points, common at 10 to 20 feet with ductile iron pipe, for a zero leak rate.
- Highly resistant to corrosion and weather, recent studies conclude it will last at least 100 years.
- Its light weight and flexibility make it easy to install, eliminate the need for fittings required with directional changes, and make it highly suitable for use in earthquake-prone areas.
- Its high-strength walls give it the highest PE pressure rating, outstanding resistance to SCG and increased resistance to rapid crack propagation.
- The increased working stress rating of high-performance PE 4710 resin material makes it a superior choice over steel or ductile iron pipe, especially for the large-diameter pipe sizes.

Revised 3/8/2013. This information may have been updated. Please download the latest version at www.jmeagle.com/onesheets.

JM Eagle™

Building essentials for a better tomorrow™

HDPE WATER & SEWER

SUBMITTAL AND DATA SHEET

HDPE IRON PIPE SIZE (I.P.S.) PRESSURE PIPE

ANSI/NSF-61, 14 LISTED

PE 4710		DR 7 (333 psi)			DR 9 (250 psi)			DR 11 (200 psi)		
PIPE SIZE	AVG. O.D.	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT
1/2	0.840	0.120	0.586	0.12	0.093	0.643	0.10	0.076	0.679	0.08
3/4	1.050	0.150	0.732	0.19	0.117	0.802	0.15	0.095	0.849	0.12
1	1.315	0.188	0.916	0.29	0.146	1.005	0.23	0.120	1.061	0.20
1-1/4	1.660	0.237	1.158	0.46	0.184	1.270	0.37	0.151	1.340	0.31
1-1/2	1.900	0.271	1.325	0.61	0.211	1.453	0.49	0.173	1.533	0.41
2	2.375	0.339	1.656	0.95	0.264	1.815	0.77	0.216	1.917	0.64
3	3.500	0.500	2.440	2.06	0.389	2.675	1.66	0.318	2.826	1.39
4	4.500	0.643	3.137	3.40	0.500	3.440	2.75	0.409	3.633	2.30
5-3/8	5.375	0.768	3.747	4.85	0.597	4.109	3.92	0.489	4.338	3.29
5	5.563	0.795	3.878	5.20	0.618	4.253	4.20	0.506	4.490	3.52
6	6.625	0.946	4.619	7.36	0.736	5.065	5.96	0.602	5.349	4.99
7	7.125	0.976	5.056	8.52	0.792	5.446	6.89	0.648	5.751	5.78
8	8.625	1.232	6.013	12.48	0.958	6.594	10.09	0.784	6.963	8.46
10	10.750	1.536	7.494	19.40	1.194	8.219	15.68	0.977	8.679	13.14
12	12.750	1.821	8.889	27.28	1.417	9.746	22.07	1.159	10.293	18.49
14	14.000	2.000	9.760	32.90	1.556	10.107	26.61	1.273	11.301	22.30
16	16.000	2.286	11.154	42.97	1.778	12.231	34.75	1.455	12.915	29.12
18	18.000	2.571	12.549	54.37	2.000	13.760	43.97	1.636	14.532	36.84
20	20.000	2.857	13.943	67.13	2.222	15.289	54.28	1.818	16.146	45.49
22	22.000	3.143	15.337	81.23	2.444	16.819	65.68	2.000	17.76	55.05
24	24.000	3.429	16.732	96.67	2.667	18.346	78.18	2.182	19.374	65.52
26	26.000	—	—	—	2.889	19.875	91.75	2.364	20.988	76.90
28	28.000	—	—	—	3.111	21.405	106.40	2.545	22.605	89.15
30	30.000	—	—	—	3.333	22.934	122.13	2.727	24.219	102.35
32	32.000	—	—	—	—	—	—	2.909	25.833	116.46
34	34.000	—	—	—	—	—	—	3.091	27.447	131.48
36	36.000	—	—	—	—	—	—	3.273	29.061	147.41

PE 4710		DR 21 (100 psi)			DR 26 (80 psi)			DR 32.5 (63 psi)		
PIPE SIZE	AVG. O.D.	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT
3	3.500	0.167	3.146	0.77	0.135	3.214	0.63	0.108	3.271	0.51
4	4.500	0.214	4.046	1.27	0.173	4.133	1.03	0.138	4.207	0.83
5-3/8	5.375	0.256	4.832	1.81	0.207	4.936	1.48	0.165	5.025	1.19
5	5.563	0.265	5.001	1.94	0.214	5.109	1.58	0.171	5.200	1.27
6	6.625	0.315	5.957	2.74	0.255	6.084	2.24	0.204	6.193	1.81
7	7.125	0.339	6.406	3.18	0.274	6.544	2.59	0.219	6.661	2.09
8	8.625	0.411	7.754	4.66	0.332	7.921	3.80	0.265	8.063	3.06
10	10.750	0.512	9.665	7.24	0.413	9.874	5.90	0.331	10.048	4.77
12	12.750	0.607	11.463	10.17	0.490	11.711	8.30	0.392	11.919	6.69
14	14.000	0.667	12.586	12.28	0.538	12.859	10.00	0.431	13.086	8.08
16	16.000	0.762	14.385	16.03	0.615	14.696	13.07	0.492	14.957	10.54
18	18.000	0.857	16.183	20.28	0.692	16.533	16.54	0.554	16.826	13.36
20	20.000	0.952	17.982	25.03	0.769	18.370	20.43	0.615	18.696	16.48
22	22.000	1.048	19.778	30.31	0.846	20.206	24.72	0.677	20.565	19.95
24	24.000	1.143	21.577	36.06	0.923	22.043	29.42	0.738	22.435	23.72
26	26.000	1.238	23.375	42.32	1.000	23.880	34.53	0.800	24.304	27.86
28	28.000	1.333	25.174	49.07	1.077	25.717	40.05	0.862	26.173	32.33
30	30.000	1.429	26.971	56.36	1.154	27.554	45.98	0.923	28.043	37.09
32	32.000	1.542	28.730	64.11	1.231	29.390	52.31	0.985	29.912	42.22
34	34.000	1.619	30.568	72.36	1.308	31.227	59.06	1.046	31.782	47.63
36	36.000	1.714	32.366	81.12	1.385	33.064	66.22	1.108	33.651	53.42
42	42.000	2.000	37.760	110.43	1.615	38.576	90.08	1.292	39.261	72.68
48	48.000	2.286	43.154	144.25	1.846	44.086	117.68	1.477	44.869	94.95
54	54.000	2.571	48.549	182.51	2.077	49.597	148.95	1.662	50.477	120.20
63	63.000	3.000	56.640	248.46	2.423	57.863	202.73	1.938	58.891	163.53

PE 4710		DR 13.5 (160 psi)			DR 17 (125 psi)			DR 19 (111 psi)		
PIPE SIZE	AVG. O.D.	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT
1/2	0.840	—	—	—	—	—	—	—	—	—
3/4	1.050	0.078	0.885	0.10	—	—	—	—	—	—
1	1.315	0.097	1.109	0.16	—	—	—	—	—	—
1-1/4	1.660	0.123	1.399	0.26	—	—	—	—	—	—
~~1-1/2~~	~~1.900~~	~~0.141~~	~~1.601~~	~~0.34~~						
~~2~~	~~2.375~~	~~0.176~~	~~2.002~~	~~0.53~~	~~0.140~~	~~2.078~~	~~0.43~~	—	—	—
~~3~~	~~3.500~~	~~0.259~~	~~2.951~~	~~1.16~~	~~0.206~~	~~3.060~~	~~0.94~~	~~0.184~~	~~3.119~~	~~0.84~~
4	4.500	0.333	3.794	1.91	0.265	3.938	1.55	0.237	3.998	1.39
5-3/8	5.375	0.398	4.531	2.73	0.316	4.705	2.21	0.283	4.775	1.99
5	5.563	0.412	4.690	2.92	0.327	4.870	2.36	0.293	4.942	2.13
6	6.625	0.491	5.584	4.15	0.390	5.798	3.35	0.349	5.885	3.02
7	7.125	0.528	6.006	4.80	0.419	6.237	3.88	0.375	6.330	3.49
8	8.625	0.639	7.270	7.03	0.507	7.550	5.68	0.454	7.663	5.12
10	10.750	0.796	9.062	10.92	0.632	9.410	8.82	0.566	9.550	7.95
12	12.750	0.944	10.749	15.36	0.750	11.160	12.41	0.671	11.327	11.19
14	14.000	1.037	11.802	18.52	0.824	12.253	14.98	0.737	12.438	13.49
16	16.000	1.185	13.488	24.19	0.941	14.005	19.55	0.842	14.215	17.61
18	18.000	1.333	15.174	30.61	1.059	15.755	24.75	0.947	15.992	22.29
20	20.000	1.481	16.860	37.79	1.176	17.507	30.53	1.053	17.768	27.52
22	22.000	1.630	18.544	45.75	1.294	19.257	36.86	1.158	19.545	33.30
24	24.000	1.778	20.231	54.44	1.412	21.007	43.99	1.263	21.322	39.63
26	26.000	1.926	21.917	63.89	1.529	22.759	51.61	1.368	23.100	46.51
28	28.000	2.074	23.603	74.09	1.647	24.508	59.87	1.474	24.875	53.94
30	30.000	2.222	25.289	85.04	1.765	26.258	68.74	1.579	26.653	61.92
32	32.000	2.370	26.976	96.76	1.882	28.010	78.18	1.684	28.430	70.45
34	34.000	2.519	28.660	109.26	2.000	29.760	88.28	1.790	30.205	79.54
36	36.000	2.667	30.346	122.49	2.118	31.510	98.98	1.895	31.983	89.17
42	42.000	3.111	35.404	166.70	2.471	36.761	134.72	2.211	37.314	121.37
48	48.000	3.556	40.462	217.76	2.824	42.013	175.97	2.526	42.644	158.52
54	54.000	—	—	—	3.177	47.265	222.67	2.842	47.975	200.63

HDPE DUCTILE IRON PIPE SIZE (D.I.P.S.) PRESSURE PIPE

ANSI/NSF-61, 14 LISTED

PE 4710		DR 7 (333 psi)			DR 9 (250 psi)			DR 11 (200 psi)		
PIPE SIZE	AVG. O.D.	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT
4	4.800	0.686	3.346	3.87	0.533	3.670	3.13	0.436	3.876	2.62
6	6.900	0.946	4.894	7.99	0.767	5.274	6.46	0.627	5.571	5.41
8	9.050	1.293	6.309	13.75	1.006	6.917	11.12	0.823	7.305	9.32
10	11.100	1.586	7.738	20.68	1.233	8.486	16.72	1.009	8.961	14.01
12	13.200	1.886	9.202	29.25	1.467	10.090	23.65	1.200	10.656	19.82
14	15.300	2.186	10.666	39.29	1.700	11.696	31.77	1.391	12.351	26.63
16	17.400	2.486	12.130	50.82	1.933	13.302	41.08	1.582	14.046	34.44
18	19.500	2.786	13.594	63.82	2.167	14.906	51.61	1.773	15.741	43.25
20	21.600	3.086	15.058	78.31	2.400	16.512	63.32	1.964	17.436	53.07
24	25.800	—	—	—	2.867	19.722	90.35	2.345	20.829	75.69
30	32.000	—	—	—	—	—	—	2.909	25.833	116.46
36	38.300	—	—	—	—	—	—	3.482	31.33	166.84

PE 4710		DR 13.5 (160 psi)			DR 17 (125 psi)			DR 19 (111 psi)		
PIPE SIZE	AVG. O.D.	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT
4	4.800	0.356	4.045	2.18	0.282	4.202	1.76	0.253	4.264	1.59
6	6.900	0.511	5.817	4.50	0.406	6.039	3.64	0.363	6.130	3.27
8	9.050	0.670	7.630	7.74	0.532	7.922	6.25	0.476	8.041	5.63
10	11.100	0.822	9.357	11.64	0.653	9.761	9.41	0.584	9.862	8.47
12	13.200	0.978	11.127	16.47	0.776	11.555	13.30	0.695	11.727	11.99
14	15.300	1.133	12.898	22.12	0.900	13.392	17.88	0.805	13.593	16.10
16	17.400	1.289	14.667	28.61	1.024	15.229	23.13	0.916	15.458	20.84
18	19.500	1.444	16.439	35.92	1.147	17.068	29.04	1.026	17.325	26.15
20	21.600	1.600	18.208	44.09	1.271	18.905	35.64	1.137	19.190	32.10
24	25.800	1.911	21.749	62.90	1.518	22.582	50.84	1.358	22.921	45.80
30	32.000	2.370	26.976	96.76	1.880	28.014	78.18	1.684	28.430	70.45
36	38.300	2.837	32.286	138.62	2.253	33.524	112.02	2.016	34.026	100.94
42	44.500	—	—	—	2.618	38.950	151.24	2.342	39.535	136.24
48	50.800	—	—	—	2.988	44.465	197.05	2.674	45.131	177.57

PE 4710		DR 21 (100 psi)			DR 26 (80 psi)			DR 32.5 (63 psi)		
PIPE SIZE	AVG. O.D.	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT	MIN. T.	AVG. I.D.	WEIGHT LB/FT
4	4.800	0.229	4.315	1.44	0.185	4.408	1.18	0.148	4.486	0.95
6	6.900	0.329	6.203	2.98	0.265	6.338	2.43	0.212	6.451	1.96
8	9.050	0.431	8.136	5.13	0.348	8.312	4.18	0.278	8.461	3.37
10	11.100	0.529	9.979	7.72	0.427	10.195	6.29	0.342	10.375	5.08
12	13.200	0.629	11.867	10.91	0.508	12.123	8.91	0.406	12.339	7.18
14	15.300	0.729	13.755	14.66	0.588	14.053	11.95	0.471	14.301	9.65
16	17.400	0.829	15.643	18.96	0.669	15.982	15.46	0.536	16.264	12.49
18	19.500	0.929	17.531	23.81	0.750	17.910	19.95	0.600	18.228	15.67
20	21.600	1.029	19.419	29.22	0.831	19.838	23.84	0.665	20.190	19.24
24	25.800	1.229	23.195	41.68	0.992	23.697	33.99	0.794	24.117	27.44
30	32.000	1.524	28.769	64.11	1.231	29.390	52.31	0.985	29.912	42.22
36	38.300	1.824	34.433	91.84	1.473	35.177	74.92	1.179	35.801	60.43
42	44.500	2.119	40.008	123.96	1.712	40.871	101.17	1.370	41.596	81.59
48	50.800	2.419	45.672	161.55	1.954	46.658	131.83	1.563	47.486	106.34

* For custom DR, perforated pipe, please contact JM Eagle™ PE sales at (800) 621-4404 for availability.
* All dimensions are in inches unless noted otherwise.

I.D. : Inside Diameter
O.D. : Outside Diameter
T. : Wall Thickness

* For data, sizes, or classes not reflected in these charts, please contact JM Eagle™ for assistance.

Revised 3/8/2013. This information may have been updated. Please download the latest version at www.jmeagle.com/onesheets.

APPENDIX D

Leachate Collection Trench Plan and Profile

0 100 200

SCALE: 1" = 100'

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

DRAFT

MARK	DATE	DESCRIPTION	BY
	10/25/17	90% DESIGN SUBMISSION	JCK/WJM

CLEARVIEW LANDFILL
LOWER DARBY, PENNSYLVANIA

LEACHATE COLLECTION TRENCH PROFILE KEY SHEET

SCALE: AS NOTED

DATE:	–DRAFT–
PROJECT NO.:	112G07477
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	CSG
SHEET:	2 OF X

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C17.10

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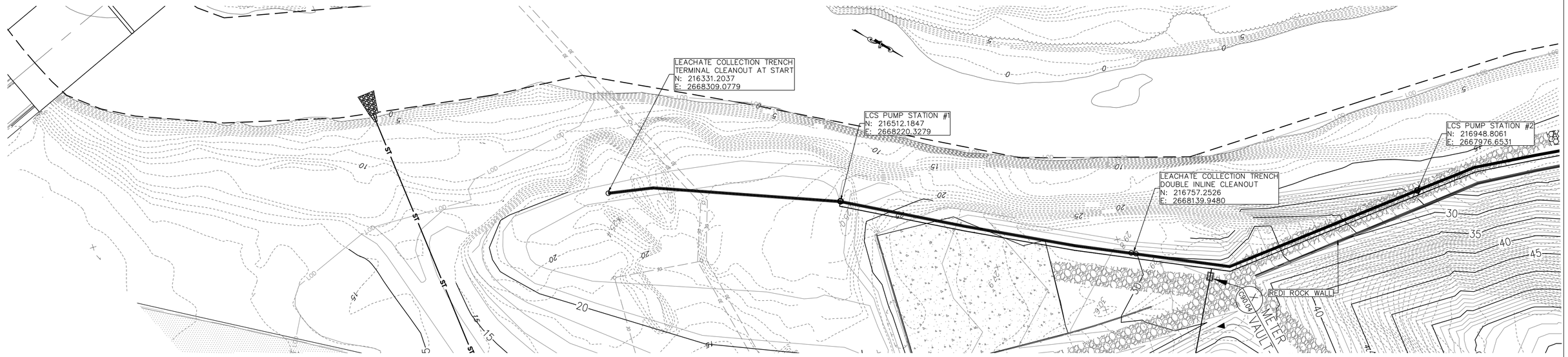

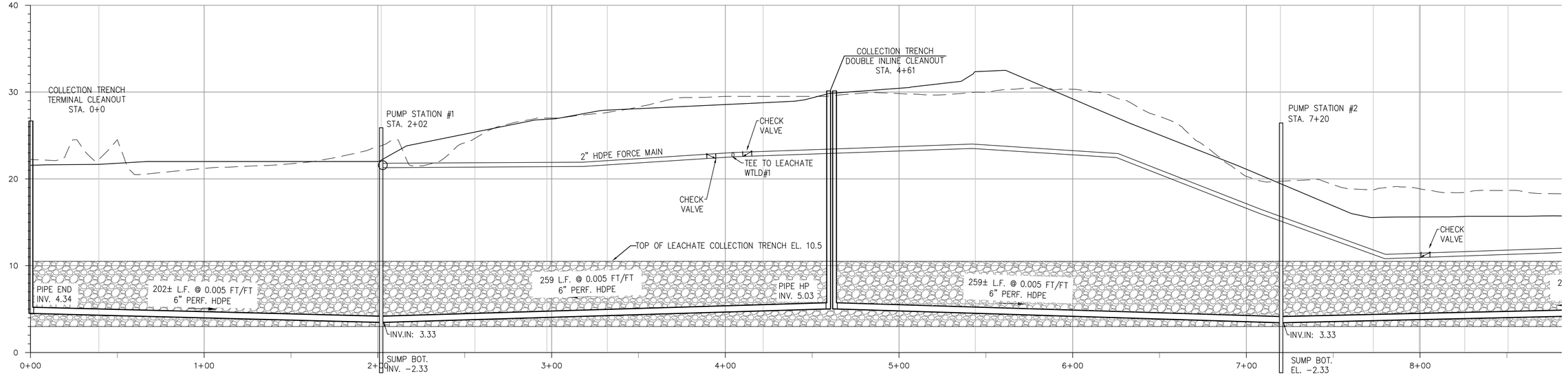

HORIZONTAL SCALE: 1" = 30'

VERTICAL SCALE: 1" = 3'

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

DRAFT

MARK	DATE	DESCRIPTION	BY
	10/25/17	90% DESIGN SUBMISSION	JCK/WJM

CLEARVIEW LANDFILL
LOWER DARBY, PENNSYLVANIA

LEACHATE COLLECTION TRENCH PROFILE

SCALE: AS NOTED

DATE:	–DRAFT–
PROJECT NO.:	112G07477
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	CSG
SHEET:	2 OF X

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C17.11

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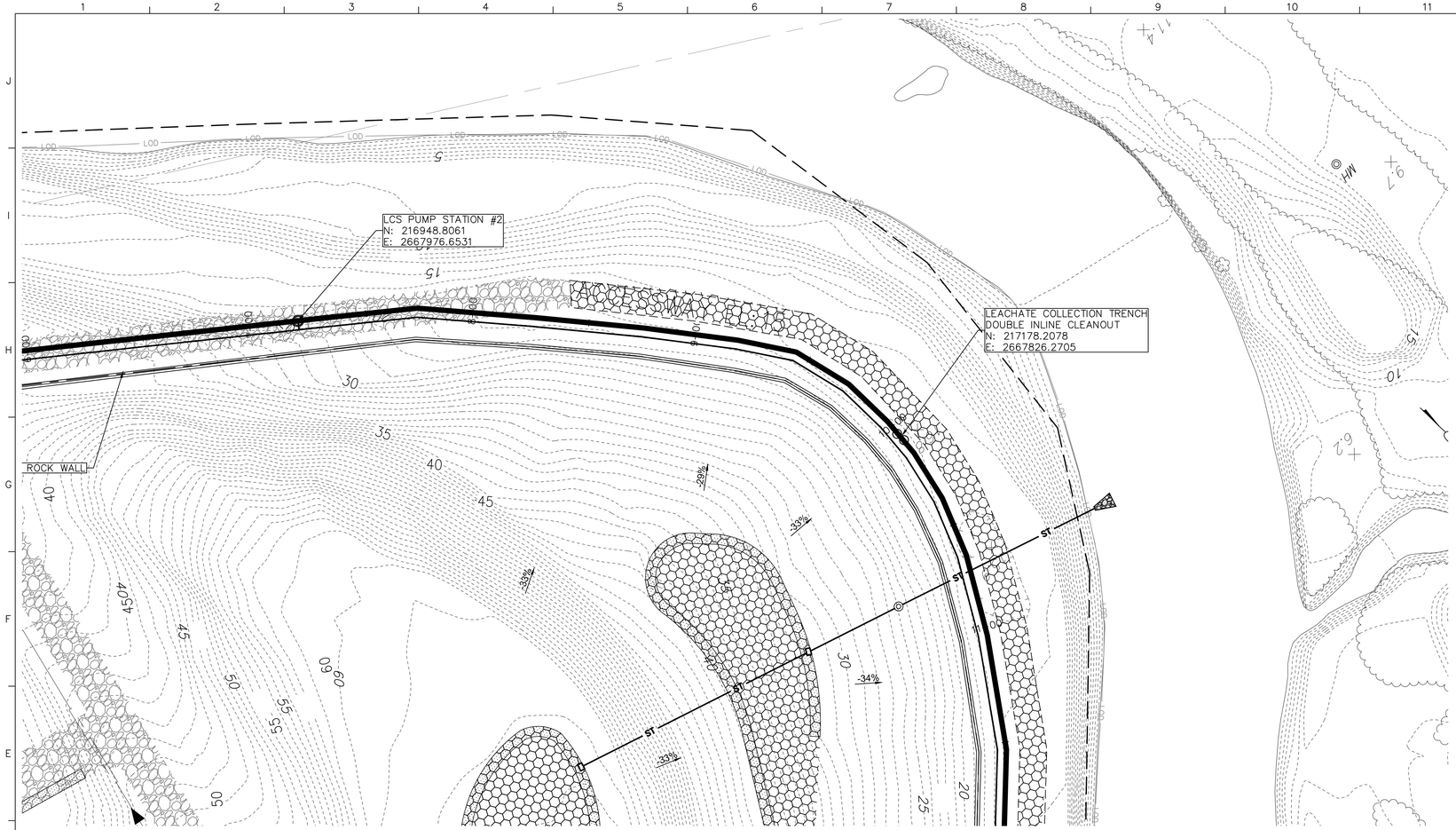

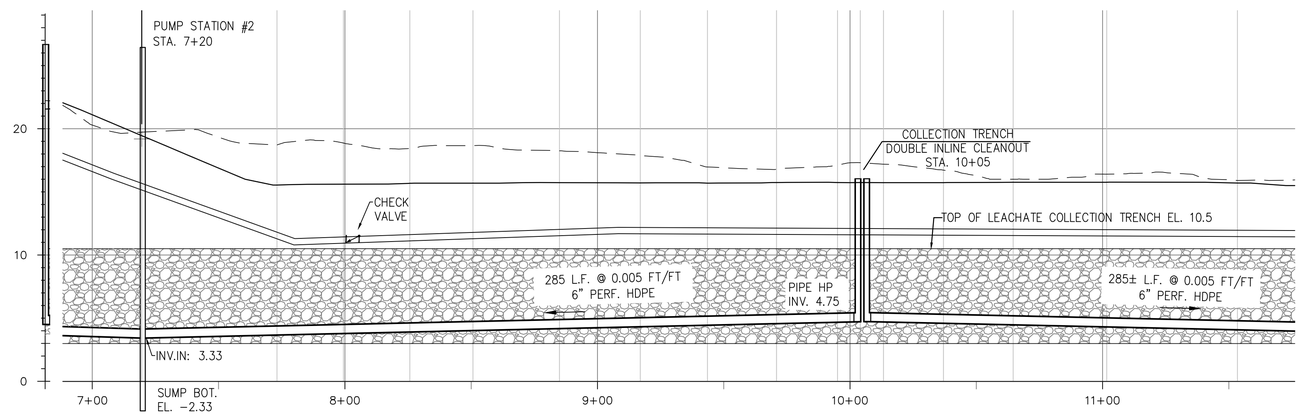

0 30 60
HORIZONTAL SCALE: 1" = 30'

0 3 6
VERTICAL SCALE: 1" = 3'

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

DRAFT

MARK	DATE	DESCRIPTION	BY
	10/25/17	90% DESIGN SUBMISSION	JCK/WJM

CLEARVIEW LANDFILL
LOWER DARBY, PENNSYLVANIA

LEACHATE COLLECTION TRENCH PROFILE

SCALE: AS NOTED

DATE:	–DRAFT–
PROJECT NO.:	112G07477
DESIGNED BY:	ARB
DRAWN BY:	BH
CHECKED BY:	CSG
SHEET:	2 OF X

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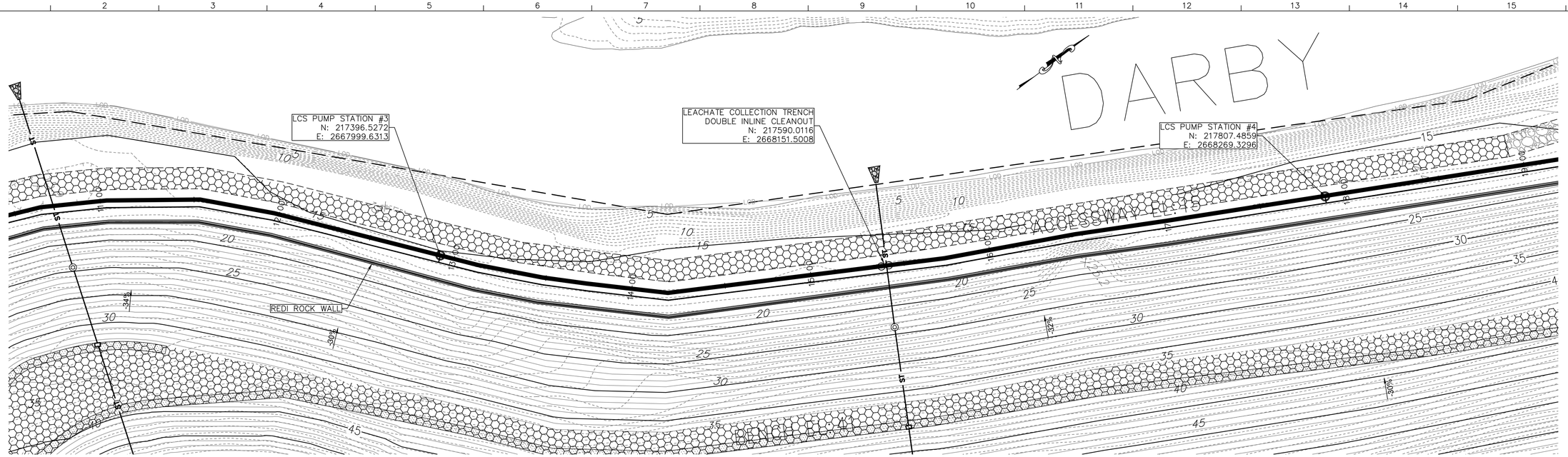

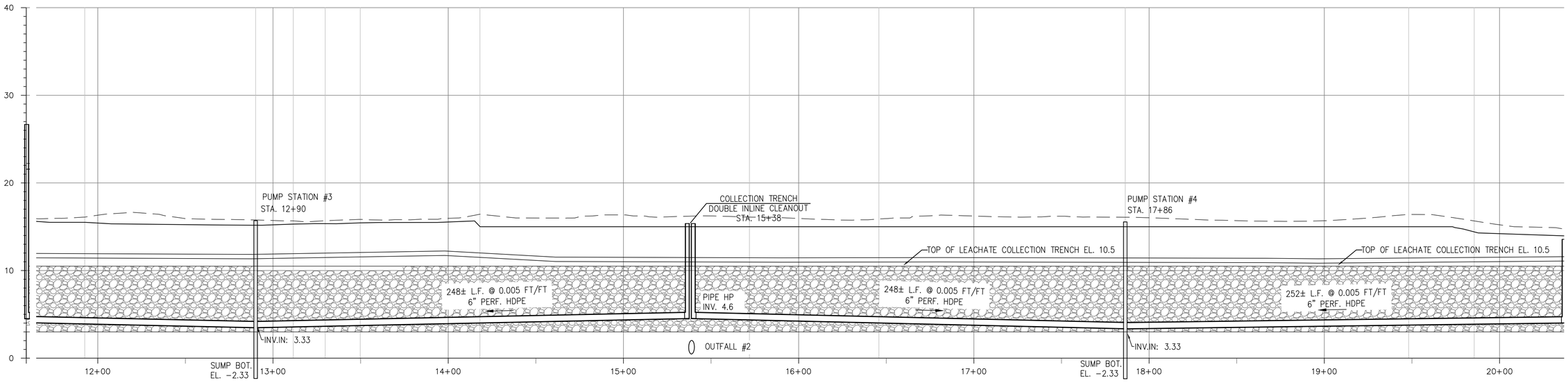

0 30 60
HORIZONTAL SCALE: 1" = 30'

0 3 6
VERTICAL SCALE: 1" = 3'

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	10/25/17	90% DESIGN SUBMISSION	JCK/WJM

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LOWER DARBY, PENNSYLVANIA

LEACHATE COLLECTION TRENCH PROFILE

SCALE: AS NOTED

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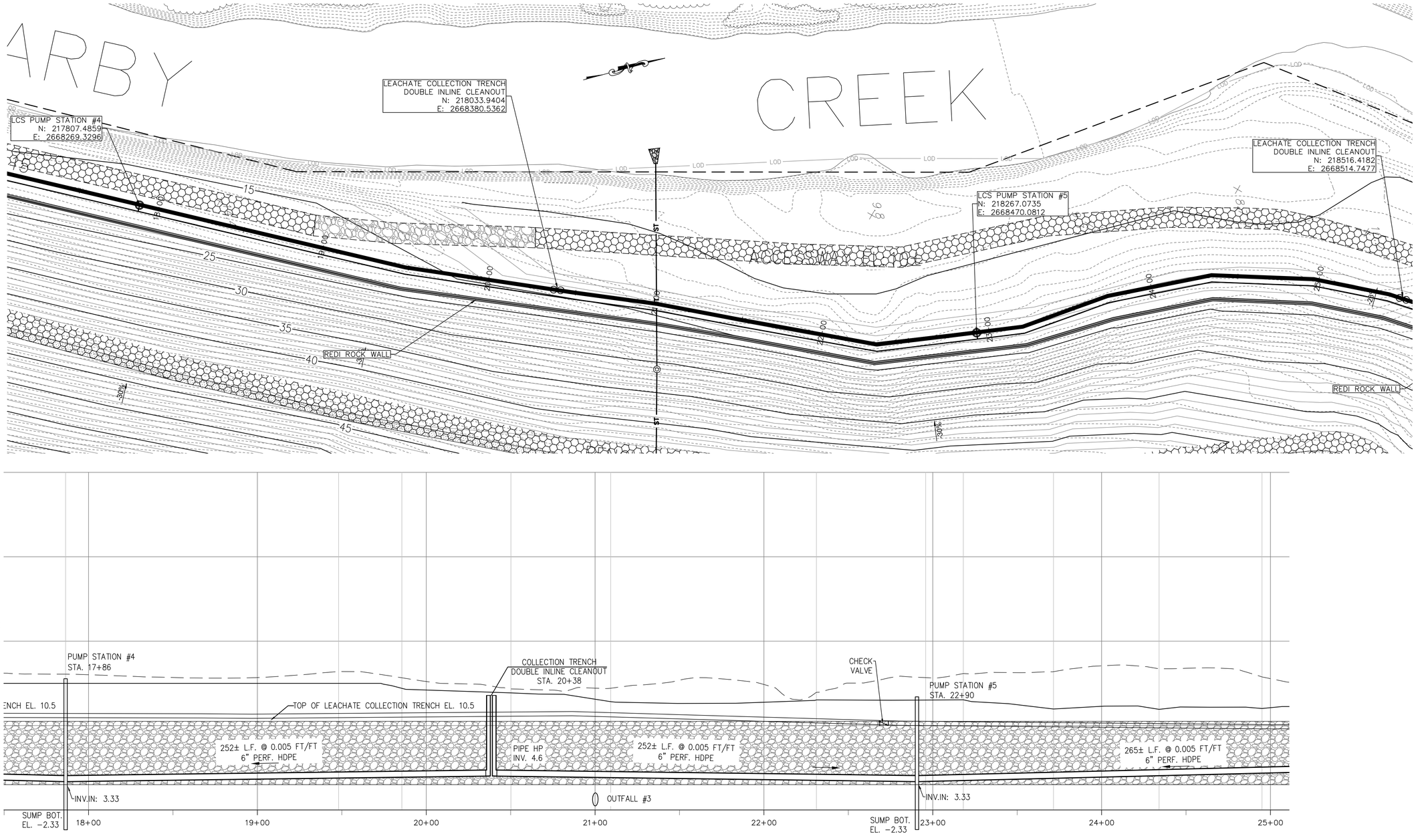

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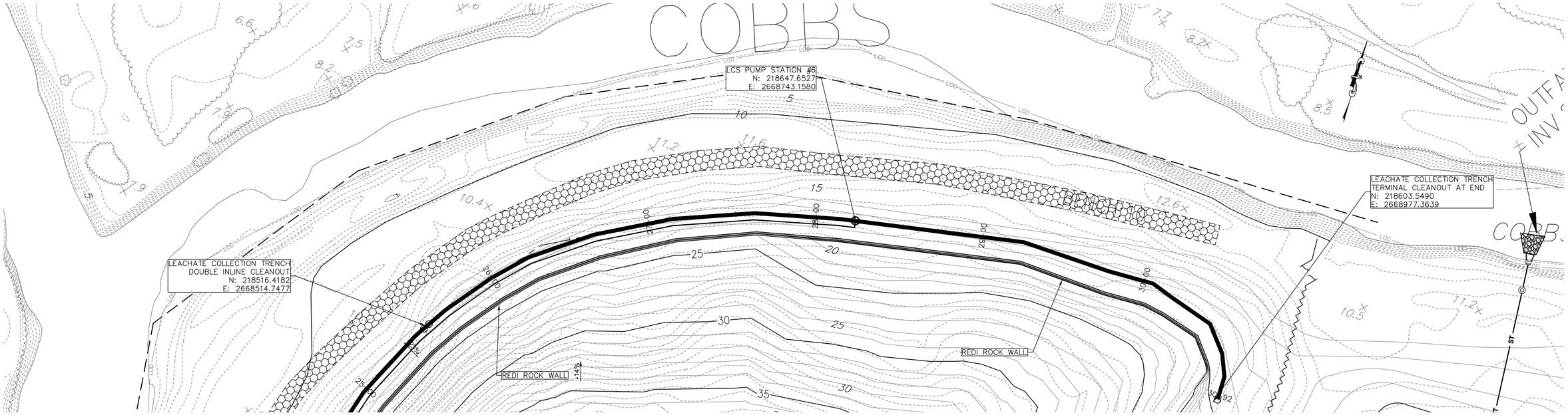

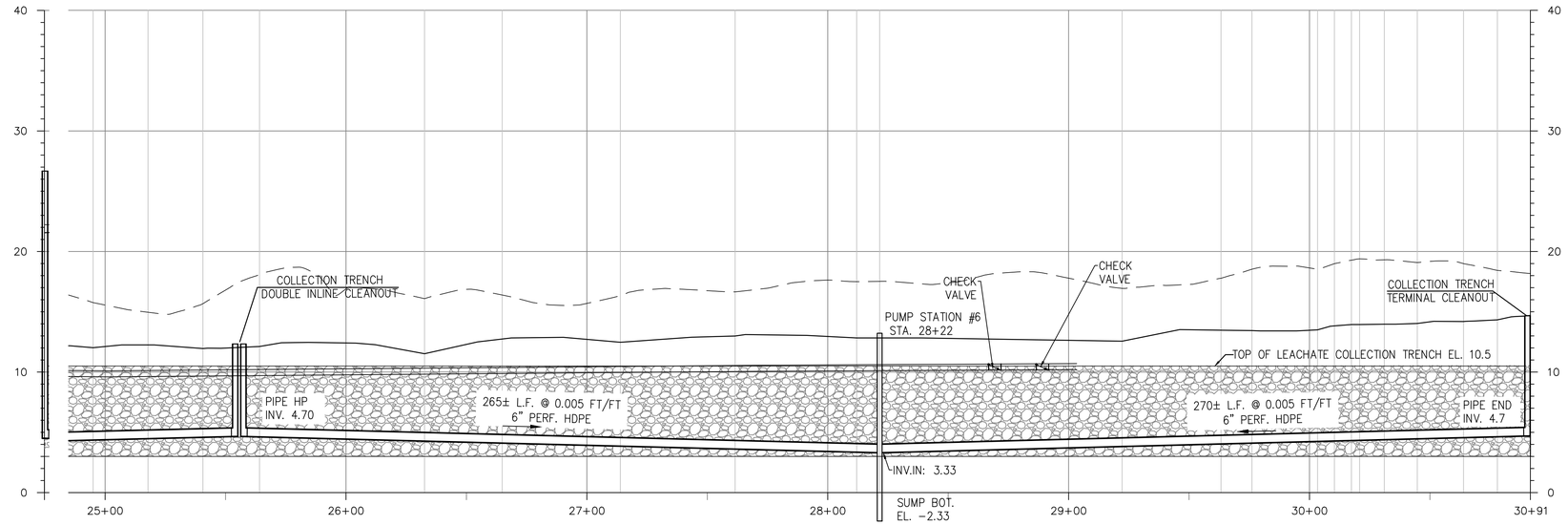

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