August 12, 2024

Ms. Mariya Chiger
Department of Natural Resources and
Environmental Control
Remediation Section
391 Lukens Drive
New Castle, DE 19720

Re: Project No. 16530
Post-Demolition Grading Soil Sampling Report
Rodney Reservoir Site (DE-1851) - P00074
1500 W Ninth Street
Wilmington, Delaware

Dear Ms. Chiger:

Verdantas LLC (Verdantas) submits this report on behalf of our client, [D'Huy Engineering], to document post-demolition grading soil sampling activities conducted at the above-referenced site (the "Property" or "Site"). The Site is located at 1500 West Ninth Street in Wilmington, Delaware (Figure 1), and is identified by the State of Delaware, Department of Natural Resources and Environmental Control – Remediation Section (DNREC-RS) as DE-1851 (aka P00074). The sampling was completed in accordance with Verdantas' June 19, 2024, "Work Plan for Post-Demolition Grading Soil Sampling" (Work Plan) as approved by DNREC-RS.

PROJECT BACKGROUND

Prior to demolition of the reservoir structure, soil sampling was conducted on the earthen berm surrounding the reservoir to assess the suitability of on-site soil reuse. Analytical results indicated that several semi-volatile organic compounds (SVOCs) and metals, including cobalt, were present at concentrations that exceeded the DNREC-RS Screening Levels. Based on the results of human health risk calculations, Verdantas prepared an Environmental Monitoring Work Plan (December 19, 2023) to address the management of potentially environmentally-impacted materials during demolition and soil-disturbing activities. The Environmental Monitoring Work Plan was approved by DNREC-RS on December 21, 2023.

Verdantas conducted environmental monitoring and reporting activities at the Site in accordance with the Environmental Monitoring Work Plan since demolition activities commenced on March 4, 2024. Soil disturbing activities associated with on-site demolition and grading was completed by the site contractor on July 15, 2024. In accordance with the Environmental Monitoring Work Plan, following the completion of regrading and stabilization activities, soil sampling was conducted by Verdantas on July 16, 2024, to assess the final shallow soil conditions at the Site.

Post-demolition grading soil sampling activities are summarized below:

A. FIELD ACTIVITIES

1. Soil Sample Collection

On July 16, 2024, Verdantas personnel completed 10 soil borings using a hand-auger to depths of approximately two feet below ground surface (bgs) in the locations depicted on Figure 2 (attached). During field activities, excavated soils were reviewed by Verdantas personnel for indications of environmental impact using visual and olfactory observations along with a photoionization detector (PID) to screen for volatile organic compounds (VOCs). VOCs were not detected by the PID and no indications of environmental impact (e.g. odors, staining, debris) were observed.

One composite shallow soil sample from each boring was collected for a total of 10 samples. The hand auger was decontaminated before completion of the first soil boring, after each subsequent soil boing, and at the conclusion of sampling activities.

Soil samples were collected in general accordance with the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA). Quality Assurance/Quality Control (QA/QC) samples included the collection of one blind duplicate, one matrix spike, one matrix spike duplicate, and one equipment blank.

Following collection, the soil samples were transported to DNREC-RS' laboratory for screening for VOCs, SVOCs, pesticides, poly-chlorinated biphenyls (PCBs), and metals.

B. ENVIRONMENTAL DATA SUMMARY

1. DNREC-RS Screening Results & Confirmatory Sample Selection

The findings of the soil screening completed by DNREC-RS indicated that VOCs, pesticides, and PCBs were not present in the 10 soil samples. Nine soil samples were reported with the presence of polycyclic aromatic hydrocarbons (PAHs), and one soil sample was reported for total petroleum hydrocarbons (TPH). Metals were reported in each of the 10 soil samples. A copy of DNREC-RS' Soil Screening Report is included as Attachment A.

Following review of the soil screening results and based on the selection criteria presented in the Work Plan, Verdantas and DNREC-RS selected the samples for analysis as presented in Table A, below, by a HSCA-certified laboratory.

Table A: Confirmatory Soil Sample Selection

Sample ID	Confirmation Analyses				
	TAL Metals	TCL VOCs	TCL SVOCs	TCL Pesticides	PCB Homologs
1851 - SB-01-0724	X	X	X	X	X
1851 - SB-02-0724	X		X		
1851 - SB-03-0724	X		X		
1851 - SB-04-0724	X		X		
1851 - SB-05-0724	X		X		
1851 - SB-06-0724	X		X		
1851 - SB-07-0724	X	X	X		
1851 - SB-08-0724	X		X		
1851 - SB-09-0724-MS/MSD	X		X		
1851 - SB-10-0724	X		X		
1851-SB DUP-0724	X		X		
1851- EB-0724	X		X		
TB		X			

2. Analytical Results

Soil samples were submitted to Eurofins Testing America (Eurofins) for confirmatory laboratory analysis of the parameters listed in Table A, above. Results of the analyses are detailed below and provided in Table 1. A copy of Eurofins analytical report is included as Attachment B.

a. TAL Metals, Mercury, and Cyanide

Nineteen metals and mercury were reported as detected in the soil samples. Aluminum, cobalt, and vanadium were reported in one sample (1851-SB09-0724) at concentrations that exceeded DNREC-RS Screening Levels. Thallium was reported in eight samples at concentrations that exceeded the DNREC-RS Screening Level.

b. TCL SVOCs

Twenty-one SVOCs were reported as detected in the soil samples. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene were reported in two samples (1851-SB05-0724 and 1851-SB06-0724) at concentrations exceeding DNREC-RS Screening Levels.

c. TCL VOCs

One VOC (Methyl acetate) was reported as detected in one soil sample; however, the reported concentration did not exceed the DNREC-RS Screening Level.

d. TCL Pesticides

No pesticides were detected in the analyzed samples.

e. PCB Homologs

No PCB homologs were detected in the analyzed samples.

The locations of shallow soil exceedances are depicted on Figure 3.

C. RISK CALCULATION

Due to the reported DNREC-RS Screening Level exceedances, Verdantas utilized the Delaware Risk Assessment Calculator (DERAC) Program to perform a human health risk assessment (HHRA) in general accordance with DNREC's "Guidance for Human Health Risk Assessment under the Hazardous Substance Cleanup Act" (HHRA Guidance), July 2020. Although future residential use of the Site is not anticipated, Verdantas considered the residential land use exposure scenario due to the HHRA Guidance requirement that potential commercial exposure to sensitive receptors (i.e. playgrounds or potential exposed soil) be evaluated under a child residential risk. Other exposure scenarios were considered and included the excavator, outdoor worker, recreator, and urban garden use scenarios. The urban garden use exposure scenario considers an exposure frequency duration of 20 days/year for a child and 60 days/year for an adult. Selection of exposure pathways are detailed on Table 2.

Substances identified at concentrations that exceeded DNREC-RS Screening Levels were considered Contaminants of Potential Concern (COPCs) for exposures to shallow soil. Selected COPCs are summarized on Table 3. Following DNREC's policy for the calculation of Exposure Point Concentrations (EPCs), a 95% Upper Confidence Limit (UCL) was calculated for each COPC using the USEPA-developed statistical software ProUCL 5.1 (ProUCL) (Table 4 and Attachment C). Based on the ProUCL outputs, the recommended 95% UCL for several analytes were below the respective DNREC-RS Screening Level. Therefore, those analytes (aluminum and cobalt) were not retained for further evaluation. The analytes that were retained as COPCs include:

- Shallow Soil COPCs – thallium, vanadium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.

Using the COPCs identified above, Verdantas input the EPCs for each analyte into the DERAC, a program developed by DNREC for use in human health risk assessments to provide quantitative assessment of cancer and non-cancer risks. The risk calculations were compared to the Hazardous Substance Cleanup Act target cancer risk value and target non-cancer (hazard index) risk value of $1x10^{-5}$ and 1, respectively.

Future risk calculations for exposure to soil are included on Tables 5-10 and tabulated as follows:

Shallow Soil

Scenario	Total Risk	Total Hazard Index	Child Hazard Index
Resident	**3×10^{-5}**	0.2	0.7
Urban Garden Use	2×10^{-6}	0.02	0.04
Outdoor Worker	2×10^{-7}	0.04	NA
Excavator	2×10^{-8}	0.01	NA
Recreator	7×10^{-6}	0.04	0.1
Trespasser	5×10^{-7}	0.01	NA

Note: ***Bold*** = Risk scenario exceeds comparative regulatory values of 1 or 1×10^{-5}.
NA = Not Applicable.

The results indicate that:

- Regulated substances in shallow soil are present at an unacceptable cancer risk under the resident scenario;
- Regulated substances in shallow soil are present at an acceptable non-cancer risk under the resident and resident child HI scenarios; and
- Regulated substances in shallow soil are present at an acceptable cancer and non-cancer risk under the urban garden, outdoor worker, excavator, recreator, and trespasser scenarios.

Copies of the DERAC Outputs are included as Attachment D.

D. CONCLUSIONS

Verdantas collected soil samples from across the Site following the completion of onsite demolition and grading activities. Analytical results for the samples were compared to DNREC-RS Screening Levels. No VOCs, pesticides, or PCBs were reported at concentrations that were above the DNREC-RS Screening Levels. Several SVOCs were reported above DNREC-RS Screening Levels in two shallow soil

samples. Several metals were reported in shallow soil samples at concentrations exceeding DNREC-RS Screening Levels.

A risk assessment was performed using the calculated 95% UCL concentrations of COPCs identified in shallow soil. Under the urban garden, recreator, outdoor worker, excavator, and trespasser use scenarios, regulated substances in shallow soil are present at an acceptable cancer and non-cancer risk. Additionally, regulated substances in shallow soil are present at an acceptable non-cancer risk under the resident child HI scenario.

The results of the calculations indicated that regulated substances in shallow soil may pose an unacceptable cancer risk under the resident scenario. The results of the calculations also appear to be consistent with the risk assessment results of the previous investigations. Compared to a risk assessment conducted for shallow soil prior to demolition and grading activities, the potential for unacceptable non-cancer risk has been reduced for all exposure scenarios with the exception of the excavator scenario, which remained the same. Furthermore, the potential for unacceptable cancer risk either remained the same or has been reduced following demolition and grading activities. The Site is currently zoned for "exempt commercial" use, not residential, and the proposed future use of the Site is as a public park (commercial use).

At your convenience we would like to request a meeting to discuss the findings of this assessment. Should you have any questions, concerns, or comments regarding this report, please feel free to contact our office at 302-239-6634.

Sincerely,

VERDANTAS LLC

Kaushal Prajapati
Staff Engineer I

Robert B. Smagala Jr.
Environmental Project Manager

KP/RBS:acj
Rpt-16530-20240812

Attachments

Tables

Table 1: Analytical Soil Results
Table 2 - 10: Risk Assessment

Figures

- Figure 1: Site Location Map
- Figure 2: Site Features Sketch
- Figure 3: Shallow Soil Exceedance Sketch

Attachments

- Attachment A – DNREC Soil Screening Results
- Attachment B – Eurofins Analytical Report (Attachment Sent Separately)
- Attachment C – ProUCL Inputs/Outputs
- Attachment D – DERAC Outputs

TABLES

TABLE 1: ANALYTICAL SOIL RESULTS
TABLES 2-10: RISK ASSESSMENT

Table 1 - Analytical Soil Results
Rodney Reservoir Site DE-1851 (P00074)
1500 W Ninth Street
Wilmington, Delaware

Sample ID	Units	DNREC HSCA Soil Screening Level (Nov 2023)	1851-SB01-0724		1851-SBDUP-0724		1851-SB01-AVG		1851-SB02-0724		1851-SB03-0724		1851-SB04-0724		1851-SB05-0724		1851-SB06-0724		1851-SB07-0724		1851-SB08-0724		1851-SB09-0724		1851-SB10-0724	
Sample Date			7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024		7/16/2024	
Matrix			Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SVOCs																										
1,1'-Biphenyl	mg/kg	4.7	0.012	U	0.012	U	0.012		0.012	U	0.012	U	0.012	U	0.26	J	0.014	U	0.012	U	0.012	U	0.012	U	0.012	U
2-Methylphenol	mg/kg	320	0.013	U	0.013	U	0.013		0.013	U	0.013	U	0.013	U	0.016	J	0.015	U	0.013	U	0.013	U	0.013	U	0.013	U
Bis(2-ethylhexyl) phthalate	mg/kg	130	0.021	U	0.021	U	0.021		0.021	U	0.022	U	0.021	U	0.042	J	0.024	U	0.021	U	0.021	U	0.021	U	0.021	U
Acenaphthene	mg/kg	360	0.0096	U	0.0097	U	0.00965		0.0096	U	0.0099	U	0.0097	U	2.5		0.078	J	0.0098	U	0.0097	U	0.0096	U	0.0096	U
Acenaphthylene	mg/kg	NS	0.0097	U	0.0098	U	0.00975		0.0096	U	0.010	U	0.0098	U	0.0099	U	0.19	J	0.0098	U	0.0098	U	0.0097	U	0.012	J
Anthracene	mg/kg	1800	0.010	U	0.011	J	0.0105		0.010	U	0.011	U	0.010	U	3.4		0.75		0.010	U	0.030	J	0.010	U	0.014	J
Benzo[a]anthracene	mg/kg	1.1	0.039		0.058		0.0485		0.026	J	0.032	J	0.040		**3.9**		**2.3**		0.039		0.042		0.025	U	0.098	
Benzo[a]pyrene	mg/kg	0.24	0.036		0.056		0.046		0.024	J	0.027	J	0.042		**3.3**		**2.3**		0.038		0.037		0.0090	U	0.10	
Benzo[b]fluoranthene	mg/kg	1.1	0.051		0.070		0.0605		0.032	J	0.035		0.055		**3.9**		**2.6**		0.049		0.047		0.0087	U	0.14	
Benzo[g,h,i]perylene	mg/kg	NS	0.027	J	0.036	J	0.0315		0.018	J	0.020	J	0.037	J	1.9		1.4		0.024	J	0.023	J	0.010	U	0.069	J
Benzo[k]fluoranthene	mg/kg	11	0.020	J	0.030	J	0.025		0.011	J	0.012	J	0.021	J	1.4		0.94		0.020	J	0.019	J	0.0066	U	0.054	
Carbazole	mg/kg	NS	0.013	U	0.013	U	0.013		0.013	U	0.013	U	0.013	U	1.5		0.063	J	0.013	U	0.013	U	0.013	U	0.013	U
Chrysene	mg/kg	110	0.037	J	0.064	J	0.0505		0.025	J	0.023	J	0.040	J	3.7		2.0		0.037	J	0.038	J	0.014	U	0.10	J
Dibenz(a,h)anthracene	mg/kg	0.17	0.015	U	0.015	U	0.015		0.015	U	0.015	U	0.015	U	**0.44**		**0.29**		0.015	U	0.015	U	0.015	U	0.016	J
Dibenzofuran	mg/kg	7.8	0.011	U	0.011	U	0.011		0.011	U	0.012	U	0.011	U	1.7		0.055	J	0.011	U	0.019	J	0.011	U	0.011	U
Fluoranthene	mg/kg	240	0.065	J	0.12	J	0.0925		0.049	J	0.056	J	0.067	J	15	D	5.4		0.072	J	0.11	J	0.012	U	0.18	J
Fluorene	mg/kg	240	0.0099	U	0.010	U	0.00995		0.0099	U	0.010	U	0.010	U	1.9		0.17	J	0.010	U	0.027	J	0.0099	U	0.0098	U
Indeno[1,2,3-cd]pyrene	mg/kg	1.3	0.023	J	0.039		0.031		0.017	J	0.017	J	0.030	J	**1.9**		**1.4**		0.026	J	0.024	J	0.013	U	0.074	
Naphthalene	mg/kg	2	0.0058	U	0.0059	U	0.00585		0.0058	U	0.0060	U	0.0059	U	1.6		0.025	J	0.0059	J	0.0059	U	0.0058	U	0.012	J
Phenanthrene	mg/kg	180	0.030	J	0.046	J	0.038		0.016	J	0.014	U	0.030	J	20	D	2.5		0.042	J	0.054	J	0.014	U	0.10	J
Pyrene	mg/kg	180	0.063	J	0.10	J	0.0815		0.047	J	0.048	J	0.065	J	13	D	4.8		0.060	J	0.082	J	0.0084	U	0.16	J
Metals																										
Aluminum	mg/kg	51200	28300		27300		27800		27800		28400		30500		30400		31000		26300		29700		**59400**		25400	
Antimony	mg/kg	3.1	0.14	U	0.14	J	0.14		0.14	U	0.14	U	0.15	U	0.14	J	0.16	U	0.14	U	0.14	U	0.75	U F1	0.21	J
Arsenic	mg/kg	11	4.5		4.8		4.65		4.1		3.8		4.6		4.6		4.6		4.1		4.0		2.3	J	5.1	
Barium	mg/kg	1500	134		117		125.5		111		121		111		126		120		121		105		134		256	
Beryllium	mg/kg	16	0.78		0.75		0.765		0.92		0.86		0.81		0.86		0.91		0.89		0.82		0.98	J	0.93	
Calcium	mg/kg	NS	919		928		923.5		2230		1690		1700		1520		1850		1960		2430		914		1370	
Chromium	mg/kg	214	150		109		129.5		112		121		97.9		72.0		71.8		109		77.5		56.2		59.6	
Cobalt	mg/kg	34	22.7		27.5		25.1		24.4		31.6		23.3		27.6		30.9		23.9		28.0		**39.0**		22.8	
Copper	mg/kg	310	27.2		28.5		27.85		32.5		29.5		30.2		29.1		33.6		31.8		55.7		72.3		24.7	
Iron	mg/kg	74767	33600		33600		33600		34500		34200		37100		38500		38600		35300		43400		74100		34000	
Lead	mg/kg	400	25.0		26.3		25.65		12.1		12.6		17.8		20.3		21.2		22.9		12.1		3.3		146	
Magnesium	mg/kg	NS	678		704		691		739		658		756		641		666		761		512		609		770	
Manganese	mg/kg	2100	440		442		441		466		666		463		508		573		516		406		899		667	
Nickel	mg/kg	150	39.3		32.2		35.75		29.7		30.1		25.7		26.1		24.0		30.3		22.2		34.1	F1	18.7	
Potassium	mg/kg	NS	319		328		323.5		324		308		328		311		315		312		317		156	J	336	
Selenium	mg/kg	39	0.42	J	0.48	J	0.45		0.35	J	0.36	J	0.44	J	0.60	J	0.52	J	0.37	J	0.56	J	0.65	U	0.58	J
Thallium	mg/kg	0.078	**0.11**	J	**0.12**	J	**0.115**		**0.10**	J	**0.11**	J	**0.10**	J	**0.11**	J	**0.11**	J	**0.12**	J	**0.095**	J	0.21	U	**0.11**	J
Vanadium	mg/kg	134	78.9		80.6		79.75		82.3		82.9		85.0		95.8		97.0		88.0		114		**286**		86.2	
Zinc	mg/kg	2300	21.5		23.0		22.25		18.2		16.3		22.5		25.8		26.0		21.6		19.9		36.9	J	26.3	
Mercury																										
Mercury	mg/kg	1.1	0.066		0.081		0.0735		0.050		0.033		0.051		0.055		0.064		0.066		0.051		0.023		0.088	
VOCs																										
Methyl acetate	mg/kg	7800	0.19	U	NT		NT		NT		NT		NT		NT		NT		0.54	J	NT		NT		NT	
Pesticide																										
No Pesticides were detected in associated samples																										
PCBs																										
No PCBs were detected in associated samples																										

NS: No Standard
NT: Not Analyzed
Highlighted Concentrations shown in bold type face exceed DNREC HSCA Screening Levels.
D : Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1 : MS and/or MSD recovery exceeds control limits.
U : Indicates the analyte was analyzed for but not detected.

TABLE 2 - Selection of Exposure Pathways
Rodney Reservoir Site - DE-1851 (P00074)
1500 W Ninth Street
Wilmington, Delaware

Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Age	Exposure Route	Rationale for Selection or Elimination of Exposure Pathway
Resident	Future	Soil	Shallow Soil	Shallow Soil	Child/Adult	Ingestion, Dermal, Inhalation	HHRA Guidance requires child residential risk be evaluated for exposure to sensitive recepors.
Outdoor Worker	Future	Soil	Shallow Soil	Shallow Soil	Adult	Ingestion, Dermal, Inhalation	Proposed development is likely to have outside workers.
Excavation Worker	Future	Soil	Shallow Soil	Shallow Soil	Adult	Ingestion, Dermal, Inhalation	Proposed redevelopment may require shallow soil work.
Recreator	Future	Soil	Shallow Soil	Shallow Soil	Child/Adult	Ingestion, Dermal, Inhalation	Proposed development may contain recreational use as open space.
Trespasser	Future	Soil	Shallow Soiil	Shallow Soil	Adult	Ingestion, Dermal, Inhalation	Contact with soil by future trespassers is possible.
Urban Garden Use (Modified Resident)	Future	Soil	Shallow Soil	Shallow Soil	Child/Adult	Ingestion, Dermal, Inhalation	Requested by DNREC to assess the potential urban garden use exposure scenario.

TABLE 3 - Selection of Contaminants of Potential Concern - Soil

Rodney Reservoir Site - DE-1851 (P00074)

1500 W Ninth Street

Wilmington, Delaware

Exposure Medium	Chemical	Maximum Concentration	Lab Qualifier	Units	Screening Level (November 2023)	COPC Flag (Y/N)	Comment
Shallow Soil	Aluminum	59400		mg/kg	51200	Y	Max exceeds screening level.
	Cobalt	39		mg/kg	34	Y	Max exceeds screening level.
	Thallium	0.21	J	mg/kg	0.078	Y	Max exceeds screening level.
	Vanadium	286		mg/kg	134	Y	Max exceeds screening level.
	Benzo(a)anthracene	3.90		mg/kg	1.1	Y	Max exceeds screening level.
	Benzo(a)pyrene	3.30		mg/kg	0.24	Y	Max exceeds screening level.
	Benzo(b)fluoranthene	3.90		mg/kg	1.1	Y	Max exceeds screening level.
	Dibenz(a,h)anthracene	0.44		mg/kg	0.17	Y	Max exceeds screening level.
	Indeno(1,2,3-cd)pyrene	1.90		mg/kg	1.3	Y	Max exceeds screening level.

TABLE 4 -Selection of Exposure Point Concentrations (EPC)
Rodney Reservoir Site - P00074
1500 W Ninth Street
Wilmington, Delaware

Exposure Medium	Exposure Point	COPC	# of Detects/# of Samples	Mean Detects	95% UCL	Maximum Concentration	Units	Selected EPC	Distribution/Comment
Soil	Shallow Soil	Aluminum	10/10	30317.00	36883.00	59400	mg/kg	36883.00	95% Student's-t UCL is below the screening value. Therefore, this substance will not be futher evaluated as a COPC for shallow soil.
		Cobalt	10/10	26.29	30.47	39	mg/kg	30.47	95% Student's-t UCL is below the screening value. Therefore, this substance will not be futher evaluated as a COPC for shallow soil.
		Thallium	9/10	0.11	0.11	0.21	mg/kg	0.11	95% KM (t) UCL
		Vanadium	10/10	105.80	144.00	286	mg/kg	144.00	95% Student's-t UCL
		Benzo(a)anthracene	9/10	0.73	3.32	3.90	mg/kg	3.32	95% KM (Chebyshev) UCL
		Benzo(a)pyrene	9/10	0.66	2.95	3.30	mg/kg	2.95	95% KM (Chebyshev) UCL
		Benzo(b)fluoranthene	9/10	0.77	3.44	3.90	mg/kg	3.44	95% KM (Chebyshev) UCL
		Dibenz(a,h)anthracene	3/10	0.25	0.19	0.44	mg/kg	0.19	95% KM (t) UCL
		Indeno(1,2,3-cd)pyrene	9/10	0.39	1.73	1.90	mg/kg	1.73	95% KM (Chebyshev) UCL

TABLE 5 - Risk Summary for Receptors - Resident, Shallow Soil
Rodney Reservoir Site
Timeframe: Future

Exposure Media	Exposure Route	DERAC Input Constituent	COPC	EPC	Units	Carcinogenic Risk	Hazard Quotient	Child Hazard Quotient	Target Organ	Comment
Shallow Soil	Ingestion	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	2.17E-06	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.9E-05	0.04	0.126		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	2.25E-06	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	1.22E-06	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	1.13E-06	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	0.04	0.144		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.11	0.365		
	Total for Exposure Route					**2.61E-05**	**0.19**	**0.64**		
	Dermal	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	7.24E-07	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	6.4E-06	0.01	0.0388		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	7.50E-07	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	4.07E-07	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	3.77E-07	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	-	-		
	Total for Exposure Route					**8.69E-06**	**0.014**	**0.039**		
	Inhalation	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	4.47E-08	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.29E-09	0.00	0.0010		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.50E-10	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	8.14E-11	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	7.54E-11	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.00	0.0010		
	Total for Exposure Route					**4.63E-08**	**0.002**	**0.0021**		
Total for Exposure Media						**3.48E-05**	**0.21**	**0.68**		
Cumulative Carcinogenic Risk (One significant figure)						**3E-05**				
Hazard Index (One significant figure)							**0.2**	**0.7**		

TABLE 6 - Risk Summary for Receptors - Outdoor Worker, Shallow Soil
Rodney Reservoir Site
Timeframe: Future

Exposure Media	Exposure Route	DERAC Input Constituent	COPC	EPC	Units	Carcinogenic Risk	Hazard Quotient	Target Organ	Comment
Shallow Soil	Ingestion	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	9.14E-08	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	8.1E-07	0.01		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	9.47E-08	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	5.15E-08	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	4.77E-08	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	0.01		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.02		
	Total for Exposure Route					**1.10E-06**	**0.04**		
	Dermal	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	5.03E-08	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	4.5E-07	0.00		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	5.21E-08	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	2.83E-08	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	2.62E-08	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	-		
	Total for Exposure Route					**6.04E-07**	**0.004**		
	Inhalation	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	3.33E-09	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	9.56E-11	0.0002		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.11E-11	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	6.06E-12	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	5.61E-12	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.0002		
	Total for Exposure Route					**3.45E-09**	**0.000**		
Total for Exposure Media						**1.70E-06**	**0.04**		
Cumulative Carcinogenic Risk (One significant figure)						**2E-06**			
Hazard Index (One significant figure)							**0.04**		

TABLE 7 - Risk Summary for Receptors - Excavator, Shallow Soil
Rodney Reservoir Site
Timeframe: Future

Exposure Media	Exposure Route	DERAC Input Constituent	COPC	EPC	Units	Carcinogenic Risk	Hazard Quotient	Target Organ	Comment
Shallow Soil	Ingestion	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	1.07E-09	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	9.5E-09	0.002		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.11E-09	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	6.04E-10	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	5.59E-10	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	0.001		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.003		
	Total for Exposure Route					**1.29E-08**	**0.01**		
	Dermal	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	4.47E-10	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	4.0E-09	0.001		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	4.63E-10	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	2.52E-10	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	2.33E-10	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	-		
	Total for Exposure Route					**5.37E-09**	**0.001**		
	Inhalation	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	1.18E-11	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	3.40E-13	0.00002		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	3.96E-14	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	2.15E-14	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	1.99E-14	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.00		
	Total for Exposure Route					**1.22E-11**	**0.00004**		
Total for Exposure Media						**1.83E-08**	**0.01**		
Cumulative Carcinogenic Risk (One significant figure)						**2E-08**			
Hazard Index (One significant figure)							**0.01**		

TABLE 8 - Risk Summary for Receptors - Recreator, Shallow Soil
Rodney Reservoir Site
Timeframe: Future

Exposure Media	Exposure Route	DERAC Input Constituent	COPC	EPC	Units	Carcinogenic Risk	Hazard Quotient	Child Hazard Quotient	Target Organ	Comment
Shallow Soil	Ingestion	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	4.65E-07	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	4.1E-06	0.01	0.027		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	4.81E-07	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	2.62E-07	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	2.42E-07	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	0.01	0.031		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.02	0.078		
	Total for Exposure Route					**5.58E-06**	**0.04**	**0.14**		
	Dermal	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	1.55E-07	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.4E-06	0.003	0.0083		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.61E-07	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	8.73E-08	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	8.09E-08	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	-	-		
	Total for Exposure Route					**1.86E-06**	**0.003**	**0.008**		
	Inhalation	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	3.99E-10	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.15E-11	0.00001	0.00001		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.34E-12	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	7.27E-13	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	6.73E-13	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.00001	0.00001		
	Total for Exposure Route					**4.13E-10**	**0.0000**	**0.0000**		
Total for Exposure Media						**7.44E-06**	**0.04**	**0.14**		
Cumulative Carcinogenic Risk (One significant figure)						**7E-06**				
Hazard Index (One significant figure)							**0.04**	**0.1**		

TABLE 9 - Risk Summary for Receptors - Trespasser, Shallow Soil
Rodney Reservoir Site
Timeframe: Future

Exposure Media	Exposure Route	DERAC Input Constituent	COPC	EPC	Units	Carcinogenic Risk	Hazard Quotient	Target Organ	Comment
Shallow Soil	Ingestion	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	2.83E-08	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	2.5E-07	0.002		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	2.93E-08	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	1.59E-08	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	1.47E-08	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	0.00		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.01		
	Total for Exposure Route					**3.39E-07**	**0.01**		
	Dermal	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	1.55E-08	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.4E-07	0.001		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.61E-08	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	8.74E-09	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	8.09E-09	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	-		
	Total for Exposure Route					**1.86E-07**	**0.001**		
	Inhalation	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	5.02E-10	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.44E-11	0.00003		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.68E-12	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	9.13E-13	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	8.46E-13	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.00003		
	Total for Exposure Route					**5.20E-10**	**0.0001**		
Total for Exposure Media						**5.26E-07**	**0.01**		
Cumulative Carcinogenic Risk (One significant figure)						**5E-07**			
Hazard Index (One significant figure)							**0.01**		

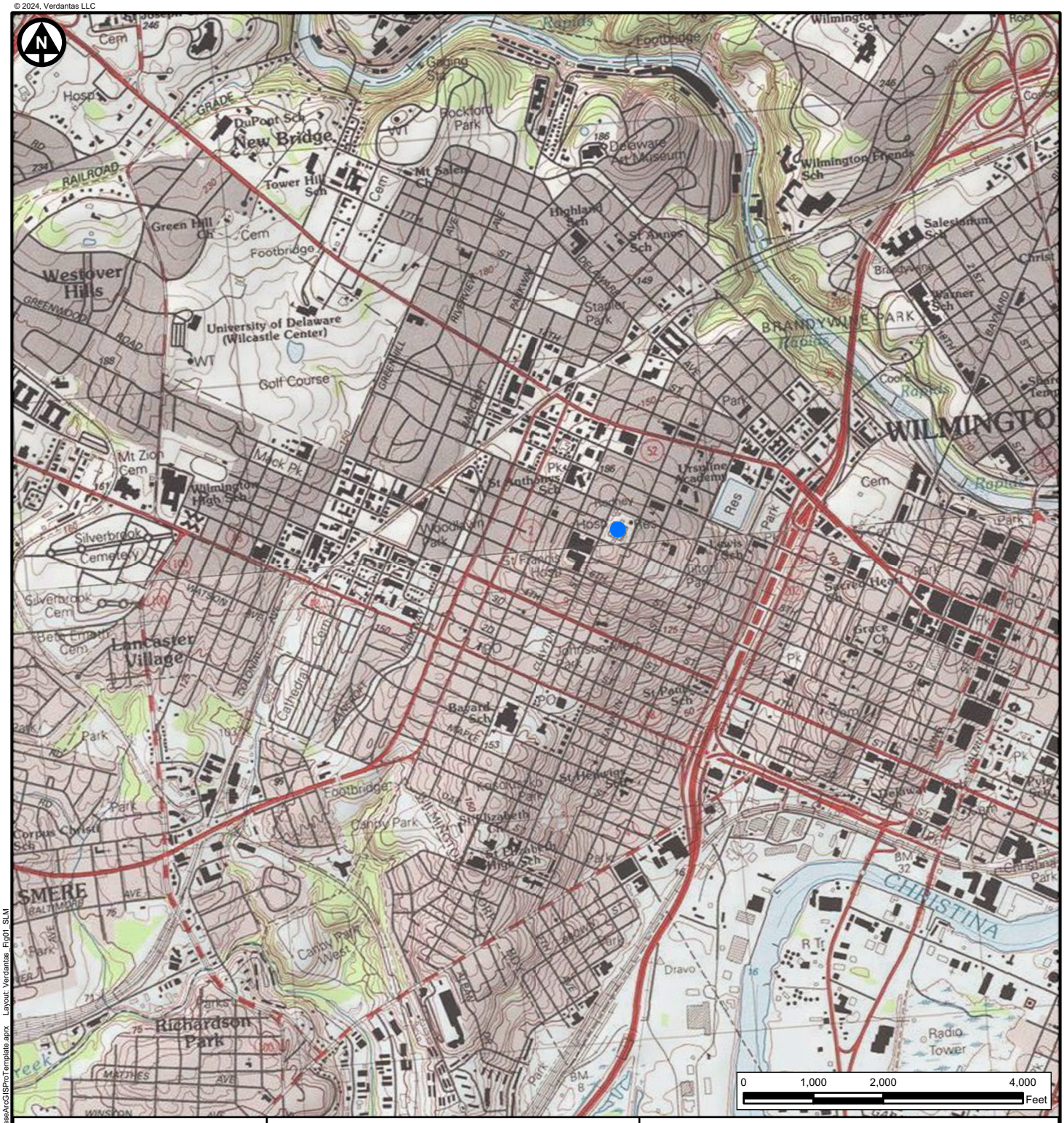
TABLE 10 - Risk Summary for Receptors - Urban Garden Use (Modified Resident), Shallow Soil

Rodney Reservoir Site

Timeframe: Future

Exposure Media	Exposure Route	DERAC Input Constituent	COPC	EPC	Units	Carcinogenic Risk	Hazard Quotient	Child Hazard Quotient	Target Organ	Comment
Shallow Soil	Ingestion	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	1.50E-07	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.33E-06	0.003	0.007		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	1.55E-07	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	8.44E-08	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	7.82E-08	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	-	0.00	0.008		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.01	0.021		
	Total for Exposure Route					**1.80E-06**	**0.02**	**0.04**		
	Dermal	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	5.57E-08	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	4.94E-07	0.001	0.0022		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	5.76E-08	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	3.13E-08	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	2.90E-08	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	--	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	--	-	-		
	Total for Exposure Route					**6.68E-07**	**0.001**	**0.002**		
	Inhalation	Benz(a)anthracene	Benz(a)anthracene	3.32	mg/kg	6.49E-09	-	-		
		Benzo(a)pyrene	Benzo(a)pyrene	3.0	mg/kg	1.86E-10	0.0002	0.0001		
		Benzo(b)fluoranthene	Benzo(b)fluoranthene	3.44	mg/kg	2.17E-11	-	-		
		Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	0.19	mg/kg	1.18E-11	-	-		
		Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.73	mg/kg	1.09E-11	-	-		
		Thallium (Soluble Salts)	Thallium	0.11	mg/kg	--	-	-		
		Vanadium and Compounds	Vanadium	144.00	mg/kg	-	0.0001	0.0001		
	Total for Exposure Route					**6.72E-09**	**0.000**	**0.0001**		
Total for Exposure Media						**2.47E-06**	**0.02**	**0.04**		
Cumulative Carcinogenic Risk (One significant figure)						**2E-06**				
Hazard Index (One significant figure)							**0.02**	**0.04**		

FIGURES



Site Location

verdantas

Sources:
Aerial Imagery: Esri Imagery Web Service dated 2015.

Topographic Map: National Geographic Society Web Service.

Quadrangle: Wilmington North, Delaware

Post-Demolition Grading Soil Sampling
Rodney Reservoir Site (DE-1851

Site Location Map

1500 W Ninth Street
Wilmington, Delaware

Project Number	16530
Date	08/2024
Author	kprajapati
Scale	1 in = 2,000 ft
Figure	1

Edited: 8/1/2024 File Location: Z:\GIS\Projects\00716530_RodneyReservoir\ BaseArcGISProTemplate.aprx Layout: Verdantas Fig01_SLM

Produced Using Esri's ArcGIS Software

Site Boundary

Soil Boring Locations

Note: The aerial photo was acquired through the Esri Imagery Web Service. Aerial photography dated 2022.

verdantas

Post-Demolition Grading Soil Sampling
Rodney Reservoir Site (DE-1851

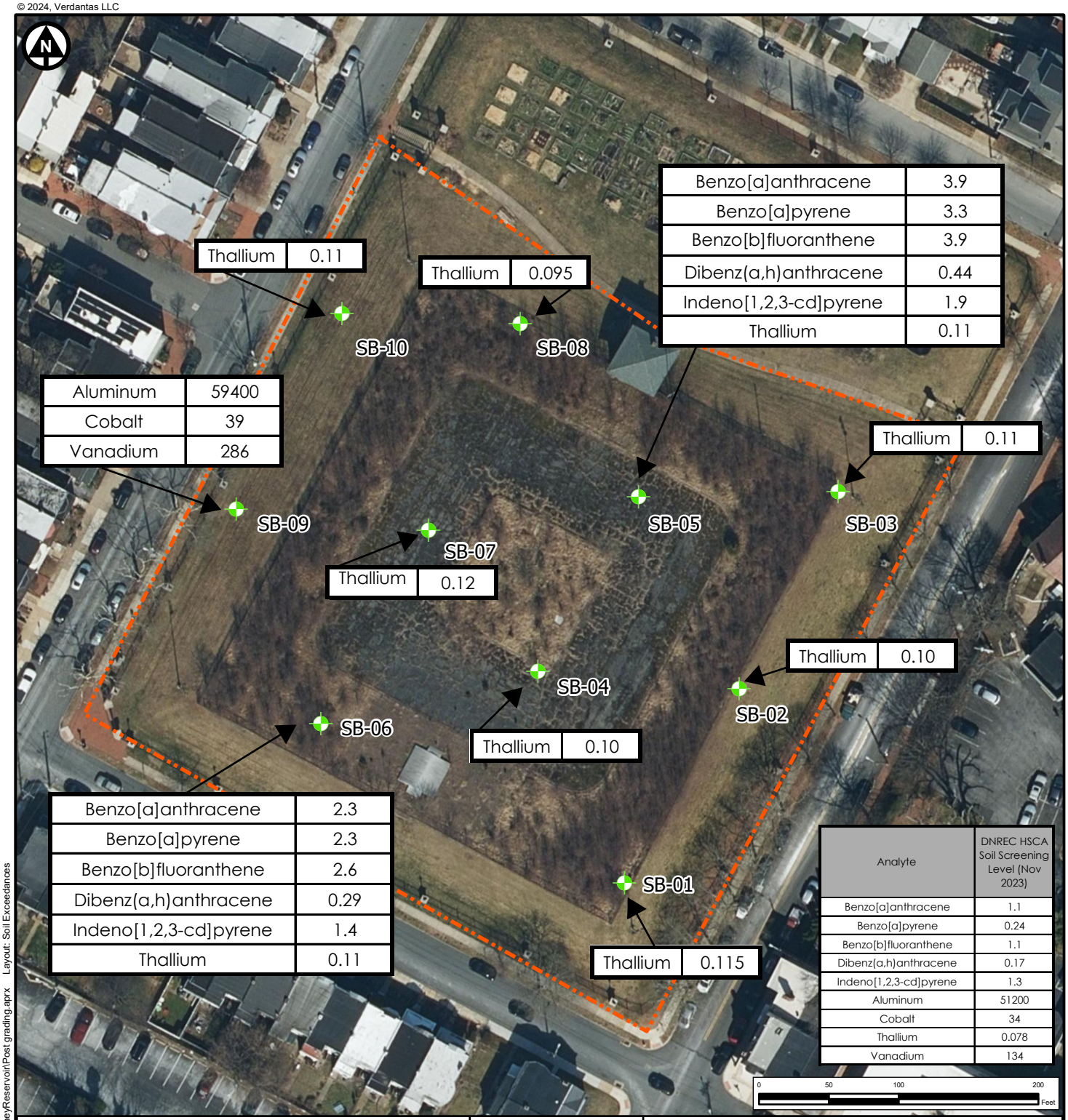
Site Layout Map

1500 W Ninth Street
Wilmington, Delaware

Project Number	16530
Date	08/2024
Author	kprajapati
Scale	1 in = 100 ft
Figure	2

Edited: 8/1/2024 File Location: Z:\GIS\Projects\00716530_RodneyReservoir_BaseArcGISProTemplate.aprx Layout: Verdantas_8.5x11P

Produced Using Esri's ArcGIS Software



Analyte	DNREC HSCA Soil Screening Level (Nov 2023)
Benzo[a]anthracene	1.1
Benzo[a]pyrene	0.24
Benzo[b]fluoranthene	1.1
Dibenz(a,h)anthracene	0.17
Indeno[1,2,3-cd]pyrene	1.3
Aluminum	51200
Cobalt	34
Thallium	0.078
Vanadium	134

Site Boundary

Soil Boring Locations

Note: 1. The aerial photo was acquired through the Esri Imagery Web Service. Aerial photography dated 2022.

2. Analyte results are in mg/kg = milligram per kilogram

verdantas

Post-Demolition Grading Soil Sampling
Rodney Reservoir Site (DE-1851

Soil Exceedances

1500 W Ninth Street
Wilmington, Delaware

Project Number	16530
Date	08/2024
Author	kprajapati
Scale	1 in = 100 ft
Figure	3

Edited: 8/5/2024 File Location: Z:\GIS\Projects\0071\16530_RodneyReservoir\Post grading.aprx Layout: Soil Exceedances

Produced Using Esri's ArcGIS Software

September 8, 2023
Ms. Mariya Chiger
Project Number: 16530

ATTACHMENT A

DNREC SOIL SCREENING REPORT

FIELD SCREENING ANALYSIS SUMMARY

Site Name: Rodney Reservoir Site Site ID: DE-1851

Estimated PQL
1PPM

Sample name	VOC's	Pest PCB	Screening Date	Semi's
SB01	ND	ND	7/16-7/18	PAH
SB02	↓	↓	↓	↓
SB03				
SB04				Trace PAH
SB05				Trace PAH
SB06				PAH
SB07				PAH
SB08				Trace PAH
SB09				Trace TPH
SB10	↓	↓	↓	Trace PAH

Chain of Custody Record

662349

eurofins | Environment Testing America

Address: _____

_____

_____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: DC - ISM

TAL-8210

Client Contact	Project Manager: Robert Samuels	Site Contact: Kristal Pompeo	Date: 07/16/2024	COC No:
Company Name: Versar Inc LLC	Tel/Email: 302 239 6634	Lab Contact: Crystal Pengal	Carrier:	1 of 2 COCs
Address: 9400 Limestone Rd	Analysis Turnaround Time			Sampler: KP
City/State/Zip: Wilmington DE 19808	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 302 239 6634	TAT if different from Below _____			Walk-in Client:
Fax: —	☑ 2 weeks			Lab Sampling:
Project Name: Rodney Reservoir Site	☐ 1 week			
Site: Rodney Wilmington	☐ 2 days			Job / SDG No.:
P O # 16530	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Sample Specific Notes:
1851 - SB01 - 0724	07/16/24	10:30	G	S	3			
1851 - SB02 - 0724	07/16/24	11:00	G	S	3			
1851 - SB03 - 0724	07/16/24	11:15	G	S	3			
1851 - SB04 - 0724	07/16/24	10:15	G	S	3			
1851 - SB05 - 0724	07/16/24	11:30	G	S	3			
1851 - SB06 - 0724	07/16/24	08:30	G	S	3			
1851 - SB07 - 0724	07/16/24	09:10	G	S	3			
1851 - SB08 - 0724	07/16/24	10:00	G	S	3			
1851 - SB09 - 0724 - MS/MSD	07/16/24	08:55	G	S	9		Y	
1851 - SB10 - 0724	07/16/24	09:30	G	S	3			
1851 - SBDUP - 0724	07/16/24	08:00	G	S	3			
1851 - EB - 0724	07/16/24	12:00	G	S/AQ	4			

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other DI H2O

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Analyses on hold

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

	Company:	Date/Time:		Company:	Date/Time:
Relinquished by:	Versar	7/16/24 1:30	Received by:	DWRC	7/16/24 1:30 pm
Relinquished by:	DWRC	7/17/24	Received by:	STAT	7/17/24 12:45
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Ti	2436 ppm	275	93
Ag	[0.2] ppm	0	5
Cd	[0.8] ppm	1	8
Ba	526 ppm	183	379
Sb	0 ppm	0	25
Co	15.74 ppm	41	112
Ni	30.3 ppm	11	3
Cu	[2.4] ppm	0	12
Zn	40.6 ppm	9	14
As	0.33 ppm	1	11
Se	0 ppm	0	10
Hg	0 ppm	0	10
Tl	0 ppm	0	12
Pb	4.5 ppm	1	14
SiO5	97.88 % Diff		

1851 SB1

Ca	2729 ppm	113	40
V	160.9 ppm	26	111
Cr	119.5 ppm	40	64
Mn	685.3 ppm	279	50
Fe	34038 ppm	17475	2522
Ti	3305 ppm	369	142
Ag	0 ppm	0	3
Cd	0 ppm	0	6
Ba	204 ppm	61	213
Sb	[2.2] ppm	1	17
Co	39.02 ppm	99	287
Ni	61.7 ppm	19	-4
Cu	27.9 ppm	4	12
Zn	36.2 ppm	7	12
As	26.18 ppm	69	33
Se	0.89 ppm	1	9
Hg	3.5 ppm	1	8
Tl	0 ppm	0	28
Pb	223.7 ppm	62	48
SiO5	95.834 % Diff		

1851 SB2

Ca	6848 ppm	286	78
V	190.3 ppm	31	128
Cr	169.4 ppm	55	74
Mn	945.1 ppm	371	56
Fe	40347 ppm	19895	2885
Ti	3948 ppm	433	161
Ag	0 ppm	0	3
Cd	[0.3] ppm	0	6
Ba	290 ppm	82	229
Sb	[1.0] ppm	0	17
Co	38.37 ppm	93	269
Ni	65.4 ppm	19	-4
Cu	24.9 ppm	3	12
Zn	39.5 ppm	7	11
As	1.98 ppm	5	11
Se	[0.32] ppm	0	8
Hg	[1.0] ppm	0	9
Tl	0 ppm	0	12
Pb	15.0 ppm	4	16
SiO5	94.707 % Diff		

1851 SB3

Ca	6744 ppm	282	78
V	222.1 ppm	36	139
Cr	178.8 ppm	58	81
Mn	1111.8 ppm	431	58
Fe	46804 ppm	22684	3270
Ti	4200 ppm	461	175
Ag	0 ppm	0	3
Cd	0 ppm	0	6
Ba	213 ppm	58	202
Sb	0 ppm	0	16
Co	46.98 ppm	113	323
Ni	80.5 ppm	23	-6
Cu	31.4 ppm	4	13
Zn	40.6 ppm	7	12
As	1.87 ppm	4	10
Se	[0.49] ppm	1	8
Hg	[1.2] ppm	0	9

Tl	0 ppm	0	10
Pb	9.3 ppm	2	17
SiO5	94.031 % Diff		

1851 SB4

Ca	6014 ppm	251	73
V	188.1 ppm	30	131
Cr	149.7 ppm	49	80
Mn	1001.2 ppm	391	60
Fe	45537 ppm	22263	3238
Ti	3843 ppm	423	170
Ag	0 ppm	0	4
Cd	[0.2] ppm	0	7
Ba	258 ppm	71	245
Sb	[2.6] ppm	1	18
Co	44.24 ppm	108	297
Ni	70.3 ppm	20	-5
Cu	41.1 ppm	6	12
Zn	41.7 ppm	7	12
As	2.30 ppm	5	11
Se	[0.03] ppm	0	9
Hg	[0.6] ppm	0	9
Tl	0 ppm	0	11
Pb	11.0 ppm	3	18
SiO5	94.279 % Diff		

1851 SB5

Ca	2386 ppm	99	35
V	128.7 ppm	21	95
Cr	71.9 ppm	24	56
Mn	640.9 ppm	265	43
Fe	29206 ppm	15305	2289
Ti	2659 ppm	298	123
Ag	[0.5] ppm	0	3
Cd	0 ppm	0	7
Ba	218 ppm	69	257
Sb	0 ppm	0	19
Co	34.88 ppm	89	248
Ni	51.5 ppm	17	-3
Cu	29.7 ppm	5	11
Zn	30.3 ppm	6	12
As	2.99 ppm	8	11
Se	[0.26] ppm	0	8
Hg	[0.77] ppm	0	8
Tl	0 ppm	0	11
Pb	23.5 ppm	7	17
SiO5	96.452 % Diff		

1851 SB6

Ca	3698 ppm	154	49
V	160.0 ppm	26	106
Cr	90.4 ppm	30	61
Mn	788.0 ppm	318	48
Fe	37792 ppm	19185	2755
Ti	2984 ppm	332	136
Ag	0 ppm	0	3
Cd	[0.1] ppm	0	6
Ba	195 ppm	57	212
Sb	0 ppm	0	16
Co	45.04 ppm	113	331
Ni	67.0 ppm	21	-7
Cu	34.0 ppm	5	12
Zn	43.9 ppm	8	11
As	2.24 ppm	6	9
Se	[0.15] ppm	0	8
Hg	0 ppm	0	9
Tl	0 ppm	0	10
Pb	9.0 ppm	2	17
SiO5	95.409 % Diff		

1851 SB7

Ca	5522 ppm	231	72
V	204 ppm	33	148
Cr	216.8 ppm	71	87
Mn	1095.7 ppm	423	67
Fe	50272 ppm	24245	3505
Ti	4343 ppm	480	185
Ag	[0.3] ppm	0	3

Cd	[0.8] ppm	0	6
Ba	292 ppm	78	225
Sb	[1.9] ppm	1	16
Co	44.50 ppm	107	304
Ni	77.2 ppm	21	-5
Cu	36.0 ppm	5	13
Zn	34.7 ppm	6	12
As	2.78 ppm	6	11
Se	0.80 ppm	1	8
Hg	0 ppm	0	9
Tl	0 ppm	0	11
Pb	16.8 ppm	4	18
SiO5	93.784 % Diff		

1851 SB8

Ca	13411 ppm	560	138
V	200.4 ppm	31	114
Cr	149.5 ppm	48	76
Mn	1170.9 ppm	441	51
Fe	48269 ppm	22736	3240
Ti	3217 ppm	342	156
Ag	0 ppm	0	3
Cd	0 ppm	0	6
Ba	254 ppm	67	222
Sb	0 ppm	0	16
Co	47.03 ppm	110	322
Ni	75.9 ppm	21	-6
Cu	35.6 ppm	5	12
Zn	36.1 ppm	6	11
As	1.87 ppm	4	8
Se	0 ppm	0	8
Hg	0 ppm	0	9
Tl	0 ppm	0	10
Pb	5.8 ppm	1	16
SiO5	93.313 % Diff		

1851 SB9

Ca	1632 ppm	69	41
V	334 ppm	55	141
Cr	113.0 ppm	38	93
Mn	1422.5 ppm	541	58
Fe	70552 ppm	33084	4693
Ti	3444 ppm	389	200
Ag	[1.3] ppm	0	3
Cd	[0.4] ppm	0	6
Ba	198 ppm	47	192
Sb	[1.6] ppm	0	14
Co	73.39 ppm	176	614
Ni	119.7 ppm	30	-13
Cu	73.2 ppm	8	14
Zn	54.7 ppm	8	12
As	0.74 ppm	1	7
Se	0 ppm	0	7
Hg	2.6 ppm	1	7
Tl	3.6 ppm	1	7
Pb	0 ppm	0	20
SiO5	92.197 % Diff		

1851 SB10

Ca	4466 ppm	187	61
V	204.7 ppm	33	144
Cr	100.1 ppm	33	78
Mn	1513.2 ppm	593	54
Fe	45449 ppm	22311	3262
Ti	4224 ppm	469	178
Ag	0 ppm	0	3
Cd	[0.5] ppm	0	6
Ba	274 ppm	76	238
Sb	0 ppm	0	17
Co	44.02 ppm	107	308
Ni	69.7 ppm	20	-5
Cu	30.6 ppm	4	12
Zn	48.6 ppm	9	12
As	4.44 ppm	11	12
Se	0.85 ppm	1	8
Hg	[1.8] ppm	1	9
Tl	0 ppm	0	13
Pb	36.5 ppm	9	20

SiO5	94.353 % Diff		
2710			
Ca	9675 ppm	391	107
V	44.2 ppm	7	105
Cr	84.1 ppm	26	47
Mn	8688 ppm	3307	322
Fe	28170 ppm	13563	2616
Ti	2279 ppm	239	114
Ag	39.5 ppm	9	5
Cd	18.9 ppm	10	8
Ba	645 ppm	158	237
Sb	38.9 ppm	12	20
Co	22.87 ppm	53	151
Ni	47.8 ppm	15	-2
Cu	2065 ppm	294	95
Zn	4805 ppm	908	298
As	458.2 ppm	1058	335
Se	8.59 ppm	12	24
Hg	23.4 ppm	8	20
Tl	0 ppm	0	300
Pb	4099 ppm	977	507
SiO5	93.879 % Diff		

ATTACHMENT B

EUROFINS LABORATORY REPORT (ATTACHMENT SENT SEPARATELY)

ATTACHMENT C

PROUCL INPUTS AND OUTPUTS

Attachment C - ProUCL Data Input

Thallium	D_Thallium	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo[b]fluoranthene	D_Benzo[b]fluoranthene	Dibenz(a,h)anthracene	D_Dibenz(a,h)anthracene	Indeno[1,2,3-cd]pyrene	D_Indeno[1,2,3-cd]pyrene	Aluminium	D_Aluminium	Cobalt	D_Cobalt	Vanadium	D_Vanadium
0.115	1	0.0485	1	0.046	1	0.0605	1	0.015	0	0.031	1	14274	1	11.41	1	40.75	1
0.1	1	0.026	1	0.024	1	0.032	1	0.015	0	0.017	1	27800	1	24.4	1	82.3	1
0.11	1	0.032	1	0.027	1	0.035	1	0.015	0	0.017	1	28400	1	31.6	1	82.9	1
0.1	1	0.04	1	0.042	1	0.055	1	0.015	0	0.03	1	30500	1	23.3	1	85	1
0.11	1	**3.9**	1	**3.3**	1	**3.9**	1	**0.44**	1	**1.9**	1	30400	1	27.6	1	95.8	1
0.11	1	**2.3**	1	**2.3**	1	**2.6**	1	**0.29**	1	**1.4**	1	31000	1	30.9	1	97	1
0.12	1	0.039	1	0.038	1	0.049	1	0.015	0	0.026	1	26300	1	23.9	1	88	1
0.095	1	0.042	1	0.037	1	0.047	1	0.015	0	0.024	1	29700	1	28	1	114	1
0.21	0	0.025	0	0.009	0	0.0087	0	0.015	0	0.013	0	**59400**	1	**39**	1	**286**	1
0.11	1	0.098	1	0.1	1	0.14	1	0.016	1	0.074	1	25400	1	22.8	1	86.2	1

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3				User Selected Options								
4				Date/Time of Computation	ProUCL 5.18/1/2024 11:09:41 AM							
5				From File	16530-ProUCL input.xls							
6				Full Precision	OFF							
7				Confidence Coefficient	95%							
8				Number of Bootstrap Operations	2000							
9												
10	**Thallium**											
11												
12	**General Statistics**											
13						Total Number of Observations	10			Number of Distinct Observations		6
14						Number of Detects	9			Number of Non-Detects		1
15						Number of Distinct Detects	5			Number of Distinct Non-Detects		1
16						Minimum Detect	0.095			Minimum Non-Detect		0.21
17						Maximum Detect	0.12			Maximum Non-Detect		0.21
18						Variance Detects	6.3194E-5			Percent Non-Detects		10%
19						Mean Detects	0.108			SD Detects		0.00795
20						Median Detects	0.11			CV Detects		0.0738
21						Skewness Detects	-0.25			Kurtosis Detects		-0.607
22						Mean of Logged Detects	-2.23			SD of Logged Detects		0.0746
23												
24	**Normal GOF Test on Detects Only**											
25						Shapiro Wilk Test Statistic	0.92			**Shapiro Wilk GOF Test**		
26						5% Shapiro Wilk Critical Value	0.829			Detected Data appear Normal at 5% Significance Level		
27						Lilliefors Test Statistic	0.277			**Lilliefors GOF Test**		
28						5% Lilliefors Critical Value	0.274			Detected Data Not Normal at 5% Significance Level		
29	**Detected Data appear Approximate Normal at 5% Significance Level**											
30												
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
32						KM Mean	0.108			KM Standard Error of Mean		0.00265
33						KM SD	0.00749			95% KM (BCA) UCL		0.112
34						95% KM (t) UCL	0.113			95% KM (Percentile Bootstrap) UCL		0.112
35						95% KM (z) UCL	0.112			95% KM Bootstrap t UCL		0.112
36						90% KM Chebyshev UCL	0.116			95% KM Chebyshev UCL		0.119
37						97.5% KM Chebyshev UCL	0.124			99% KM Chebyshev UCL		0.134
38												
39	**Gamma GOF Tests on Detected Observations Only**											
40						A-D Test Statistic	0.528			**Anderson-Darling GOF Test**		
41						5% A-D Critical Value	0.72			Detected data appear Gamma Distributed at 5% Significance Level		
42						K-S Test Statistic	0.291			**Kolmogorov-Smirnov GOF**		
43						5% K-S Critical Value	0.279			Detected Data Not Gamma Distributed at 5% Significance Level		
44	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
45												
46	**Gamma Statistics on Detected Data Only**											
47						k hat (MLE)	204			k star (bias corrected MLE)		136
48						Theta hat (MLE)	5.2842E-4			Theta star (bias corrected MLE)		7.9220E-4
49						nu hat (MLE)	3671			nu star (bias corrected)		2449
50						Mean (detects)	0.108					
51												
52	**Gamma ROS Statistics using Imputed Non-Detects**											

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.095				Mean	0.108	
59					Maximum	0.12				Median	0.11	
60					SD	0.00749				CV	0.0695	
61					k hat (MLE)	226.6				k star (bias corrected MLE)	158.7	
62					Theta hat (MLE)	4.7557E-4				Theta star (bias corrected MLE)	6.7910E-4	
63					nu hat (MLE)	4532				nu star (bias corrected)	3174	
64					Adjusted Level of Significance (β)	0.0267						
65					Approximate Chi Square Value (N/A, α)	3044				Adjusted Chi Square Value (N/A, β)	3022	
66					95% Gamma Approximate UCL (use when n>=50)	0.112				95% Gamma Adjusted UCL (use when n<50)	0.113	
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	0.108				SD (KM)	0.00749	
70					Variance (KM)	5.6173E-5				SE of Mean (KM)	0.00265	
71					k hat (KM)	206.8				k star (KM)	144.8	
72					nu hat (KM)	4136				nu star (KM)	2896	
73					theta hat (KM)	5.2119E-4				theta star (KM)	7.4422E-4	
74					80% gamma percentile (KM)	0.115				90% gamma percentile (KM)	0.119	
75					95% gamma percentile (KM)	0.123				99% gamma percentile (KM)	0.13	
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (N/A, α)	2772				Adjusted Chi Square Value (N/A, β)	2751	
79					95% Gamma Approximate KM-UCL (use when n>=50)	0.113				95% Gamma Adjusted KM-UCL (use when n<50)	0.113	
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.914				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.829				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.287				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.274				Detected Data Not Lognormal at 5% Significance Level		
86	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	0.108				Mean in Log Scale	-2.23	
90					SD in Original Scale	0.0075				SD in Log Scale	0.0703	
91					95% t UCL (assumes normality of ROS data)	0.112				95% Percentile Bootstrap UCL	0.112	
92					95% BCA Bootstrap UCL	0.111				95% Bootstrap t UCL	0.112	
93					95% H-UCL (Log ROS)	N/A						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	-2.23				KM Geo Mean	0.108	
97					KM SD (logged)	0.0703				95% Critical H Value (KM-Log)	N/A	
98					KM Standard Error of Mean (logged)	0.0249				95% H-UCL (KM -Log)	N/A	
99					KM SD (logged)	0.0703				95% Critical H Value (KM-Log)	N/A	
100					KM Standard Error of Mean (logged)	0.0249						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	0.108				Mean in Log Scale	-2.233	

105				SD in Original Scale	0.00755					SD in Log Scale	0.0707	
106				95% t UCL (Assumes normality)	0.112					95% H-Stat UCL	N/A	
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113				95% KM (t) UCL	0.113							
114												
115	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
116	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
117												
118	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
119	Recommendations are based upon data size, data distribution, and skewness.											
120	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
121	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
122												
123	**Benzo(a)anthracene**											
124												
125	**General Statistics**											
126				Total Number of Observations	10					Number of Distinct Observations	10	
127				Number of Detects	9					Number of Non-Detects	1	
128				Number of Distinct Detects	9					Number of Distinct Non-Detects	1	
129				Minimum Detect	0.026					Minimum Non-Detect	0.025	
130				Maximum Detect	3.9					Maximum Non-Detect	0.025	
131				Variance Detects	1.973					Percent Non-Detects	10%	
132				Mean Detects	0.725					SD Detects	1.405	
133				Median Detects	0.042					CV Detects	1.937	
134				Skewness Detects	1.955					Kurtosis Detects	2.944	
135				Mean of Logged Detects	-2.209					SD of Logged Detects	1.913	
136												
137	**Normal GOF Test on Detects Only**											
138				Shapiro Wilk Test Statistic	0.581					**Shapiro Wilk GOF Test**		
139				5% Shapiro Wilk Critical Value	0.829					Detected Data Not Normal at 5% Significance Level		
140				Lilliefors Test Statistic	0.45					**Lilliefors GOF Test**		
141				5% Lilliefors Critical Value	0.274					Detected Data Not Normal at 5% Significance Level		
142	**Detected Data Not Normal at 5% Significance Level**											
143												
144	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
145				KM Mean	0.655					KM Standard Error of Mean	0.427	
146				KM SD	1.274					95% KM (BCA) UCL	1.428	
147				95% KM (t) UCL	1.438					95% KM (Percentile Bootstrap) UCL	1.423	
148				95% KM (z) UCL	1.358					95% KM Bootstrap t UCL	39.27	
149				90% KM Chebyshev UCL	1.937					95% KM Chebyshev UCL	2.518	
150				97.5% KM Chebyshev UCL	3.323					99% KM Chebyshev UCL	4.906	
151												
152	**Gamma GOF Tests on Detected Observations Only**											
153				A-D Test Statistic	1.642					**Anderson-Darling GOF Test**		
154				5% A-D Critical Value	0.797					Detected Data Not Gamma Distributed at 5% Significance Level		
155				K-S Test Statistic	0.401					**Kolmogorov-Smirnov GOF**		
156				5% K-S Critical Value	0.299					Detected Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Detected Data Not Gamma Distributed at 5% Significance Level**											
158												
159	**Gamma Statistics on Detected Data Only**											
160					k hat (MLE)	0.355			k star (bias corrected MLE)	0.311		
161					Theta hat (MLE)	2.04			Theta star (bias corrected MLE)	2.331		
162					nu hat (MLE)	6.397			nu star (bias corrected)	5.598		
163					Mean (detects)	0.725						
164												
165	**Gamma ROS Statistics using Imputed Non-Detects**											
166	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
167	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
168	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
169	This is especially true when the sample size is small.											
170	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
171					Minimum	0.01			Mean	0.654		
172					Maximum	3.9			Median	0.041		
173					SD	1.344			CV	2.056		
174					k hat (MLE)	0.335			k star (bias corrected MLE)	0.301		
175					Theta hat (MLE)	1.952			Theta star (bias corrected MLE)	2.171		
176					nu hat (MLE)	6.696			nu star (bias corrected)	6.02		
177					Adjusted Level of Significance (β)	0.0267						
178					Approximate Chi Square Value (6.02, α)	1.65			Adjusted Chi Square Value (6.02, β)	1.286		
179					95% Gamma Approximate UCL (use when n>=50)	2.384			95% Gamma Adjusted UCL (use when n<50)	3.06		
180												
181	**Estimates of Gamma Parameters using KM Estimates**											
182					Mean (KM)	0.655			SD (KM)	1.274		
183					Variance (KM)	1.623			SE of Mean (KM)	0.427		
184					k hat (KM)	0.264			k star (KM)	0.252		
185					nu hat (KM)	5.288			nu star (KM)	5.035		
186					theta hat (KM)	2.477			theta star (KM)	2.602		
187					80% gamma percentile (KM)	0.954			90% gamma percentile (KM)	1.965		
188					95% gamma percentile (KM)	3.164			99% gamma percentile (KM)	6.353		
189												
190	**Gamma Kaplan-Meier (KM) Statistics**											
191					Approximate Chi Square Value (5.04, α)	1.168			Adjusted Chi Square Value (5.04, β)	0.88		
192					95% Gamma Approximate KM-UCL (use when n>=50)	2.823			95% Gamma Adjusted KM-UCL (use when n<50)	3.747		
193												
194	**Lognormal GOF Test on Detected Observations Only**											
195					Shapiro Wilk Test Statistic	0.703			**Shapiro Wilk GOF Test**			
196					5% Shapiro Wilk Critical Value	0.829			Detected Data Not Lognormal at 5% Significance Level			
197					Lilliefors Test Statistic	0.332			**Lilliefors GOF Test**			
198					5% Lilliefors Critical Value	0.274			Detected Data Not Lognormal at 5% Significance Level			
199	**Detected Data Not Lognormal at 5% Significance Level**											
200												
201	**Lognormal ROS Statistics Using Imputed Non-Detects**											
202					Mean in Original Scale	0.653			Mean in Log Scale	-2.623		
203					SD in Original Scale	1.344			SD in Log Scale	2.23		
204					95% t UCL (assumes normality of ROS data)	1.432			95% Percentile Bootstrap UCL	1.422		
205					95% BCA Bootstrap UCL	1.587			95% Bootstrap t UCL	34.4		
206					95% H-UCL (Log ROS)	72.89						
207												
208	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											

209				KM Mean (logged)	-2.357					KM Geo Mean	0.0947
210				KM SD (logged)	1.768					95% Critical H Value (KM-Log)	4.838
211				KM Standard Error of Mean (logged)	0.593					95% H-UCL (KM -Log)	7.826
212				KM SD (logged)	1.768					95% Critical H Value (KM-Log)	4.838
213				KM Standard Error of Mean (logged)	0.593						
214											
215	**DL/2 Statistics**										
216	**DL/2 Normal**						**DL/2 Log-Transformed**				
217				Mean in Original Scale	0.654					Mean in Log Scale	-2.426
218				SD in Original Scale	1.343					SD in Log Scale	1.93
219				95% t UCL (Assumes normality)	1.433					95% H-Stat UCL	16.46
220	**DL/2 is not a recommended method, provided for comparisons and historical reasons**										
221											
222	**Nonparametric Distribution Free UCL Statistics**										
223	**Data do not follow a Discernible Distribution at 5% Significance Level**										
224											
225	**Suggested UCL to Use**										
226				975% KM (Chebyshev) UCL	3.323						
227											
228	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
229	Recommendations are based upon data size, data distribution, and skewness.										
230	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
231	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
232											
233	**Benzo(a)pyrene**										
234											
235	**General Statistics**										
236				Total Number of Observations	10					Number of Distinct Observations	10
237				Number of Detects	9					Number of Non-Detects	1
238				Number of Distinct Detects	9					Number of Distinct Non-Detects	1
239				Minimum Detect	0.024					Minimum Non-Detect	0.009
240				Maximum Detect	3.3					Maximum Non-Detect	0.009
241				Variance Detects	1.539					Percent Non-Detects	10%
242				Mean Detects	0.657					SD Detects	1.241
243				Median Detects	0.042					CV Detects	1.888
244				Skewness Detects	1.791					Kurtosis Detects	1.882
245				Mean of Logged Detects	-2.27					SD of Logged Detects	1.907
246											
247	**Normal GOF Test on Detects Only**										
248				Shapiro Wilk Test Statistic	0.583		**Shapiro Wilk GOF Test**				
249				5% Shapiro Wilk Critical Value	0.829		Detected Data Not Normal at 5% Significance Level				
250				Lilliefors Test Statistic	0.451		**Lilliefors GOF Test**				
251				5% Lilliefors Critical Value	0.274		Detected Data Not Normal at 5% Significance Level				
252	**Detected Data Not Normal at 5% Significance Level**										
253											
254	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
255				KM Mean	0.592					KM Standard Error of Mean	0.378
256				KM SD	1.126					95% KM (BCA) UCL	1.269
257				95% KM (t) UCL	1.285					95% KM (Percentile Bootstrap) UCL	1.243
258				95% KM (z) UCL	1.214					95% KM Bootstrap t UCL	27.31
259				90% KM Chebyshev UCL	1.726					95% KM Chebyshev UCL	2.239
260				97.5% KM Chebyshev UCL	2.952					99% KM Chebyshev UCL	4.352

	A	B	C	D	E	F	G	H	I	J	K	L
261												
262	**Gamma GOF Tests on Detected Observations Only**											
263					A-D Test Statistic	1.608	**Anderson-Darling GOF Test**					
264					5% A-D Critical Value	0.796	Detected Data Not Gamma Distributed at 5% Significance Level					
265					K-S Test Statistic	0.39	**Kolmogorov-Smirnov GOF**					
266					5% K-S Critical Value	0.299	Detected Data Not Gamma Distributed at 5% Significance Level					
267	**Detected Data Not Gamma Distributed at 5% Significance Level**											
268												
269	**Gamma Statistics on Detected Data Only**											
270					k hat (MLE)	0.361	k star (bias corrected MLE)				0.315	
271					Theta hat (MLE)	1.818	Theta star (bias corrected MLE)				2.086	
272					nu hat (MLE)	6.507	nu star (bias corrected)				5.671	
273					Mean (detects)	0.657						
274												
275	**Gamma ROS Statistics using Imputed Non-Detects**											
276	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
277	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
278	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
279	This is especially true when the sample size is small.											
280	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
281					Minimum	0.01	Mean				0.592	
282					Maximum	3.3	Median				0.04	
283					SD	1.187	CV				2.004	
284					k hat (MLE)	0.341	k star (bias corrected MLE)				0.305	
285					Theta hat (MLE)	1.737	Theta star (bias corrected MLE)				1.94	
286					nu hat (MLE)	6.82	nu star (bias corrected)				6.107	
287					Adjusted Level of Significance (β)	0.0267						
288					Approximate Chi Square Value (6.11, α)	1.695	Adjusted Chi Square Value (6.11, β)				1.324	
289					95% Gamma Approximate UCL (use when n>=50)	2.135	95% Gamma Adjusted UCL (use when n<50)				2.733	
290												
291	**Estimates of Gamma Parameters using KM Estimates**											
292					Mean (KM)	0.592	SD (KM)				1.126	
293					Variance (KM)	1.269	SE of Mean (KM)				0.378	
294					k hat (KM)	0.276	k star (KM)				0.26	
295					nu hat (KM)	5.529	nu star (KM)				5.204	
296					theta hat (KM)	2.142	theta star (KM)				2.276	
297					80% gamma percentile (KM)	0.872	90% gamma percentile (KM)				1.772	
298					95% gamma percentile (KM)	2.833	99% gamma percentile (KM)				5.64	
299												
300	**Gamma Kaplan-Meier (KM) Statistics**											
301					Approximate Chi Square Value (5.20, α)	1.247	Adjusted Chi Square Value (5.20, β)				0.946	
302					95% Gamma Approximate KM-UCL (use when n>=50)	2.471	95% Gamma Adjusted KM-UCL (use when n<50)				3.259	
303												
304	**Lognormal GOF Test on Detected Observations Only**											
305					Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk GOF Test**					
306					5% Shapiro Wilk Critical Value	0.829	Detected Data Not Lognormal at 5% Significance Level					
307					Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**					
308					5% Lilliefors Critical Value	0.274	Detected Data Not Lognormal at 5% Significance Level					
309	**Detected Data Not Lognormal at 5% Significance Level**											
310												
311	**Lognormal ROS Statistics Using Imputed Non-Detects**											
312					Mean in Original Scale	0.592	Mean in Log Scale				-2.687	

313				SD in Original Scale		1.188					SD in Log Scale	2.229
314				95% t UCL (assumes normality of ROS data)		1.28					95% Percentile Bootstrap UCL	1.248
315				95% BCA Bootstrap UCL		1.469					95% Bootstrap t UCL	26.53
316				95% H-UCL (Log ROS)		67.94						
317												
318				**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**								
319				KM Mean (logged)		-2.514					KM Geo Mean	0.0809
320				KM SD (logged)		1.856					95% Critical H Value (KM-Log)	5.048
321				KM Standard Error of Mean (logged)		0.622					95% H-UCL (KM -Log)	10.28
322				KM SD (logged)		1.856					95% Critical H Value (KM-Log)	5.048
323				KM Standard Error of Mean (logged)		0.622						
324												
325				**DL/2 Statistics**								
326				**DL/2 Normal**							**DL/2 Log-Transformed**	
327				Mean in Original Scale		0.592					Mean in Log Scale	-2.584
328				SD in Original Scale		1.188					SD in Log Scale	2.052
329				95% t UCL (Assumes normality)		1.28					95% H-Stat UCL	27.15
330				**DL/2 is not a recommended method, provided for comparisons and historical reasons**								
331												
332				**Nonparametric Distribution Free UCL Statistics**								
333				**Data do not follow a Discernible Distribution at 5% Significance Level**								
334												
335				**Suggested UCL to Use**								
336				975% KM (Chebyshev) UCL		2.952						
337												
338				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
339				Recommendations are based upon data size, data distribution, and skewness.								
340				These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).								
341				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
342												
343	**Benzo[b]fluoranthene**											
344												
345				**General Statistics**								
346				Total Number of Observations		10					Number of Distinct Observations	10
347				Number of Detects		9					Number of Non-Detects	1
348				Number of Distinct Detects		9					Number of Distinct Non-Detects	1
349				Minimum Detect		0.032					Minimum Non-Detect	0.0087
350				Maximum Detect		3.9					Maximum Non-Detect	0.0087
351				Variance Detects		2.086					Percent Non-Detects	10%
352				Mean Detects		0.769					SD Detects	1.444
353				Median Detects		0.055					CV Detects	1.879
354				Skewness Detects		1.832					Kurtosis Detects	2.152
355				Mean of Logged Detects		-2.025					SD of Logged Detects	1.856
356												
357				**Normal GOF Test on Detects Only**								
358				Shapiro Wilk Test Statistic		0.587					**Shapiro Wilk GOF Test**	
359				5% Shapiro Wilk Critical Value		0.829					Detected Data Not Normal at 5% Significance Level	
360				Lilliefors Test Statistic		0.446					**Lilliefors GOF Test**	
361				5% Lilliefors Critical Value		0.274					Detected Data Not Normal at 5% Significance Level	
362				**Detected Data Not Normal at 5% Significance Level**								
363												
364				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**								

	A	B	C	D	E	F	G	H	I	J	K	L
365					KM Mean	0.693				KM Standard Error of Mean		0.44
366					KM SD	1.312				95% KM (BCA) UCL		1.58
367					95% KM (t) UCL	1.499				95% KM (Percentile Bootstrap) UCL		1.458
368					95% KM (z) UCL	1.416				95% KM Bootstrap t UCL		26.41
369					90% KM Chebyshev UCL	2.013				95% KM Chebyshev UCL		2.61
370					97.5% KM Chebyshev UCL	3.44				99% KM Chebyshev UCL		5.07
371												
372					**Gamma GOF Tests on Detected Observations Only**							
373					A-D Test Statistic	1.561	**Anderson-Darling GOF Test**					
374					5% A-D Critical Value	0.793	Detected Data Not Gamma Distributed at 5% Significance Level					
375					K-S Test Statistic	0.376	**Kolmogorov-Smirnov GOF**					
376					5% K-S Critical Value	0.299	Detected Data Not Gamma Distributed at 5% Significance Level					
377					**Detected Data Not Gamma Distributed at 5% Significance Level**							
378												
379					**Gamma Statistics on Detected Data Only**							
380					k hat (MLE)	0.377	k star (bias corrected MLE)					0.325
381					Theta hat (MLE)	2.039	Theta star (bias corrected MLE)					2.362
382					nu hat (MLE)	6.788	nu star (bias corrected)					5.858
383					Mean (detects)	0.769						
384												
385					**Gamma ROS Statistics using Imputed Non-Detects**							
386					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
387					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
388					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
389					This is especially true when the sample size is small.							
390					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
391					Minimum	0.01	Mean					0.693
392					Maximum	3.9	Median					0.052
393					SD	1.383	CV					1.995
394					k hat (MLE)	0.351	k star (bias corrected MLE)					0.312
395					Theta hat (MLE)	1.975	Theta star (bias corrected MLE)					2.219
396					nu hat (MLE)	7.017	nu star (bias corrected)					6.245
397					Adjusted Level of Significance (β)	0.0267						
398					Approximate Chi Square Value (6.25, α)	1.766	Adjusted Chi Square Value (6.25, β)					1.385
399					95% Gamma Approximate UCL (use when n>=50)	2.45	95% Gamma Adjusted UCL (use when n<50)					3.124
400												
401					**Estimates of Gamma Parameters using KM Estimates**							
402					Mean (KM)	0.693	SD (KM)					1.312
403					Variance (KM)	1.72	SE of Mean (KM)					0.44
404					k hat (KM)	0.279	k star (KM)					0.262
405					nu hat (KM)	5.578	nu star (KM)					5.238
406					theta hat (KM)	2.484	theta star (KM)					2.645
407					80% gamma percentile (KM)	1.022	90% gamma percentile (KM)					2.072
408					95% gamma percentile (KM)	3.306	99% gamma percentile (KM)					6.572
409												
410					**Gamma Kaplan-Meier (KM) Statistics**							
411					Approximate Chi Square Value (5.24, α)	1.264	Adjusted Chi Square Value (5.24, β)					0.959
412					95% Gamma Approximate KM-UCL (use when n>=50)	2.871	95% Gamma Adjusted KM-UCL (use when n<50)					3.782
413												
414					**Lognormal GOF Test on Detected Observations Only**							
415					Shapiro Wilk Test Statistic	0.723	**Shapiro Wilk GOF Test**					
416					5% Shapiro Wilk Critical Value	0.829	Detected Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
417					Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**					
418					5% Lilliefors Critical Value	0.274	Detected Data Not Lognormal at 5% Significance Level					
419	**Detected Data Not Lognormal at 5% Significance Level**											
420												
421	**Lognormal ROS Statistics Using Imputed Non-Detects**											
422					Mean in Original Scale	0.692	Mean in Log Scale					-2.433
423					SD in Original Scale	1.383	SD in Log Scale					2.174
424				95% t UCL (assumes normality of ROS data)		1.494	95% Percentile Bootstrap UCL					1.345
425					95% BCA Bootstrap UCL	1.713	95% Bootstrap t UCL					25.73
426					95% H-UCL (Log ROS)	63.33						
427												
428	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
429					KM Mean (logged)	-2.297	KM Geo Mean					0.101
430					KM SD (logged)	1.849	95% Critical H Value (KM-Log)					5.032
431					KM Standard Error of Mean (logged)	0.62	95% H-UCL (KM -Log)					12.37
432					KM SD (logged)	1.849	95% Critical H Value (KM-Log)					5.032
433					KM Standard Error of Mean (logged)	0.62						
434												
435	**DL/2 Statistics**											
436	**DL/2 Normal**						**DL/2 Log-Transformed**					
437					Mean in Original Scale	0.692	Mean in Log Scale					-2.366
438					SD in Original Scale	1.383	SD in Log Scale					2.056
439					95% t UCL (Assumes normality)	1.494	95% H-Stat UCL					34.33
440	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
441												
442	**Nonparametric Distribution Free UCL Statistics**											
443	**Data do not follow a Discernible Distribution at 5% Significance Level**											
444												
445	**Suggested UCL to Use**											
446					975% KM (Chebyshev) UCL	3.44						
447												
448	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
449	Recommendations are based upon data size, data distribution, and skewness.											
450	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
451	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
452												
453	**Dibenz(a,h)anthracene**											
454												
455	**General Statistics**											
456					Total Number of Observations	10	Number of Distinct Observations					4
457					Number of Detects	3	Number of Non-Detects					7
458					Number of Distinct Detects	3	Number of Distinct Non-Detects					1
459					Minimum Detect	0.016	Minimum Non-Detect					0.015
460					Maximum Detect	0.44	Maximum Non-Detect					0.015
461					Variance Detects	0.0462	Percent Non-Detects					70%
462					Mean Detects	0.249	SD Detects					0.215
463					Median Detects	0.29	CV Detects					0.865
464					Skewness Detects	-0.833	Kurtosis Detects					N/A
465					Mean of Logged Detects	-2.065	SD of Logged Detects					1.805
466												
467	**Warning: Data set has only 3 Detected Values.**											
468	**This is not enough to compute meaningful or reliable statistics and estimates.**											

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470												
471	**Normal GOF Test on Detects Only**											
472					Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**					
473					5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level					
474					Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**					
475					5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level					
476	**Detected Data appear Normal at 5% Significance Level**											
477												
478	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
479					KM Mean	0.0851	KM Standard Error of Mean	0.0557				
480					KM SD	0.144	95% KM (BCA) UCL	N/A				
481					95% KM (t) UCL	0.187	95% KM (Percentile Bootstrap) UCL	N/A				
482					95% KM (z) UCL	0.177	95% KM Bootstrap t UCL	N/A				
483					90% KM Chebyshev UCL	0.252	95% KM Chebyshev UCL	0.328				
484					97.5% KM Chebyshev UCL	0.433	99% KM Chebyshev UCL	0.64				
485												
486	**Gamma GOF Tests on Detected Observations Only**											
487	**Not Enough Data to Perform GOF Test**											
488												
489	**Gamma Statistics on Detected Data Only**											
490					k hat (MLE)	0.872	k star (bias corrected MLE)	N/A				
491					Theta hat (MLE)	0.285	Theta star (bias corrected MLE)	N/A				
492					nu hat (MLE)	5.232	nu star (bias corrected)	N/A				
493					Mean (detects)	0.249						
494												
495	**Gamma ROS Statistics using Imputed Non-Detects**											
496	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
497	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
498	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
499	This is especially true when the sample size is small.											
500	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
501					Minimum	0.01	Mean	0.0816				
502					Maximum	0.44	Median	0.01				
503					SD	0.154	CV	1.881				
504					k hat (MLE)	0.478	k star (bias corrected MLE)	0.402				
505					Theta hat (MLE)	0.171	Theta star (bias corrected MLE)	0.203				
506					nu hat (MLE)	9.567	nu star (bias corrected)	8.03				
507					Adjusted Level of Significance (β)	0.0267						
508					Approximate Chi Square Value (8.03, α)	2.752	Adjusted Chi Square Value (8.03, β)	2.245				
509					95% Gamma Approximate UCL (use when n>=50)	0.238	95% Gamma Adjusted UCL (use when n<50)	N/A				
510												
511	**Estimates of Gamma Parameters using KM Estimates**											
512					Mean (KM)	0.0851	SD (KM)	0.144				
513					Variance (KM)	0.0207	SE of Mean (KM)	0.0557				
514					k hat (KM)	0.35	k star (KM)	0.311				
515					nu hat (KM)	6.993	nu star (KM)	6.229				
516					theta hat (KM)	0.243	theta star (KM)	0.273				
517					80% gamma percentile (KM)	0.132	90% gamma percentile (KM)	0.25				
518					95% gamma percentile (KM)	0.385	99% gamma percentile (KM)	0.733				
519												
520	**Gamma Kaplan-Meier (KM) Statistics**											

521	Approximate Chi Square Value (6.23, α)					1.758	Adjusted Chi Square Value (6.23, β)					1.378
522	95% Gamma Approximate KM-UCL (use when n>=50)					0.302	95% Gamma Adjusted KM-UCL (use when n<50)					0.385
523												
524	**Lognormal GOF Test on Detected Observations Only**											
525	Shapiro Wilk Test Statistic					0.843	**Shapiro Wilk GOF Test**					
526	5% Shapiro Wilk Critical Value					0.767	Detected Data appear Lognormal at 5% Significance Level					
527	Lilliefors Test Statistic					0.343	**Lilliefors GOF Test**					
528	5% Lilliefors Critical Value					0.425	Detected Data appear Lognormal at 5% Significance Level					
529	**Detected Data appear Lognormal at 5% Significance Level**											
530												
531	**Lognormal ROS Statistics Using Imputed Non-Detects**											
532	Mean in Original Scale					0.0751	Mean in Log Scale					-6.947
533	SD in Original Scale					0.157	SD in Log Scale					4.087
534	95% t UCL (assumes normality of ROS data)					0.166	95% Percentile Bootstrap UCL					0.162
535	95% BCA Bootstrap UCL					0.19	95% Bootstrap t UCL					2.389
536	95% H-UCL (Log ROS)					7601824						
537												
538	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
539	KM Mean (logged)					-3.559	KM Geo Mean					0.0285
540	KM SD (logged)					1.268	95% Critical H Value (KM-Log)					3.68
541	KM Standard Error of Mean (logged)					0.491	95% H-UCL (KM -Log)					0.302
542	KM SD (logged)					1.268	95% Critical H Value (KM-Log)					3.68
543	KM Standard Error of Mean (logged)					0.491						
544												
545	**DL/2 Statistics**											
546	**DL/2 Normal**						**DL/2 Log-Transformed**					
547	Mean in Original Scale					0.0799	Mean in Log Scale					-4.044
548	SD in Original Scale					0.154	SD in Log Scale					1.609
549	95% t UCL (Assumes normality)					0.169	95% H-Stat UCL					0.701
550	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
551												
552	**Nonparametric Distribution Free UCL Statistics**											
553	**Detected Data appear Normal Distributed at 5% Significance Level**											
554												
555	**Suggested UCL to Use**											
556	95% KM (t) UCL					0.187						
557												
558	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
559	Recommendations are based upon data size, data distribution, and skewness.											
560	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
561	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
562												
563	**Indeno[1,2,3-cd]pyrene**											
564												
565	**General Statistics**											
566	Total Number of Observations					10	Number of Distinct Observations					9
567	Number of Detects					9	Number of Non-Detects					1
568	Number of Distinct Detects					8	Number of Distinct Non-Detects					1
569	Minimum Detect					0.017	Minimum Non-Detect					0.013
570	Maximum Detect					1.9	Maximum Non-Detect					0.013
571	Variance Detects					0.525	Percent Non-Detects					10%
572	Mean Detects					0.391	SD Detects					0.725

	A	B	C	D	E	F	G	H	I	J	K	L
573					Median Detects	0.03					CV Detects	1.854
574					Skewness Detects	1.745					Kurtosis Detects	1.581
575					Mean of Logged Detects	-2.682					SD of Logged Detects	1.85
576												
577					**Normal GOF Test on Detects Only**							
578					Shapiro Wilk Test Statistic	0.585	**Shapiro Wilk GOF Test**					
579					5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level					
580					Lilliefors Test Statistic	0.447	**Lilliefors GOF Test**					
581					5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level					
582					**Detected Data Not Normal at 5% Significance Level**							
583												
584					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
585					KM Mean	0.353	KM Standard Error of Mean					0.221
586					KM SD	0.658	95% KM (BCA) UCL					0.723
587					95% KM (t) UCL	0.758	95% KM (Percentile Bootstrap) UCL					0.722
588					95% KM (z) UCL	0.716	95% KM Bootstrap t UCL					13.37
589					90% KM Chebyshev UCL	1.015	95% KM Chebyshev UCL					1.315
590					97.5% KM Chebyshev UCL	1.732	99% KM Chebyshev UCL					2.55
591												
592					**Gamma GOF Tests on Detected Observations Only**							
593					A-D Test Statistic	1.561	**Anderson-Darling GOF Test**					
594					5% A-D Critical Value	0.793	Detected Data Not Gamma Distributed at 5% Significance Level					
595					K-S Test Statistic	0.372	**Kolmogorov-Smirnov GOF**					
596					5% K-S Critical Value	0.298	Detected Data Not Gamma Distributed at 5% Significance Level					
597					**Detected Data Not Gamma Distributed at 5% Significance Level**							
598												
599					**Gamma Statistics on Detected Data Only**							
600					k hat (MLE)	0.381	k star (bias corrected MLE)					0.328
601					Theta hat (MLE)	1.027	Theta star (bias corrected MLE)					1.193
602					nu hat (MLE)	6.852	nu star (bias corrected)					5.901
603					Mean (detects)	0.391						
604												
605					**Gamma ROS Statistics using Imputed Non-Detects**							
606					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
607					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
608					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
609					This is especially true when the sample size is small.							
610					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
611					Minimum	0.01	Mean					0.353
612					Maximum	1.9	Median					0.028
613					SD	0.694	CV					1.966
614					k hat (MLE)	0.365	k star (bias corrected MLE)					0.322
615					Theta hat (MLE)	0.968	Theta star (bias corrected MLE)					1.096
616					nu hat (MLE)	7.291	nu star (bias corrected)					6.437
617					Adjusted Level of Significance (β)	0.0267						
618					Approximate Chi Square Value (6.44, α)	1.867	Adjusted Chi Square Value (6.44, β)					1.472
619					95% Gamma Approximate UCL (use when n>=50)	1.217	95% Gamma Adjusted UCL (use when n<50)					1.544
620												
621					**Estimates of Gamma Parameters using KM Estimates**							
622					Mean (KM)	0.353	SD (KM)					0.658
623					Variance (KM)	0.433	SE of Mean (KM)					0.221
624					k hat (KM)	0.288	k star (KM)					0.268

625					nu hat (KM)	5.76					nu star (KM)	5.365
626					theta hat (KM)	1.226					theta star (KM)	1.317
627					80% gamma percentile (KM)	0.525					90% gamma percentile (KM)	1.054
628					95% gamma percentile (KM)	1.674					99% gamma percentile (KM)	3.307
629												
630					**Gamma Kaplan-Meier (KM) Statistics**							
631					Approximate Chi Square Value (5.37, α)	1.325					Adjusted Chi Square Value (5.37, β)	1.01
632					95% Gamma Approximate KM-UCL (use when n>=50)	1.431					95% Gamma Adjusted KM-UCL (use when n<50)	1.876
633												
634					**Lognormal GOF Test on Detected Observations Only**							
635					Shapiro Wilk Test Statistic	0.722					**Shapiro Wilk GOF Test**	
636					5% Shapiro Wilk Critical Value	0.829					Detected Data Not Lognormal at 5% Significance Level	
637					Lilliefors Test Statistic	0.332					**Lilliefors GOF Test**	
638					5% Lilliefors Critical Value	0.274					Detected Data Not Lognormal at 5% Significance Level	
639					**Detected Data Not Lognormal at 5% Significance Level**							
640												
641					**Lognormal ROS Statistics Using Imputed Non-Detects**							
642					Mean in Original Scale	0.352					Mean in Log Scale	-3.089
643					SD in Original Scale	0.694					SD in Log Scale	2.169
644					95% t UCL (assumes normality of ROS data)	0.755					95% Percentile Bootstrap UCL	0.726
645					95% BCA Bootstrap UCL	0.818					95% Bootstrap t UCL	12.4
646					95% H-UCL (Log ROS)	31.84						
647												
648					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
649					KM Mean (logged)	-2.848					KM Geo Mean	0.058
650					KM SD (logged)	1.728					95% Critical H Value (KM-Log)	4.743
651					KM Standard Error of Mean (logged)	0.58					95% H-UCL (KM -Log)	3.967
652					KM SD (logged)	1.728					95% Critical H Value (KM-Log)	4.743
653					KM Standard Error of Mean (logged)	0.58						
654												
655					**DL/2 Statistics**							
656					**DL/2 Normal**						**DL/2 Log-Transformed**	
657					Mean in Original Scale	0.353					Mean in Log Scale	-2.917
658					SD in Original Scale	0.694					SD in Log Scale	1.897
659					95% t UCL (Assumes normality)	0.755					95% H-Stat UCL	8.454
660					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
661												
662					**Nonparametric Distribution Free UCL Statistics**							
663					**Data do not follow a Discernible Distribution at 5% Significance Level**							
664												
665					**Suggested UCL to Use**							
666					975% KM (Chebyshev) UCL	1.732						
667												
668					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
669					Recommendations are based upon data size, data distribution, and skewness.							
670					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
671					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
672												
673												
674	**Aluminium**											
675												
676					**General Statistics**							

677			Total Number of Observations		10					Number of Distinct Observations		10
678										Number of Missing Observations		0
679			Minimum		14274					Mean		30317
680			Maximum		59400					Median		29050
681			SD		11326					Std. Error of Mean		3581
682			Coefficient of Variation		0.374					Skewness		1.937
683												
684			**Normal GOF Test**									
685			Shapiro Wilk Test Statistic		0.729		**Shapiro Wilk GOF Test**					
686			5% Shapiro Wilk Critical Value		0.842		Data Not Normal at 5% Significance Level					
687			Lilliefors Test Statistic		0.376		**Lilliefors GOF Test**					
688			5% Lilliefors Critical Value		0.262		Data Not Normal at 5% Significance Level					
689			**Data Not Normal at 5% Significance Level**									
690												
691			**Assuming Normal Distribution**									
692			**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**					
693			95% Student's-t UCL		36883		95% Adjusted-CLT UCL (Chen-1995)					38553
694							95% Modified-t UCL (Johnson-1978)					37248
695												
696			**Gamma GOF Test**									
697			A-D Test Statistic		1.067		**Anderson-Darling Gamma GOF Test**					
698			5% A-D Critical Value		0.726		Data Not Gamma Distributed at 5% Significance Level					
699			K-S Test Statistic		0.33		**Kolmogorov-Smirnov Gamma GOF Test**					
700			5% K-S Critical Value		0.267		Data Not Gamma Distributed at 5% Significance Level					
701			**Data Not Gamma Distributed at 5% Significance Level**									
702												
703			**Gamma Statistics**									
704			k hat (MLE)		9.398		k star (bias corrected MLE)					6.645
705			Theta hat (MLE)		3226		Theta star (bias corrected MLE)					4562
706			nu hat (MLE)		188		nu star (bias corrected)					132.9
707			MLE Mean (bias corrected)		30317		MLE Sd (bias corrected)					11761
708							Approximate Chi Square Value (0.05)					107.3
709			Adjusted Level of Significance		0.0267		Adjusted Chi Square Value					103.3
710												
711			**Assuming Gamma Distribution**									
712			95% Approximate Gamma UCL (use when n>=50))		37562		95% Adjusted Gamma UCL (use when n<50)					39016
713												
714			**Lognormal GOF Test**									
715			Shapiro Wilk Test Statistic		0.817		**Shapiro Wilk Lognormal GOF Test**					
716			5% Shapiro Wilk Critical Value		0.842		Data Not Lognormal at 5% Significance Level					
717			Lilliefors Test Statistic		0.312		**Lilliefors Lognormal GOF Test**					
718			5% Lilliefors Critical Value		0.262		Data Not Lognormal at 5% Significance Level					
719			**Data Not Lognormal at 5% Significance Level**									
720												
721			**Lognormal Statistics**									
722			Minimum of Logged Data		9.566		Mean of logged Data					10.27
723			Maximum of Logged Data		10.99		SD of logged Data					0.342
724												
725			**Assuming Lognormal Distribution**									
726			95% H-UCL		38358		90% Chebyshev (MVUE) UCL					40186
727			95% Chebyshev (MVUE) UCL		44678		97.5% Chebyshev (MVUE) UCL					50914
728			99% Chebyshev (MVUE) UCL		63163							

729												
730	**Nonparametric Distribution Free UCL Statistics**											
731	**Data do not follow a Discernible Distribution (0.05)**											
732												
733	**Nonparametric Distribution Free UCLs**											
734					95% CLT UCL	36208			95% Jackknife UCL	36883		
735					95% Standard Bootstrap UCL	35788			95% Bootstrap-t UCL	41031		
736					95% Hall's Bootstrap UCL	68077			95% Percentile Bootstrap UCL	36367		
737					95% BCA Bootstrap UCL	38220						
738					90% Chebyshev(Mean, Sd) UCL	41062			95% Chebyshev(Mean, Sd) UCL	45929		
739					97.5% Chebyshev(Mean, Sd) UCL	52684			99% Chebyshev(Mean, Sd) UCL	65952		
740												
741	**Suggested UCL to Use**											
742					95% Student's-t UCL	36883			or 95% Modified-t UCL	37248		
743												
744	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
745	Recommendations are based upon data size, data distribution, and skewness.											
746	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
747	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
748												
749												
750	**Cobalt**											
751												
752	**General Statistics**											
753					Total Number of Observations	10			Number of Distinct Observations	10		
754									Number of Missing Observations	0		
755					Minimum	11.41			Mean	26.29		
756					Maximum	39			Median	26		
757					SD	7.207			Std. Error of Mean	2.279		
758					Coefficient of Variation	0.274			Skewness	-0.4		
759												
760	**Normal GOF Test**											
761					Shapiro Wilk Test Statistic	0.942			**Shapiro Wilk GOF Test**			
762					5% Shapiro Wilk Critical Value	0.842			Data appear Normal at 5% Significance Level			
763					Lilliefors Test Statistic	0.214			**Lilliefors GOF Test**			
764					5% Lilliefors Critical Value	0.262			Data appear Normal at 5% Significance Level			
765	**Data appear Normal at 5% Significance Level**											
766												
767	**Assuming Normal Distribution**											
768	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
769					95% Student's-t UCL	30.47			95% Adjusted-CLT UCL (Chen-1995)	29.73		
770									95% Modified-t UCL (Johnson-1978)	30.42		
771												
772	**Gamma GOF Test**											
773					A-D Test Statistic	0.527			**Anderson-Darling Gamma GOF Test**			
774					5% A-D Critical Value	0.725			Detected data appear Gamma Distributed at 5% Significance Level			
775					K-S Test Statistic	0.249			**Kolmogorov-Smirnov Gamma GOF Test**			
776					5% K-S Critical Value	0.267			Detected data appear Gamma Distributed at 5% Significance Level			
777	**Detected data appear Gamma Distributed at 5% Significance Level**											
778												
779	**Gamma Statistics**											
780					k hat (MLE)	12.17			k star (bias corrected MLE)	8.583		

781					Theta hat (MLE)	2.161					Theta star (bias corrected MLE)	3.063
782					nu hat (MLE)	243.3					nu star (bias corrected)	171.7
783					MLE Mean (bias corrected)	26.29					MLE Sd (bias corrected)	8.974
784											Approximate Chi Square Value (0.05)	142.4
785					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	137.7
786												
787					**Assuming Gamma Distribution**							
788				95% Approximate Gamma UCL (use when n>=50))		31.7					95% Adjusted Gamma UCL (use when n<50)	32.77
789												
790					**Lognormal GOF Test**							
791					Shapiro Wilk Test Statistic	0.847					**Shapiro Wilk Lognormal GOF Test**	
792					5% Shapiro Wilk Critical Value	0.842					Data appear Lognormal at 5% Significance Level	
793					Lilliefors Test Statistic	0.278					**Lilliefors Lognormal GOF Test**	
794					5% Lilliefors Critical Value	0.262					Data Not Lognormal at 5% Significance Level	
795					**Data appear Approximate Lognormal at 5% Significance Level**							
796												
797					**Lognormal Statistics**							
798					Minimum of Logged Data	2.434					Mean of logged Data	3.228
799					Maximum of Logged Data	3.664					SD of logged Data	0.325
800												
801					**Assuming Lognormal Distribution**							
802					95% H-UCL	33.03					90% Chebyshev (MVUE) UCL	34.66
803					95% Chebyshev (MVUE) UCL	38.38					97.5% Chebyshev (MVUE) UCL	43.55
804					99% Chebyshev (MVUE) UCL	53.7						
805												
806					**Nonparametric Distribution Free UCL Statistics**							
807					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
808												
809					**Nonparametric Distribution Free UCLs**							
810					95% CLT UCL	30.04					95% Jackknife UCL	30.47
811					95% Standard Bootstrap UCL	29.84					95% Bootstrap-t UCL	30.3
812					95% Hall's Bootstrap UCL	30.44					95% Percentile Bootstrap UCL	29.78
813					95% BCA Bootstrap UCL	29.37						
814					90% Chebyshev(Mean, Sd) UCL	33.13					95% Chebyshev(Mean, Sd) UCL	36.22
815					97.5% Chebyshev(Mean, Sd) UCL	40.52					99% Chebyshev(Mean, Sd) UCL	48.97
816												
817					**Suggested UCL to Use**							
818					95% Student's-t UCL	30.47						
819												
820					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
821					Recommendations are based upon data size, data distribution, and skewness.							
822					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
823					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
824												
825					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
826					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
827												
828												
829	**Vanadium**											
830												
831					**General Statistics**							
832					Total Number of Observations	10					Number of Distinct Observations	10

833											Number of Missing Observations	0
834					Minimum	40.75					Mean	105.8
835					Maximum	286					Median	87.1
836					SD	65.96					Std. Error of Mean	20.86
837					Coefficient of Variation	0.623					Skewness	2.675
838												
839	**Normal GOF Test**											
840					Shapiro Wilk Test Statistic	0.618	**Shapiro Wilk GOF Test**					
841					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
842					Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**					
843					5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level					
844	**Data Not Normal at 5% Significance Level**											
845												
846	**Assuming Normal Distribution**											
847	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
848					95% Student's-t UCL	144					95% Adjusted-CLT UCL (Chen-1995)	159
849											95% Modified-t UCL (Johnson-1978)	147
850												
851	**Gamma GOF Test**											
852					A-D Test Statistic	1.266	**Anderson-Darling Gamma GOF Test**					
853					5% A-D Critical Value	0.729	Data Not Gamma Distributed at 5% Significance Level					
854					K-S Test Statistic	0.308	**Kolmogorov-Smirnov Gamma GOF Test**					
855					5% K-S Critical Value	0.268	Data Not Gamma Distributed at 5% Significance Level					
856	**Data Not Gamma Distributed at 5% Significance Level**											
857												
858	**Gamma Statistics**											
859					k hat (MLE)	4.42	k star (bias corrected MLE)	3.16				
860					Theta hat (MLE)	23.94	Theta star (bias corrected MLE)	33.47				
861					nu hat (MLE)	88.39	nu star (bias corrected)	63.21				
862					MLE Mean (bias corrected)	105.8	MLE Sd (bias corrected)	59.51				
863							Approximate Chi Square Value (0.05)	45.92				
864					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	43.37				
865												
866	**Assuming Gamma Distribution**											
867					95% Approximate Gamma UCL (use when n>=50))	145.6	95% Adjusted Gamma UCL (use when n<50)	154.2				
868												
869	**Lognormal GOF Test**											
870					Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk Lognormal GOF Test**					
871					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
872					Lilliefors Test Statistic	0.289	**Lilliefors Lognormal GOF Test**					
873					5% Lilliefors Critical Value	0.262	Data Not Lognormal at 5% Significance Level					
874	**Data Not Lognormal at 5% Significance Level**											
875												
876	**Lognormal Statistics**											
877					Minimum of Logged Data	3.707	Mean of logged Data	4.544				
878					Maximum of Logged Data	5.656	SD of logged Data	0.475				
879												
880	**Assuming Lognormal Distribution**											
881					95% H-UCL	148.9	90% Chebyshev (MVUE) UCL	151.7				
882					95% Chebyshev (MVUE) UCL	173.3	97.5% Chebyshev (MVUE) UCL	203.2				
883					99% Chebyshev (MVUE) UCL	262.1						
884												

	A	B	C	D	E	F	G	H	I	J	K	L
885	**Nonparametric Distribution Free UCL Statistics**											
886	**Data do not follow a Discernible Distribution (0.05)**											
887												
888	**Nonparametric Distribution Free UCLs**											
889					95% CLT UCL	140.1			95% Jackknife UCL	144		
890					95% Standard Bootstrap UCL	137.7			95% Bootstrap-t UCL	209.4		
891					95% Hall's Bootstrap UCL	313.9			95% Percentile Bootstrap UCL	141.5		
892					95% BCA Bootstrap UCL	167.6						
893					90% Chebyshev(Mean, Sd) UCL	168.4			95% Chebyshev(Mean, Sd) UCL	196.7		
894					97.5% Chebyshev(Mean, Sd) UCL	236.1			99% Chebyshev(Mean, Sd) UCL	313.3		
895												
896	**Suggested UCL to Use**											
897					95% Student's-t UCL	144			or 95% Modified-t UCL	147		
898												
899	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
900	Recommendations are based upon data size, data distribution, and skewness.											
901	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
902	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
903												

ATTACHMENT D

DERAC OUTPUTS

Site-specific Risk
Resident Soil Inputs

Variable	Resident Soil Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ^{3}	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
p_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{0-2} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{2-6} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{6-16} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{16-26} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{res-a} (skin adherence factor - adult) mg/cm ^{2}	0.07	0.07

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Site-specific Risk
Resident Soil Inputs

Variable	Resident Soil Default Value	Site-Specific Value
AF_{res-c} (skin adherence factor - child) mg/cm ^{2}	0.2	0.2
AT_{res} (averaging time - resident carcinogenic)	365	365
BW_{0-2} (mutagenic body weight) kg	15	15
BW_{2-6} (mutagenic body weight) kg	15	15
BW_{6-16} (mutagenic body weight) kg	80	80
BW_{16-26} (mutagenic body weight) kg	80	80
BW_{res-a} (body weight - adult) kg	80	80
BW_{res-c} (body weight - child) kg	15	15
$DFS_{res-adj}$ (age-adjusted soil dermal factor) mg/kg	103390	103390
$DFSM_{res-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	428260	428260
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration) years	2	2
ED_{2-6} (mutagenic exposure duration) years	4	4
ED_{6-16} (mutagenic exposure duration) years	10	10
ED_{16-26} (mutagenic exposure duration) years	10	10
ED_{res-a} (exposure duration - adult) years	20	20
ED_{res-c} (exposure duration - child) years	6	6
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency) days/year	350	350
EF_{2-6} (mutagenic exposure frequency) days/year	350	350
EF_{6-16} (mutagenic exposure frequency) days/year	350	350
EF_{16-26} (mutagenic exposure frequency) days/year	350	350
EF_{res-a} (exposure frequency - adult) days/year	350	350
EF_{res-c} (exposure frequency - child) days/year	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time) hours/day	24	24
ET_{2-6} (mutagenic exposure time) hours/day	24	24
ET_{6-16} (mutagenic exposure time) hours/day	24	24
ET_{16-26} (mutagenic exposure time) hours/day	24	24

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Site-specific Risk
Resident Soil Inputs

Variable	Resident Soil Default Value	Site-Specific Value
ET_{res-a} (adult exposure time) hours/day	24	24
ET_{res-c} (child exposure time) hours/day	24	24
$IFS_{res-adj}$ (age-adjusted soil ingestion factor) mg/kg	36750	36750
$IFSM_{res-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	166833.3	166833.3
IRS_{0-2} (mutagenic soil intake rate) mg/day	200	200
IRS_{2-6} (mutagenic soil intake rate) mg/day	200	200
IRS_{6-16} (mutagenic soil intake rate) mg/day	100	100
IRS_{16-26} (mutagenic soil intake rate) mg/day	100	100
IRS_{res-a} (soil intake rate - adult) mg/day	100	100
IRS_{res-c} (soil intake rate - child) mg/day	200	200
LT (lifetime) years	70	70
SA_{0-2} (mutagenic skin surface area) cm^2/day	2373	2373
SA_{2-6} (mutagenic skin surface area) cm^2/day	2373	2373
SA_{6-16} (mutagenic skin surface area) cm^2/day	6032	6032
SA_{16-26} (mutagenic skin surface area) cm^2/day	6032	6032
SA_{res-a} (skin surface area - adult) cm^2/day	6032	6032
SA_{res-c} (skin surface area - child) cm^2/day	2373	2373
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-specific Risk
Resident for Soil

Chemical	CAS Number	Mutagen?	VOC?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	ABS_{gi}	ABS_{derm}
Benz[a]anthracene	56-55-3	Yes	Yes	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Benzo[a]pyrene	50-32-8	Yes	No	3.00E-04	IRIS	2.00E-06	IRIS	1.00E+00	IRIS	6.00E-04	IRIS	1	0.13
Benzo[b]fluoranthene	205-99-2	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Dibenz[a,h]anthracene	53-70-3	Yes	No	-		-		1.00E+00	EPA/RPF	6.00E-04	EPA/RPF	1	0.13
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Thallium (Soluble Salts)	7440-28-0	No	No	1.00E-05	SCREEN Current	-		-		-		1	-
Vanadium and Compounds	7440-62-2	No	No	5.04E-03	SURROGATE. See Vanadium Pentoxide. MW contribution adjustment.	1.00E-04	ATSDR Final	-		-		0.026	-
*Total Risk/HI				-		-		-		-		-	-

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Site-specific Risk
Resident for Soil

Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	DA	Particulate Emission Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	RBA	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	Normal Boiling Point BP (K)	BP Ref
4.41E+06	-	4.41E+06	6.83E-10	1.36E+09	-	1	1.20E-05	4.91E-04	PHYSPROP	4.91E-04	7.11E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	4.57E-07	1.87E-05	PHYSPROP	1.87E-05	7.68E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	6.57E-07	2.69E-05	PHYSPROP	2.69E-05	7.16E+02	EPI
-	-	-	-	1.36E+09	-	1	1.41E-07	5.76E-06	EPI	5.76E-06	7.97E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	3.48E-07	1.42E-05	PHYSPROP	1.42E-05	8.09E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	1.73E+03	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	3.68E+03	CRC
-	-	-	-	-	-	-	-	-		-	-	

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Site-specific Risk
Resident for Soil

Critical Temperature T_c \ (K)	T_c \ Ref	D_{ia} \ (cm^2/s)	D_{iw} \ (cm^2/s)	Soil Concentration (mg/kg)	Child Ingestion Noncarcinogenic CDI (mg/kg-day)	Child Dermal Noncarcinogenic CDI (mg/kg-day)	Child Inhalation Noncarcinogenic CDI (mg/m^3)	Adult Ingestion Noncarcinogenic CDI (mg/kg-day)	Adult Dermal Noncarcinogenic CDI (mg/kg-day)
9.79E+02	YAWS	2.61E-02	6.75E-06	3.323	4.25E-05	1.31E-05	7.25E-07	3.98E-06	2.19E-06
9.69E+02	EPA 2001 Fact Sheet	2.55E-02	6.58E-06	2.952	3.77E-05	1.16E-05	2.08E-09	3.54E-06	1.94E-06
9.69E+02	EPA 2001 Fact Sheet	2.50E-02	6.43E-06	3.44	4.40E-05	1.36E-05	2.43E-09	4.12E-06	2.26E-06
9.90E+02	EPA 2001 Fact Sheet	2.36E-02	6.02E-06	0.187	2.39E-06	7.38E-07	1.32E-10	2.24E-07	1.23E-07
1.08E+03	EPA 2001 Fact Sheet	2.47E-02	6.37E-06	1.732	2.21E-05	6.83E-06	1.22E-09	2.08E-06	1.14E-06
4.65E+03	YAWS	-	-	0.113	1.44E-06	-	7.97E-11	1.35E-07	-
1.13E+04	YAWS	-	-	144	1.84E-03	-	1.02E-07	1.73E-04	-
-		-	-	-	-	-	-	-	-

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Site-specific Risk
Resident for Soil

Adult Inhalation Noncarcinogenic CDI (mg/m^3)	Adjusted Ingestion Noncarcinogenic CDI (mg/kg-day)	Adjusted Dermal Noncarcinogenic CDI (mg/kg-day)	Adjusted Inhalation Noncarcinogenic CDI (mg/m^3)	Ingestion Carcinogenic CDI (mg/kg-day)	Dermal Carcinogenic CDI (mg/kg-day)	Inhalation Carcinogenic CDI (ug/m^3)	Child Ingestion HQ	Child Dermal HQ	Child Inhalation HQ	Child Total HI
7.25E-07	1.29E-05	4.71E-06	7.25E-07	2.17E-05	7.24E-06	7.45E-04	-	-	-	-
2.08E-09	1.14E-05	4.18E-06	2.08E-09	1.93E-05	6.43E-06	2.14E-06	**1.26E-01**	3.88E-02	1.04E-03	**1.66E-01**
2.43E-09	1.33E-05	4.87E-06	2.43E-09	2.25E-05	7.50E-06	2.50E-06	-	-	-	-
1.32E-10	7.24E-07	2.65E-07	1.32E-10	1.22E-06	4.07E-07	1.36E-07	-	-	-	-
1.22E-09	6.71E-06	2.45E-06	1.22E-09	1.13E-05	3.77E-06	1.26E-06	-	-	-	-
7.97E-11	4.38E-07	-	7.97E-11	1.63E-07	-	2.96E-08	**1.44E-01**	-	-	**1.44E-01**
1.02E-07	5.58E-04	-	1.02E-07	2.07E-04	-	3.77E-05	**3.65E-01**	-	1.02E-03	**3.66E-01**
-	-	-	-	-	-	-	***6.36E-01***	*3.88E-02*	*2.06E-03*	***6.76E-01***

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Site-specific Risk
Resident for Soil

Adult Ingestion HQ	Adult Dermal HQ	Adult Inhalation HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Inhalation HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk
-	-	-	-	-	-	-	-	2.17E-06	7.24E-07	4.47E-08	2.94E-06
1.18E-02	6.47E-03	1.04E-03	1.93E-02	3.81E-02	1.39E-02	1.04E-03	5.31E-02	1.93E-05	6.43E-06	1.29E-09	2.57E-05
-	-	-	-	-	-	-	-	2.25E-06	7.50E-07	1.50E-10	3.00E-06
-	-	-	-	-	-	-	-	1.22E-06	4.07E-07	8.14E-11	1.63E-06
-	-	-	-	-	-	-	-	1.13E-06	3.77E-07	7.54E-11	1.51E-06
1.35E-02	-	-	1.35E-02	4.38E-02	-	-	4.38E-02	-	-	-	-
3.42E-02	-	1.02E-03	3.53E-02	1.11E-01	-	1.02E-03	1.12E-01	-	-	-	-
5.96E-02	*6.47E-03*	*2.06E-03*	*6.81E-02*	*1.93E-01*	*1.39E-02*	*2.06E-03*	*2.09E-01*	*2.60E-05*	*8.69E-06*	*4.63E-08*	*3.48E-05*

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Site-specific Risk
Resident Soil Inputs

Variable	Resident Soil Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ^{3}	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
p_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{0-2} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{2-6} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{6-16} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{16-26} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{res-a} (skin adherence factor - adult) mg/cm ^{2}	0.07	0.07

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Site-specific Risk
Resident Soil Inputs

Variable	Resident Soil Default Value	Site-Specific Value
AF_{res-c} (skin adherence factor - child) mg/cm ^{2}	0.2	0.2
AT_{res} (averaging time - resident carcinogenic)	365	365
BW_{0-2} (mutagenic body weight) kg	15	15
BW_{2-6} (mutagenic body weight) kg	15	15
BW_{6-16} (mutagenic body weight) kg	80	80
BW_{16-26} (mutagenic body weight) kg	80	80
BW_{res-a} (body weight - adult) kg	80	80
BW_{res-c} (body weight - child) kg	15	15
$DFS_{res-adj}$ (age-adjusted soil dermal factor) mg/kg	103390	10130.4
$DFSM_{res-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	428260	32916.8
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration) years	2	2
ED_{2-6} (mutagenic exposure duration) years	4	4
ED_{6-16} (mutagenic exposure duration) years	10	10
ED_{16-26} (mutagenic exposure duration) years	10	10
ED_{res-a} (exposure duration - adult) years	20	20
ED_{res-c} (exposure duration - child) years	6	6
EF_{res} (exposure frequency) days/year	350	50.769
EF_{0-2} (mutagenic exposure frequency) days/year	350	20
EF_{2-6} (mutagenic exposure frequency) days/year	350	20
EF_{6-16} (mutagenic exposure frequency) days/year	350	60
EF_{16-26} (mutagenic exposure frequency) days/year	350	60
EF_{res-a} (exposure frequency - adult) days/year	350	60
EF_{res-c} (exposure frequency - child) days/year	350	20
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time) hours/day	24	24
ET_{2-6} (mutagenic exposure time) hours/day	24	24
ET_{6-16} (mutagenic exposure time) hours/day	24	24
ET_{16-26} (mutagenic exposure time) hours/day	24	24

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Site-specific Risk
Resident Soil Inputs

Variable	Resident Soil Default Value	Site-Specific Value
ET_{res-a} (adult exposure time) hours/day	24	24
ET_{res-c} (child exposure time) hours/day	24	24
$IFS_{res-adj}$ (age-adjusted soil ingestion factor) mg/kg	36750	3100
$IFSM_{res-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	166833.3	11533.333
IRS_{0-2} (mutagenic soil intake rate) mg/day	200	200
IRS_{2-6} (mutagenic soil intake rate) mg/day	200	200
IRS_{6-16} (mutagenic soil intake rate) mg/day	100	100
IRS_{16-26} (mutagenic soil intake rate) mg/day	100	100
IRS_{res-a} (soil intake rate - adult) mg/day	100	100
IRS_{res-c} (soil intake rate - child) mg/day	200	200
LT (lifetime) years	70	70
SA_{0-2} (mutagenic skin surface area) cm^2/day	2373	2373
SA_{2-6} (mutagenic skin surface area) cm^2/day	2373	2373
SA_{6-16} (mutagenic skin surface area) cm^2/day	6032	6032
SA_{16-26} (mutagenic skin surface area) cm^2/day	6032	6032
SA_{res-a} (skin surface area - adult) cm^2/day	6032	6032
SA_{res-c} (skin surface area - child) cm^2/day	2373	2373
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-specific Risk
Resident for Soil

Chemical	CAS Number	Mutagen?	VOC?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	ABS_{gi}	ABS_{derm}
Benz[a]anthracene	56-55-3	Yes	Yes	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Benzo[a]pyrene	50-32-8	Yes	No	3.00E-04	IRIS	2.00E-06	IRIS	1.00E+00	IRIS	6.00E-04	IRIS	1	0.13
Benzo[b]fluoranthene	205-99-2	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Dibenz[a,h]anthracene	53-70-3	Yes	No	-		-		1.00E+00	EPA/RPF	6.00E-04	EPA/RPF	1	0.13
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Thallium (Soluble Salts)	7440-28-0	No	No	1.00E-05	SCREEN Current	-		-		-		1	-
Vanadium and Compounds	7440-62-2	No	No	5.04E-03	SURROGATE. See Vanadium Pentoxide. MW contribution adjustment.	1.00E-04	ATSDR Final	-		-		0.026	-
*Total Risk/HI				-		-		-		-		-	-

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Site-specific Risk
Resident for Soil

Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	DA	Particulate Emission Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	RBA	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	Normal Boiling Point BP (K)	BP Ref
4.41E+06	-	4.41E+06	6.83E-10	1.36E+09	-	1	1.20E-05	4.91E-04	PHYSPROP	4.91E-04	7.11E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	4.57E-07	1.87E-05	PHYSPROP	1.87E-05	7.68E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	6.57E-07	2.69E-05	PHYSPROP	2.69E-05	7.16E+02	EPI
-	-	-	-	1.36E+09	-	1	1.41E-07	5.76E-06	EPI	5.76E-06	7.97E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	3.48E-07	1.42E-05	PHYSPROP	1.42E-05	8.09E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	1.73E+03	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	3.68E+03	CRC
-	-	-	-	-	-	-	-	-		-	-	

Output generated 01AUG2024:11:48:15

Site-specific Risk
Resident for Soil

Critical Temperature T_c\ (K)	T_c\ Ref	D_{ia}\ (cm^2/s)	D_{iw}\ (cm^2/s)	Soil Concentration (mg/kg)	Child Ingestion Noncarcinogenic CDI (mg/kg-day)	Child Dermal Noncarcinogenic CDI (mg/kg-day)	Child Inhalation Noncarcinogenic CDI (mg/m^3)	Adult Ingestion Noncarcinogenic CDI (mg/kg-day)	Adult Dermal Noncarcinogenic CDI (mg/kg-day)
9.79E+02	YAWS	2.61E-02	6.75E-06	3.323	2.43E-06	7.49E-07	4.14E-08	6.83E-07	3.75E-07
9.69E+02	EPA 2001 Fact Sheet	2.55E-02	6.58E-06	2.952	2.16E-06	6.65E-07	1.19E-10	6.07E-07	3.33E-07
9.69E+02	EPA 2001 Fact Sheet	2.50E-02	6.43E-06	3.44	2.51E-06	7.75E-07	1.39E-10	7.07E-07	3.88E-07
9.90E+02	EPA 2001 Fact Sheet	2.36E-02	6.02E-06	0.187	1.37E-07	4.21E-08	7.54E-12	3.84E-08	2.11E-08
1.08E+03	EPA 2001 Fact Sheet	2.47E-02	6.37E-06	1.732	1.27E-06	3.90E-07	6.98E-11	3.56E-07	1.95E-07
4.65E+03	YAWS	-	-	0.113	8.26E-08	-	4.55E-12	2.32E-08	-
1.13E+04	YAWS	-	-	144	1.05E-04	-	5.80E-09	2.96E-05	-
-		-	-	-	-	-	-	-	-

Output generated 01AUG2024:11:48:15

Site-specific Risk
Resident for Soil

Adult Inhalation Noncarcinogenic CDI (mg/m^3)	Adjusted Ingestion Noncarcinogenic CDI (mg/kg-day)	Adjusted Dermal Noncarcinogenic CDI (mg/kg-day)	Adjusted Inhalation Noncarcinogenic CDI (mg/m^3)	Ingestion Carcinogenic CDI (mg/kg-day)	Dermal Carcinogenic CDI (mg/kg-day)	Inhalation Carcinogenic CDI (ug/m^3)	Child Ingestion HQ	Child Dermal HQ	Child Inhalation HQ	Child Total HI
1.05E-07	1.09E-06	4.61E-07	1.05E-07	1.50E-06	5.57E-07	1.08E-04	-	-	-	-
3.02E-10	9.64E-07	4.10E-07	3.02E-10	1.33E-06	4.94E-07	3.11E-07	7.19E-03	2.22E-03	5.95E-05	9.47E-03
3.52E-10	1.12E-06	4.77E-07	3.52E-10	1.55E-06	5.76E-07	3.62E-07	-	-	-	-
1.91E-11	6.11E-08	2.60E-08	1.91E-11	8.44E-08	3.13E-08	1.97E-08	-	-	-	-
1.77E-10	5.66E-07	2.40E-07	1.77E-10	7.82E-07	2.90E-07	1.82E-07	-	-	-	-
1.16E-11	3.69E-08	-	1.16E-11	1.37E-08	-	4.29E-09	8.26E-03	-	-	8.26E-03
1.47E-08	4.70E-05	-	1.47E-08	1.75E-05	-	5.47E-06	2.09E-02	-	5.80E-05	2.09E-02
-	-	-	-	-	-	-	*3.63E-02*	*2.22E-03*	*1.18E-04*	*3.87E-02*

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Site-specific Risk
Resident for Soil

Adult Ingestion HQ	Adult Dermal HQ	Adult Inhalation HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Inhalation HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk
-	-	-	-	-	-	-	-	1.50E-07	5.57E-08	6.49E-09	2.12E-07
2.02E-03	1.11E-03	1.51E-04	3.28E-03	3.21E-03	1.37E-03	1.51E-04	4.73E-03	**1.33E-06**	4.94E-07	1.86E-10	**1.83E-06**
-	-	-	-	-	-	-	-	1.55E-07	5.76E-08	2.17E-11	2.13E-07
-	-	-	-	-	-	-	-	8.44E-08	3.13E-08	1.18E-11	1.16E-07
-	-	-	-	-	-	-	-	7.82E-08	2.90E-08	1.09E-11	1.07E-07
2.32E-03	-	-	2.32E-03	3.69E-03	-	-	3.69E-03	-	-	-	-
5.87E-03	-	1.47E-04	6.02E-03	9.33E-03	-	1.47E-04	9.48E-03	-	-	-	-
1.02E-02	*1.11E-03*	*2.98E-04*	*1.16E-02*	*1.62E-02*	*1.37E-03*	*2.98E-04*	*1.79E-02*	***1.80E-06***	*6.68E-07*	*6.72E-09*	***2.48E-06***

Output generated 01AUG2024:11:48:15

Site-specific Risk
Outdoor Worker Soil Inputs

Variable	Outdoor Worker Soil Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
ρ_b (dry soil bulk density) g/cm ^{3}	1.5	1.5
ρ_b (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
ρ_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{out} (skin adherence factor - outdoor worker) mg/cm ^{2}	0.12	0.12
AT_{out} (averaging time - outdoor worker)	365	365
BW_{out} (body weight - outdoor worker)	80	80
ED_{out} (exposure duration - outdoor worker) yr	25	25

Output generated 01AUG2024:12:24:51

Site-specific Risk
Outdoor Worker Soil Inputs

Variable	Outdoor Worker Soil Default Value	Site-Specific Value
EF_{out} (exposure frequency - outdoor worker) day/yr	225	225
ET_{out} (exposure time - outdoor worker) hr	8	8
IRS_{out} (soil ingestion rate - outdoor worker) mg/day	100	100
LT (lifetime) yr	70	70
SA_{out} (surface area - outdoor worker) cm^2/day	3527	3527
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Output generated 01AUG2024:12:24:51

Site-specific Risk
Outdoor Worker for Soil

Chemical	CAS Number	Mutagen?	VOC?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref
Benz[a]anthracene	56-55-3	Yes	Yes	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF
Benzo[a]pyrene	50-32-8	Yes	No	3.00E-04	IRIS	2.00E-06	IRIS	1.00E+00	IRIS	6.00E-04	IRIS
Benzo[b]fluoranthene	205-99-2	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF
Dibenz[a,h]anthracene	53-70-3	Yes	No	-		-		1.00E+00	EPA/RPF	6.00E-04	EPA/RPF
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF
Thallium (Soluble Salts)	7440-28-0	No	No	1.00E-05	SCREEN Current	-		-		-	
Vanadium and Compounds	7440-62-2	No	No	5.04E-03	SURROGATE. See Vanadium Pentoxide. MW contribution adjustment.	1.00E-04	ATSDR Final	-		-	
*Total Risk/HI				-		-		-		-	

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Site-specific Risk
Outdoor Worker for Soil

ABS_{gi}	ABS_{derm}	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	DA	Particulate Emission Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	Normal Boiling Point BP (K)
1	0.13	4.41E+06	-	4.41E+06	6.83E-10	1.36E+09	-	1.20E-05	4.91E-04	PHYSPROP	4.91E-04	7.11E+02
1	0.13	-	-	-	-	1.36E+09	-	4.57E-07	1.87E-05	PHYSPROP	1.87E-05	7.68E+02
1	0.13	-	-	-	-	1.36E+09	-	6.57E-07	2.69E-05	PHYSPROP	2.69E-05	7.16E+02
1	0.13	-	-	-	-	1.36E+09	-	1.41E-07	5.76E-06	EPI	5.76E-06	7.97E+02
1	0.13	-	-	-	-	1.36E+09	-	3.48E-07	1.42E-05	PHYSPROP	1.42E-05	8.09E+02
1	-	-	-	-	-	1.36E+09	-	-	-		-	1.73E+03
0.026	-	-	-	-	-	1.36E+09	-	-	-		-	3.68E+03
-	-	-	-	-	-	-	-	-	-		-	-

Output generated 01AUG2024:12:24:51

Site-specific Risk
Outdoor Worker for Soil

BP Ref	Critical Temperature T_C \ (K)	T_C \ Ref	D_{ia} \ (cm^2/s)	D_{iw} \ (cm^2/s)	Soil Concentration (mg/kg)	Ingestion Noncarcinogenic CDI (mg/kg-day)	Dermal Noncarcinogenic CDI (mg/kg-day)	Inhalation Noncarcinogenic CDI (mg/m^3)	Ingestion Carcinogenic CDI (mg/kg-day)
PHYSPROP	9.79E+02	YAWS	2.61E-02	6.75E-06	3.323	2.56E-06	1.41E-06	1.55E-07	9.14E-07
PHYSPROP	9.69E+02	EPA 2001 Fact Sheet	2.55E-02	6.58E-06	2.952	2.27E-06	1.25E-06	4.46E-10	8.12E-07
EPI	9.69E+02	EPA 2001 Fact Sheet	2.50E-02	6.43E-06	3.44	2.65E-06	1.46E-06	5.20E-10	9.47E-07
PHYSPROP	9.90E+02	EPA 2001 Fact Sheet	2.36E-02	6.02E-06	0.187	1.44E-07	7.93E-08	2.83E-11	5.15E-08
PHYSPROP	1.08E+03	EPA 2001 Fact Sheet	2.47E-02	6.37E-06	1.732	1.33E-06	7.34E-07	2.62E-10	4.77E-07
PHYSPROP	4.65E+03	YAWS	-	-	0.113	8.71E-08	-	1.71E-11	3.11E-08
CRC	1.13E+04	YAWS	-	-	144	1.11E-04	-	2.18E-08	3.96E-05
	-		-	-	-	-	-	-	-

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Site-specific Risk
Outdoor Worker for Soil

Dermal Carcinogenic CDI (mg/kg-day)	Inhalation Carcinogenic CDI (ug/m³)	Ingestion HQ	Dermal HQ	Inhalation HQ	Total HI	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk
5.03E-07	5.55E-05	-	-	-	-	9.14E-08	5.03E-08	3.33E-09	1.45E-07
4.47E-07	1.59E-07	7.58E-03	4.17E-03	2.23E-04	1.20E-02	8.12E-07	4.47E-07	9.56E-11	**1.26E-06**
5.21E-07	1.86E-07	-	-	-	-	9.47E-08	5.21E-08	1.11E-11	1.47E-07
2.83E-08	1.01E-08	-	-	-	-	5.15E-08	2.83E-08	6.06E-12	7.98E-08
2.62E-07	9.35E-08	-	-	-	-	4.77E-08	2.62E-08	5.61E-12	7.39E-08
-	6.10E-09	8.71E-03	-	-	8.71E-03	-	-	-	-
-	7.77E-06	2.20E-02	-	2.18E-04	2.22E-02	-	-	-	-
-	*-*	*3.83E-02*	*4.17E-03*	*4.41E-04*	*4.29E-02*	***1.10E-06***	*6.04E-07*	*3.45E-09*	***1.70E-06***

Output generated 01AUG2024:12:24:51

Site-specific Risk
Excavation Worker Soil Inputs

Variable	Excavation Worker Soil Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
ρ_b (dry soil bulk density) g/cm ^{3}	1.5	1.5
ρ_b (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
ρ_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{exc} (skin adherence factor - excavation worker) mg/cm ^{2}	0.3	0.3
AT_{exc} (averaging time - excavation worker)	365	365
BW_{exc} (body weight - excavation worker) kg	80	80
ED_{exc} (exposure duration - excavation worker) yr	1	1

Output generated 01AUG2024:12:32:59

Site-specific Risk
Excavation Worker Soil Inputs

Variable	Excavation Worker Soil Default Value	Site-Specific Value
EF_{exc} (exposure frequency - excavation worker) day/yr	20	20
ET_{exc} (exposure time - excavation worker) hr	8	8
IR_{exc} (soil ingestion rate - excavation worker) mg/day	330	330
LT (lifetime) yr	70	70
SA_{exc} (surface area - excavation worker) cm^2/day	3527	3527
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Output generated 01AUG2024:12:32:59

Site-specific Risk
Excavation Worker for Soil

Chemical	CAS Number	Mutagen?	VOC?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	ABS_{gi}
Benz[a]anthracene	56-55-3	Yes	Yes	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1
Benzo[a]pyrene	50-32-8	Yes	No	3.00E-04	IRIS	2.00E-06	IRIS	1.00E+00	IRIS	6.00E-04	IRIS	1
Benzo[b]fluoranthene	205-99-2	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1
Dibenz[a,h]anthracene	53-70-3	Yes	No	-		-		1.00E+00	EPA/RPF	6.00E-04	EPA/RPF	1
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1
Thallium (Soluble Salts)	7440-28-0	No	No	4.00E-05	SCREEN Current	-		-		-		1
Vanadium and Compounds	7440-62-2	No	No	1.00E-02	ATSDR Final	1.00E-04	ATSDR Final	-		-		0.026
*Total Risk/HI				-		-		-		-		-

Output generated 01AUG2024:12:32:59

Site-specific Risk
Excavation Worker for Soil

ABS_{derm}	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	DA	Particulate Emission Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)
0.13	4.41E+06	-	4.41E+06	6.83E-10	1.36E+09	-	1.20E-05	4.91E-04	PHYSPROP	4.91E-04
0.13	-	-	-	-	1.36E+09	-	4.57E-07	1.87E-05	PHYSPROP	1.87E-05
0.13	-	-	-	-	1.36E+09	-	6.57E-07	2.69E-05	PHYSPROP	2.69E-05
0.13	-	-	-	-	1.36E+09	-	1.41E-07	5.76E-06	EPI	5.76E-06
0.13	-	-	-	-	1.36E+09	-	3.48E-07	1.42E-05	PHYSPROP	1.42E-05
-	-	-	-	-	1.36E+09	-	-	-		-
-	-	-	-	-	1.36E+09	-	-	-		-
-	-	-	-	-	-	-	-	-		-

Output generated 01AUG2024:12:32:59

Site-specific Risk
Excavation Worker for Soil

Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_C (K)	T_C Ref	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	Soil Concentration (mg/kg)	Ingestion Noncarcinogenic CDI (mg/kg-day)	Dermal Noncarcinogenic CDI (mg/kg-day)	Inhalation Noncarcinogenic CDI (mg/m^3)
7.11E+02	PHYSPROP	9.79E+02	YAWS	2.61E-02	6.75E-06	3.323	7.51E-07	3.13E-07	1.38E-08
7.68E+02	PHYSPROP	9.69E+02	EPA 2001 Fact Sheet	2.55E-02	6.58E-06	2.952	6.67E-07	2.78E-07	3.97E-11
7.16E+02	EPI	9.69E+02	EPA 2001 Fact Sheet	2.50E-02	6.43E-06	3.44	7.78E-07	3.24E-07	4.62E-11
7.97E+02	PHYSPROP	9.90E+02	EPA 2001 Fact Sheet	2.36E-02	6.02E-06	0.187	4.23E-08	1.76E-08	2.51E-12
8.09E+02	PHYSPROP	1.08E+03	EPA 2001 Fact Sheet	2.47E-02	6.37E-06	1.732	3.91E-07	1.63E-07	2.33E-11
1.73E+03	PHYSPROP	4.65E+03	YAWS	-	-	0.113	2.55E-08	-	1.52E-12
3.68E+03	CRC	1.13E+04	YAWS	-	-	144	3.25E-05	-	1.93E-09
-		-		-	-	-	-	-	-

Output generated 01AUG2024:12:32:59

Site-specific Risk
Excavation Worker for Soil

Ingestion Carcinogenic CDI (mg/kg-day)	Dermal Carcinogenic CDI (mg/kg-day)	Inhalation Carcinogenic CDI (ug/m^3)	Ingestion HQ	Dermal HQ	Inhalation HQ	Total HI	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk
1.07E-08	4.47E-09	1.97E-07	-	-	-	-	1.07E-09	4.47E-10	1.18E-11	1.53E-09
9.53E-09	3.97E-09	5.67E-10	2.22E-03	9.27E-04	1.98E-05	3.17E-03	9.53E-09	3.97E-09	3.40E-13	1.35E-08
1.11E-08	4.63E-09	6.60E-10	-	-	-	-	1.11E-09	4.63E-10	3.96E-14	1.57E-09
6.04E-10	2.52E-10	3.59E-11	-	-	-	-	6.04E-10	2.52E-10	2.15E-14	8.56E-10
5.59E-09	2.33E-09	3.32E-10	-	-	-	-	5.59E-10	2.33E-10	1.99E-14	7.92E-10
3.65E-10	-	2.17E-11	6.39E-04	-	-	6.39E-04	-	-	-	-
4.65E-07	-	2.76E-08	3.25E-03	-	1.93E-05	3.27E-03	-	-	-	-
-	*-*	*-*	*6.12E-03*	*9.27E-04*	*3.92E-05*	*7.08E-03*	*1.29E-08*	*5.37E-09*	*1.23E-11*	*1.83E-08*

Output generated 01AUG2024:12:32:59

Site-specific Risk
Recreator Soil/Sediment Inputs

Variable	Recreator Soil/Sediment Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ^{3}	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
p_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{0-2} (skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{2-6} (skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{6-16} (skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{16-26} (skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{rec-a} (skin adherence factor - adult) mg/cm ^{2}	0.07	0.07

Output generated 01AUG2024:11:15:10

Site-specific Risk
Recreator Soil/Sediment Inputs

Variable	Recreator Soil/Sediment Default Value	Site-Specific Value
AF_{rec-c} (skin adherence factor - child) mg/cm ^{2}	0.2	0.2
AT_{rec} (averaging time)	365	365
BW_{0-2} (body weight) kg	15	15
BW_{2-6} (body weight) kg	15	15
BW_{6-16} (body weight) kg	80	80
BW_{16-26} (body weight) kg	80	80
BW_{rec-a} (body weight - adult) kg	80	80
BW_{rec-c} (body weight - child) kg	15	15
$DFS_{rec-adj}$ (age-adjusted soil dermal factor) mg/kg	22155	22155
$DFSM_{rec-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	91770	91770
ED_{rec} (exposure duration - recreator) years	26	26
ED_{0-2} (exposure duration) year	2	2
ED_{2-6} (exposure duration) year	4	4
ED_{6-16} (exposure duration) year	10	10
ED_{16-26} (exposure duration) year	10	10
ED_{rec-c} (exposure duration - child) years	6	6
EF_{rec} (exposure frequency) days/year	75	75
EF_{0-2} (exposure frequency) days/year	75	75
EF_{2-6} (exposure frequency) days/year	75	75
EF_{6-16} (exposure frequency) days/year	75	75
EF_{16-26} (exposure frequency) days/year	75	75
EF_{rec-a} (exposure frequency - adult) days/year	75	75
EF_{rec-c} (exposure frequency - child) days/year	75	75
ET_{rec} (exposure time - recreator) hours/day	1	1
ET_{0-2} (exposure time) hours/day	1	1
ET_{2-6} (exposure time) hours/day	1	1
ET_{6-16} (exposure time) hours/day	1	1
ET_{16-26} (exposure time) hours/day	1	1
ET_{rec-a} (adult exposure time) hours/day	1	1

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Site-specific Risk
Recreator Soil/Sediment Inputs

Variable	Recreator Soil/Sediment Default Value	Site-Specific Value
ET_{rec-c} (child exposure time) hours/day	1	1
$IFS_{rec-adj}$ (age-adjusted soil ingestion factor) mg/kg	7875	7875
$IFSM_{rec-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	35750	35750
IRS_{0-2} (soil intake rate) mg/day	200	200
IRS_{2-6} (soil intake rate) mg/day	200	200
IRS_{6-16} (soil intake rate) mg/day	100	100
IRS_{16-26} (soil intake rate) mg/day	100	100
IRS_{rec-a} (soil intake rate - adult) mg/day	100	100
IRS_{rec-c} (soil intake rate - child) mg/day	200	200
LT (lifetime - recreator) years	70	70
SA_{0-2} (skin surface area) cm^2/day	2373	2373
SA_{2-6} (skin surface area) cm^2/day	2373	2373
SA_{6-16} (skin surface area) cm^2/day	6032	6032
SA_{16-26} (skin surface area) cm^2/day	6032	6032
SA_{rec-a} (skin surface area - adult) cm^2/day	6032	6032
SA_{rec-c} (skin surface area - child) cm^2/day	2373	2373
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-specific Risk
Recreator for Soil/Sediment

Chemical	CAS Number	Mutagen?	VOC?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	ABS_{gi}	ABS_{derm}
Benz[a]anthracene	56-55-3	Yes	Yes	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Benzo[a]pyrene	50-32-8	Yes	No	3.00E-04	IRIS	2.00E-06	IRIS	1.00E+00	IRIS	6.00E-04	IRIS	1	0.13
Benzo[b]fluoranthene	205-99-2	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Dibenz[a,h]anthracene	53-70-3	Yes	No	-		-		1.00E+00	EPA/RPF	6.00E-04	EPA/RPF	1	0.13
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Thallium (Soluble Salts)	7440-28-0	No	No	1.00E-05	SCREEN Current	-		-		-		1	-
Vanadium and Compounds	7440-62-2	No	No	5.04E-03	SURROGATE. See Vanadium Pentoxide. MW contribution adjustment.	1.00E-04	ATSDR Final	-		-		0.026	-
*Total Risk/HI				-		-		-		-		-	-

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Site-specific Risk
Recreator for Soil/Sediment

Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	DA	Particulate Emission Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	RBA	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	Normal Boiling Point BP (K)	BP Ref
4.41E+06	-	4.41E+06	6.83E-10	1.36E+09	-	1	1.20E-05	4.91E-04	PHYSPROP	4.91E-04	7.11E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	4.57E-07	1.87E-05	PHYSPROP	1.87E-05	7.68E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	6.57E-07	2.69E-05	PHYSPROP	2.69E-05	7.16E+02	EPI
-	-	-	-	1.36E+09	-	1	1.41E-07	5.76E-06	EPI	5.76E-06	7.97E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	3.48E-07	1.42E-05	PHYSPROP	1.42E-05	8.09E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	1.73E+03	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	3.68E+03	CRC
-	-	-	-	-	-	-	-	-		-	-	

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Site-specific Risk
Recreator for Soil/Sediment

Critical Temperature T_c \ (K)	T_c \ Ref	D_{ia} \ (cm^2/s)	D_{iw} \ (cm^2/s)	Soil Concentration (mg/kg)	Child Ingestion Noncarcinogenic CDI (mg/kg-day)	Child Dermal Noncarcinogenic CDI (mg/kg-day)	Child Inhalation Noncarcinogenic CDI (mg/m^3)	Adult Ingestion Noncarcinogenic CDI (mg/kg-day)	Adult Dermal Noncarcinogenic CDI (mg/kg-day)
9.79E+02	YAWS	2.61E-02	6.75E-06	3.323	9.10E-06	2.81E-06	6.47E-09	8.54E-07	4.69E-07
9.69E+02	EPA 2001 Fact Sheet	2.55E-02	6.58E-06	2.952	8.09E-06	2.49E-06	1.86E-11	7.58E-07	4.16E-07
9.69E+02	EPA 2001 Fact Sheet	2.50E-02	6.43E-06	3.44	9.42E-06	2.91E-06	2.17E-11	8.84E-07	4.85E-07
9.90E+02	EPA 2001 Fact Sheet	2.36E-02	6.02E-06	0.187	5.12E-07	1.58E-07	1.18E-12	4.80E-08	2.64E-08
1.08E+03	EPA 2001 Fact Sheet	2.47E-02	6.37E-06	1.732	4.75E-06	1.46E-06	1.09E-11	4.45E-07	2.44E-07
4.65E+03	YAWS	-	-	0.113	3.10E-07	-	7.12E-13	2.90E-08	-
1.13E+04	YAWS	-	-	144	3.95E-04	-	9.07E-10	3.70E-05	-
-		-	-	-	-	-	-	-	-

Output generated 01AUG2024:11:15:10

Site-specific Risk
Recreator for Soil/Sediment

Adult Inhalation Noncarcinogenic CDI (mg/m^3)	Adjusted Ingestion Noncarcinogenic CDI (mg/kg-day)	Adjusted Dermal Noncarcinogenic CDI (mg/kg-day)	Adjusted Inhalation Noncarcinogenic CDI (mg/m^3)	Ingestion Carcinogenic CDI (mg/kg-day)	Dermal Carcinogenic CDI (mg/kg-day)	Inhalation Carcinogenic CDI (ug/m^3)	Child Ingestion HQ	Child Dermal HQ	Child Inhalation HQ	Child Total HI
6.47E-09	2.76E-06	1.01E-06	6.47E-09	4.65E-06	1.55E-06	6.66E-06	-	-	-	-
1.86E-11	2.45E-06	8.96E-07	1.86E-11	4.13E-06	1.38E-06	1.91E-08	2.70E-02	8.32E-03	9.30E-06	3.53E-02
2.17E-11	2.85E-06	1.04E-06	2.17E-11	4.81E-06	1.61E-06	2.23E-08	-	-	-	-
1.18E-12	1.55E-07	5.68E-08	1.18E-12	2.62E-07	8.73E-08	1.21E-09	-	-	-	-
1.09E-11	1.44E-06	5.26E-07	1.09E-11	2.42E-06	8.09E-07	1.12E-08	-	-	-	-
7.12E-13	9.38E-08	-	7.12E-13	3.48E-08	-	2.64E-10	3.10E-02	-	-	3.10E-02
9.07E-10	1.19E-04	-	9.07E-10	4.44E-05	-	3.37E-07	7.83E-02	-	9.07E-06	7.83E-02
-	-	-	-	-	-	-	***1.36E-01***	*8.32E-03*	*1.84E-05*	***1.45E-01***

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Site-specific Risk
Recreator for Soil/Sediment

Adult Ingestion HQ	Adult Dermal HQ	Adult Inhalation HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Inhalation HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk
-	-	-	-	-	-	-	-	4.65E-07	1.55E-07	3.99E-10	6.21E-07
2.53E-03	1.39E-03	9.30E-06	3.92E-03	8.17E-03	2.99E-03	9.30E-06	1.12E-02	**4.13E-06**	**1.38E-06**	1.15E-11	**5.51E-06**
-	-	-	-	-	-	-	-	4.81E-07	1.61E-07	1.34E-12	6.42E-07
-	-	-	-	-	-	-	-	2.62E-07	8.73E-08	7.27E-13	3.49E-07
-	-	-	-	-	-	-	-	2.42E-07	8.09E-08	6.73E-13	3.23E-07
2.90E-03	-	-	2.90E-03	9.38E-03	-	-	9.38E-03	-	-	-	-
7.34E-03	-	9.07E-06	7.35E-03	2.37E-02	-	9.07E-06	2.37E-02	-	-	-	-
1.28E-02	*1.39E-03*	*1.84E-05*	*1.42E-02*	*4.13E-02*	*2.99E-03*	*1.84E-05*	*4.43E-02*	***5.58E-06***	***1.86E-06***	*4.14E-10*	***7.44E-06***

Output generated 01AUG2024:11:15:10

Site-specific Risk
Trespasser Soil/Sediment Inputs

Variable	Trespasser Soil/Sediment Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ^{3}	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
p_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{0-2} (skin adherence factor) mg/cm ^{2}	0	0
AF_{2-6} (skin adherence factor) mg/cm ^{2}	0	0
AF_{6-16} (skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{16-26} (skin adherence factor) mg/cm ^{2}	0	0
AF_{rec-a} (skin adherence factor - adult) mg/cm ^{2}	0.07	0.07

Output generated 01AUG2024:14:21:29

Site-specific Risk
Trespasser Soil/Sediment Inputs

Variable	Trespasser Soil/Sediment Default Value	Site-Specific Value
AF_{rec-c} (skin adherence factor - child) mg/cm ^{2}	0	0
AT_{rec} (averaging time)	365	365
BW_{0-2} (body weight) kg	0	0
BW_{2-6} (body weight) kg	0	0
BW_{6-16} (body weight) kg	80	80
BW_{16-26} (body weight) kg	0	0
BW_{rec-a} (body weight - adult) kg	80	80
BW_{rec-c} (body weight - child) kg	0	0
$DFS_{rec-adj}$ (age-adjusted soil dermal factor) mg/kg	3061.24	3061.24
$DFSM_{rec-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	9183.72	9183.72
ED_{rec} (exposure duration - recreator) years	10	10
ED_{0-2} (exposure duration) year	0	0
ED_{2-6} (exposure duration) year	0	0
ED_{6-16} (exposure duration) year	10	10
ED_{16-26} (exposure duration) year	0	0
ED_{rec-c} (exposure duration - child) years	0	0
EF_{rec} (exposure frequency) days/year	58	58
EF_{0-2} (exposure frequency) days/year	0	0
EF_{2-6} (exposure frequency) days/year	0	0
EF_{6-16} (exposure frequency) days/year	58	58
EF_{16-26} (exposure frequency) days/year	0	0
EF_{rec-a} (exposure frequency - adult) days/year	58	58
EF_{rec-c} (exposure frequency - child) days/year	0	0
ET_{rec} (exposure time - recreator) hours/day	3.9	3.9
ET_{0-2} (exposure time) hours/day	0	0
ET_{2-6} (exposure time) hours/day	0	0
ET_{6-16} (exposure time) hours/day	3.9	3.9
ET_{16-26} (exposure time) hours/day	0	0
ET_{rec-a} (adult exposure time) hours/day	3.9	3.9

Output generated 01AUG2024:14:21:29

Site-specific Risk
Trespasser Soil/Sediment Inputs

Variable	Trespasser Soil/Sediment Default Value	Site-Specific Value
ET_{rec-c} (child exposure time) hours/day	0	0
$IFS_{rec-adj}$ (age-adjusted soil ingestion factor) mg/kg	725	725
$IFSM_{rec-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	2175	2175
IRS_{0-2} (soil intake rate) mg/day	0	0
IRS_{2-6} (soil intake rate) mg/day	0	0
IRS_{6-16} (soil intake rate) mg/day	100	100
IRS_{16-26} (soil intake rate) mg/day	0	0
IRS_{rec-a} (soil intake rate - adult) mg/day	100	100
IRS_{rec-c} (soil intake rate - child) mg/day	0	0
LT (lifetime - recreator) years	70	70
SA_{0-2} (skin surface area) cm^2/day	0	0
SA_{2-6} (skin surface area) cm^2/day	0	0
SA_{6-16} (skin surface area) cm^2/day	6032	6032
SA_{16-26} (skin surface area) cm^2/day	0	0
SA_{rec-a} (skin surface area - adult) cm^2/day	6032	6032
SA_{rec-c} (skin surface area - child) cm^2/day	0	0
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-specific Risk
Trespasser for Soil/Sediment

Chemical	CAS Number	Mutagen?	VOC?	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	ABS_{gi}	ABS_{derm}
Benz[a]anthracene	56-55-3	Yes	Yes	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Benzo[a]pyrene	50-32-8	Yes	No	3.00E-04	IRIS	2.00E-06	IRIS	1.00E+00	IRIS	6.00E-04	IRIS	1	0.13
Benzo[b]fluoranthene	205-99-2	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Dibenz[a,h]anthracene	53-70-3	Yes	No	-		-		1.00E+00	EPA/RPF	6.00E-04	EPA/RPF	1	0.13
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	No	-		-		1.00E-01	EPA/RPF	6.00E-05	EPA/RPF	1	0.13
Thallium (Soluble Salts)	7440-28-0	No	No	1.00E-05	SCREEN Current	-		-		-		1	-
Vanadium and Compounds	7440-62-2	No	No	5.04E-03	SURROGATE. See Vanadium Pentoxide. MW contribution adjustment.	1.00E-04	ATSDR Final	-		-		0.026	-
*Total Risk/HI				-		-		-		-		-	-

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Site-specific Risk
Trespasser for Soil/Sediment

Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	DA	Particulate Emission Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	RBA	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)	H` and HLC Ref	Henry's Law Constant Used in Calcs (unitless)	Normal Boiling Point BP (K)	BP Ref
4.41E+06	-	4.41E+06	6.83E-10	1.36E+09	-	1	1.20E-05	4.91E-04	PHYSPROP	4.91E-04	7.11E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	4.57E-07	1.87E-05	PHYSPROP	1.87E-05	7.68E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	6.57E-07	2.69E-05	PHYSPROP	2.69E-05	7.16E+02	EPI
-	-	-	-	1.36E+09	-	1	1.41E-07	5.76E-06	EPI	5.76E-06	7.97E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	3.48E-07	1.42E-05	PHYSPROP	1.42E-05	8.09E+02	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	1.73E+03	PHYSPROP
-	-	-	-	1.36E+09	-	1	-	-		-	3.68E+03	CRC
-	-	-	-	-	-	-	-	-		-	-	

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Site-specific Risk
Trespasser for Soil/Sediment

Critical Temperature T_c \ (K)	T_c \ Ref	D_{ia} \ (cm^2/s)	D_{iw} \ (cm^2/s)	Soil Concentration (mg/kg)	Child Ingestion Noncarcinogenic CDI (mg/kg-day)	Child Dermal Noncarcinogenic CDI (mg/kg-day)	Child Inhalation Noncarcinogenic CDI (mg/m^3)	Adult Ingestion Noncarcinogenic CDI (mg/kg-day)	Adult Dermal Noncarcinogenic CDI (mg/kg-day)
9.79E+02	YAWS	2.61E-02	6.75E-06	3.323	-	-	-	6.60E-07	3.62E-07
9.69E+02	EPA 2001 Fact Sheet	2.55E-02	6.58E-06	2.952	-	-	-	5.86E-07	3.22E-07
9.69E+02	EPA 2001 Fact Sheet	2.50E-02	6.43E-06	3.44	-	-	-	6.83E-07	3.75E-07
9.90E+02	EPA 2001 Fact Sheet	2.36E-02	6.02E-06	0.187	-	-	-	3.71E-08	2.04E-08
1.08E+03	EPA 2001 Fact Sheet	2.47E-02	6.37E-06	1.732	-	-	-	3.44E-07	1.89E-07
4.65E+03	YAWS	-	-	0.113	-	-	-	2.24E-08	-
1.13E+04	YAWS	-	-	144	-	-	-	2.86E-05	-
-		-	-	-	-	-	-	-	-

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Site-specific Risk
Trespasser for Soil/Sediment

Adult Inhalation Noncarcinogenic CDI (mg/m^3)	Adjusted Ingestion Noncarcinogenic CDI (mg/kg-day)	Adjusted Dermal Noncarcinogenic CDI (mg/kg-day)	Adjusted Inhalation Noncarcinogenic CDI (mg/m^3)	Ingestion Carcinogenic CDI (mg/kg-day)	Dermal Carcinogenic CDI (mg/kg-day)	Inhalation Carcinogenic CDI (ug/m^3)	Child Ingestion HQ	Child Dermal HQ	Child Inhalation HQ	Child Total HI	Adult Ingestion HQ
1.95E-08	6.60E-07	3.62E-07	1.95E-08	2.83E-07	1.55E-07	8.36E-06	-	-	-	-	-
5.61E-11	5.86E-07	3.22E-07	5.61E-11	2.51E-07	1.38E-07	2.40E-08	-	-	-	-	1.95E-03
6.53E-11	6.83E-07	3.75E-07	6.53E-11	2.93E-07	1.61E-07	2.80E-08	-	-	-	-	-
3.55E-12	3.71E-08	2.04E-08	3.55E-12	1.59E-08	8.74E-09	1.52E-09	-	-	-	-	-
3.29E-11	3.44E-07	1.89E-07	3.29E-11	1.47E-07	8.09E-08	1.41E-08	-	-	-	-	-
2.15E-12	2.24E-08	-	2.15E-12	3.21E-09	-	3.07E-10	-	-	-	-	2.24E-03
2.74E-09	2.86E-05	-	2.74E-09	4.09E-06	-	3.91E-07	-	-	-	-	5.68E-03
-	-	-	-	-	-	-	-	-	-	-	*9.87E-03*

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Site-specific Risk
Trespasser for Soil/Sediment

Adult Dermal HQ	Adult Inhalation HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Inhalation HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Inhalation Risk	Total Risk
-	-	-	-	-	-	-	2.83E-08	1.55E-08	5.02E-10	4.43E-08
1.07E-03	2.80E-05	3.06E-03	1.95E-03	1.07E-03	2.80E-05	3.06E-03	2.51E-07	1.38E-07	1.44E-11	3.89E-07
-	-	-	-	-	-	-	2.93E-08	1.61E-08	1.68E-12	4.54E-08
-	-	-	-	-	-	-	1.59E-08	8.74E-09	9.13E-13	2.47E-08
-	-	-	-	-	-	-	1.47E-08	8.09E-09	8.46E-13	2.28E-08
-	-	2.24E-03	2.24E-03	-	-	2.24E-03	-	-	-	-
-	2.74E-05	5.70E-03	5.68E-03	-	2.74E-05	5.70E-03	-	-	-	-
1.07E-03	*5.54E-05*	*1.10E-02*	*9.87E-03*	*1.07E-03*	*5.54E-05*	*1.10E-02*	*3.40E-07*	*1.86E-07*	*5.20E-10*	*5.26E-07*

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