December 16, 2020 Reference No. 11208393-410

Mr. Robert Thompson
Remedial Project Manager
United States Environmental Protection Agency
Region V
77 West Jackson Boulevard
Mail Code SR-6J
Chicago, Illinois
60604

Dear Mr. Thompson:

Re: Response to Comments on Review of the Site Characterization Technical Memorandum, Report #2, dated 08-05-2020 and RTCs, Quarry Pond Investigation South Dayton Dump and Landfill Site, Moraine, Ohio

This letter presents responses to U.S. EPA comments, dated September 9, 2020 regarding Appendix G of the Site Characterization Technical Memorandum (SCTM) for the Quarry Pond Investigation dated August 5, 2020. GHD has prepared this letter on behalf of the Respondents to the Administrative Settlement Agreement and Order on Consent (ASAOC) for Remedial Investigation/Feasibility Study for OU1 and OU2, Docket No. V-W-16-C-011 (Respondents).

For ease of reference, the agency comments are presented below (with numbering) followed by GHD's response. The referenced document (Appendix G of the SCTM report, copy attached) has been modified as indicated by GHD's responses.

USEPA Comment 1:

Response to Comment 13-Appendix E (now Appendix G), Page 3, Second paragraph: The new Attachments A and B and Tables 3 and 4 were reviewed.

USEPA Comment 1a:

- ***Based upon the upper confidence limit (UCL) output (Table B.4), it is not appropriate to use the reported 95% KM Chebyshev UCL of 0.28 ug/L as the thallium exposure point concentration (EPC). As noted in the thallium output, there are not sufficient detected data to calculate meaningful statistics and the goodness of fit tests for all distributions could not be calculated. The maximum thallium concentration should be used as the thallium EPC.***

GHD Response 1a:

The EPC for thallium has been set to the maximum concentration (see Table B.4). The maximum concentration has been carried forward to the estimation of the fish tissue concentrations and risk calculations.

USEPA Comment 1b:

- ***EPCs for lead in sediment and from sediment modeled to fish are based upon an UCL (95% Adjusted Gamma UCL). EPCs for lead modeling should be based upon the mean detected value (see https://www.epa.gov/superfund/lead-superfund-sites-frequent-questions-risk-assessors-integrated-exposure-uptake#mean).***

GHD Response1b:

The EPC for lead has been set to the mean value (see Table B.4) and the fish tissue has been calculated based on the mean of the sediment lead concentrations (see Table B.7). The revised fish tissue concentration has been used in the IEUBK modelling (Attachment C) and Adult Lead Model (Table B.12).

USEPA Comment 2:

Response to Comment 14-Appendix E (Now Appendix G), Table 2; The new lead assessment (Sections 3.1 and 3.2 and attachments) were reviewed:

USEPA Comment 2a:

- ***EPCs for lead modeling should be based on the mean detected value (see https://www.epa.gov/superfund/lead-superfund-sites-frequent-questions-risk-assessors-integrated-exposure-uptake#mean).***

GHD Response 2a:

See response to comment 1b.

USEPA Comment 2b:

- ***A RAGS D IEUBK Lead worksheet was not included in the Integrated Exposure Uptake Biokinetic (IEUBK) Model analysis and should be provided.***

GHD Response 2b:

The IEUBK Lead worksheet has been included along with IEBUK output provided in Attachment C.

USEPA Comment 2c:

- ***An incorrect age range (0-84 months) was used in the IEUBK Model. Per the November 2017 USEPA OLEM Directive 9200.2-177, the age range should be set to 12-72 months.***

GHD Response 2c:

The age group has been changed from 0 to 84 months to 12 to 72 months as shown on the output from the IEUBK model (see Attachment C).

USEPA Comment 3:

Response to Comment 15-Appendix E (Now Appendix G), Tables 3, 6 and 7:

The new Tables 5, 8, 9 and 10 were reviewed. Requested information was provided, however, it is unnecessary to quantify potential risks associated with thallium exposures since the only available toxicity value is a Provisional Peer-Reviewed Toxicity Value (PPRTV) appendix value, which has a high level of uncertainty associated with it. This approach should be discussed in the uncertainty analysis section of the risk assessment.

GHD Response 3:

Section 3.3 (Uncertainty section) has been added to the memorandum that discusses the high level of uncertainty associated with the use of the thallium toxicity value.

Should you have any questions on the above, please do not hesitate to contact us.

Sincerely,

GHD

Julian Hayward

AG/kf/7

Encl.

cc: Tammy McPeek, OhioEPA
Technical Committee
April Gowing

Memorandum

December 14, 2020

To:	Julian Hayward	Ref. No.:	11208393-410
From:	April Gowing/we/1		
cc:	Daniel Smith		
Subject:	**Preliminary Human Health Risk Assessment for Quarry Pond Fish Consumption South Dayton Dump and Landfill Site, Moraine, Ohio**		

1. Introduction

This memorandum presents GHD's preliminary assessment of potential human health risks associated with consumption of fish from the Quarry Pond at the South Dayton Dump and Landfill Site. The assessment is based on analytical results of surface water and sediment samples collected in 2018/2019 as part of the Remedial Investigation/Feasibility Study (RI/FS). The purpose of this assessment is to determine the need for characterization of fish tissue in accordance with the RI/FS Work Plan (Section 7, page 97) which states the following:

> "The analytical results for surface water and sediment samples will allow conservative estimation of COC concentrations in fish tissue. Proposed sampling of Quarry Pond sediments will include estimation of both organic carbon and black carbon, which will allow estimation of bioavailable concentrations of PCBs and other substances in the sediments. Using typical methods (e.g., biota sediment accumulation factors or BSAFs), concentrations of bioaccumulative substances can then be estimated in fish tissue, for use in the risk assessment (ecological and HHRA). During field investigations information will be collected to estimate the quantity and type of fish present in the Quarry Pond, also for input to the risk assessment. This will be based on available information regarding size and depth of the pond and the morphoedaphic index (e.g., Ryder 1965)."

2. Surface Water and Sediment Data and COPC Identification

The data used in the assessment are presented in Attachment A. This includes all surface water and sediment samples collected in 2018 and 2019.

Surface Water Data

A comparison of the Quarry Pond surface water data to the surface water screening levels for consumption of organisms (National Recommended Water Quality Criteria - Human Health Criteria Table, Human Health

for Consumption of Organisms only, (https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table), accessed November 2019), identified the following parameters with maximum concentrations above the screening levels (as shown on Table 1):

- 1,2,4-trichlorobenzene
- Butyl benzlphthalate
- Arsenic
- Manganese
- Thallium
- Aroclor-1254

Three organic parameters (1,2,4-trichlorobenzene, butyl benzlphthalate, and Aroclor-1254) were detected as estimated values in 2018 surface water samples. However, these compounds were not detected in 2019 samples from the 32 surface water samples collected within the Quarry Pond. Given the low frequency of detection of these three parameters and since they have not been identified in the 2019 sampling event, these parameters should not be considered as chemicals of potential concern (COPCs) for the consumption of the organisms based on surface water quality in the Quarry Pond.

Arsenic was identified as a COPC in surface water (as indicated above) and sediment. Preference is typically given to use of sediment data over surface water data because sediment concentrations are temporally more stable and better representative of long-term exposure of bioaccumulative chemicals than surface water concentrations. Therefore, arsenic will not be carried forward as a surface water COPC for the consumption of organisms.

The screening level for manganese is based on organoleptic (taste and odor) effects and not based on ingestion of organisms in the surface water. Manganese was detected at concentrations above the screening levels at only three sample locations, and all other surface water concentrations were well below the screening level. GHD notes that the elevated concentrations of manganese occur only at depth within the Quarry Pond, due to sub-oxic conditions. Because fish avoid water with low dissolved oxygen, they would not come into contact with these high manganese concentrations. Therefore, manganese is not expected to be a concern for ingestion of fish. However, manganese has been conservatively carried forward as a surface water COPC for the consumption of organisms.

As a result, manganese and thallium are considered to be COPCs for the consumption of the organisms related to surface water conditions.

The surface water screening levels for consumption of organisms are very conservative for the Quarry Pond, given that they assume that an individual is consuming 17.5 grams per day (g/d) to 22 g/d of fish every day of the year (6,388 g/year [14 lbs/year] to 8,030 g/year [18 lbs/year]). Given the size of the Quarry Pond, there is not likely sufficient fish in the Pond to sustain this ingestion rate by multiple individuals as discussed further in Section 4.

Sediment Data

There are no sediment screening values for the consumption of fish exposure pathway. Therefore, all substances detected in sediment that were identified as bioaccumulative in Table 4-2 of USEPA (USEPA, 2000) were carried forward as COPCs. Table 2 presents the COPCs that were carried forward for the sediment to fish ingestion exposure pathway.

Quantification of Exposure

For data sets containing less than ten distinct detected values, the maximum detected concentration was used as the exposure point concentration (EPC). EPCs have been presented in Tables 3 and 4, which includes the maximum detected concentration, the arithmetic mean concentration, and the 95% upper confidence limit (UCL) of the mean, calculated using USEPA's ProUCL software Version 5.1 (2015). The ProUCL inputs and outputs are presented in Attachment B. The EPC summaries for the COPCs in each exposure media are presented in Table 3 (surface water) and Table 4 (sediment).

3. Risk Calculations and Results

As the Quarry Pond is located on private property, it is not expected that the pond would be routinely used for recreational fishing. However, due to the location of the Quarry Pond, a nearby adolescent or adult resident may be considered a trespasser. This trespasser could potentially catch fish from the Quarry Pond while trespassing and bring the fish home for the family to eat.

Exposure via ingestion of the fish from the Quarry Pond, would assume that the fish eater receptor includes both a child and adult who consumes fish caught from within the Quarry Pond by a trespasser. The fish eater is considered to consume these fish at a low frequency and not for subsistence purposes. A frequency of one meal of fish per month (0.4 pounds per meal for an adult and 0.2 pounds per meal for a child) during April to November is assumed given that the Quarry Pond is on private property, and trespassing to catch the fish may occur during warm weather conditions. The exposure assumption used to evaluate the fish eater are presented in Table 5. Based on these assumptions, an adult would consume 3 pounds per year and a child would consume 1.5 pounds per year, therefore a family of four would consume 9 pounds of fish per year. Chemicals with a mutagenic mode of action would exhibit a greater effect in early-life versus later-life exposure. For mutagenic chemicals, cancer risk to preadolescents and adolescents includes both early-life exposures that may result in the occurrence of cancer during childhood and early-life exposures that may contribute to cancers later in life. As such, in accordance with USEPA (2005), separate cancer intake equations as presented in Table 5 have been used for the risk assessment of mutagens.

Potential fish tissue concentrations were calculated for both surface water and sediment. The fish tissue concentrations were estimated using a bioconcentration factor (BCF) as shown in Table 6 and the 95% upper confidence limit of the mean concentration of the surface water (or EPC) as shown in Table 3. The fish tissue concentrations were estimated using a biota-sediment accumulation factor (BSAF) as shown in Table 7 and the 95% upper confidence limit of the mean concentration of the sediment as shown in Table 4, with the exception of lead where the average sediment concentration was used.

The toxicity assessment provides chemical-specific quantitative dose-response data for each COPC. The non-carcinogenic and carcinogenic toxicity values for surface water and sediment COPCs are presented in Tables 8 and 9, respectively.

Based on these exposure assumption for a child and adult fish eater, the cancer risk and hazard quotient values are presented in Table 10. As shown in Table 10, the cancer risk (5E-05) is within the acceptable risk range of 1E-06 to 1E-04 and the hazard index for a child (2) is above the acceptable target level of 1. Note the hazard index for an adult (0.7) is below the acceptable target level of 1. The risk and hazards are summarized in Table 11, along with the summary of the target organs. As shown in Table 11, none of the individual HI values for the target organs are above 1. This demonstrates that the surface water screening levels are conservative for the Quarry Pond and that ingestion of the fish (related to uptake from surface water and sediment) from the Quarry Pond should not result in unacceptable risks and hazards.

It should be noted that the estimates of fish concentrations of PAH, PCBs, and chlordane due to sediment uptake are likely conservative. These concentrations were estimated with BSAFs that were based on the average sediment total organic carbon (TOC) concentration of 2.6%. However, in addition to regular organic carbon derived from decaying organic matter, Quarry Pond sediments have significant concentrations, about 1.06% on average, of soot black carbon (BC). As described in the literature and USEPA guidance (e.g., see Xia, 1998; Cornelissen et al., 2005; Driscoll et al., 2009; Lohman et al., 2005; Werner et al., 2010; USEPA, 2012), compared to regular organic carbon, BC has much higher binding capacity, an order of magnitude or more higher, to hydrophobic organic substances than other forms of TOC. Assuming that the BC had 10 times the binding capacity of regular organic carbon would suggest that the sediments behave as if the TOC concentration was 12%[1], instead of 2.6% used in estimating fish tissue concentrations with the BSAF. Using this effective TOC concentration would reduce estimated concentrations of PCBs, chlordane, and PAHs by about 78%. The calculated risk levels would be reduced similarly.

The second conservative element of estimating fish concentrations with BSAF is that much, probably most of the fish stocks in the Quarry Pond will not routinely feed on the bottom. Given the limnology of the Quarry Pond, the dominant recreational fish in this pond are likely sunfishes and bass. These species will feed primarily on the water column and the macrophyte (aquatic weed) food chains, rather than the sediment food chain. Fish bioaccumulation of chemicals from the water column and macrophyte food chains will be lower than for fish feeding on sediment food chain.

Therefore, the risks and hazard presented based on the average TOC concentration of 2.6% presented in Tables 10 and 11 are conservative and likely overestimate the risk and hazards to the receptors consuming fish from the Quarry Pond.

3.1 Adult Lead Exposure in Fish

As per USEPA guidance (USEPA, 2010), and given that lead was identified as a sediment COPC for the fish tissue exposure, the levels of fetal blood lead due to maternal exposure via the ingestion of fish was quantified using the USEPA adult lead model (ALM) methodology (USEPA, 2009), "Recommendations of the

[1] Since TOC includes BC, the effective TOC concentration is (TOC-BC) + 1 0 * BC. This simplifies to TOC + 9 * BC, or 2.59% + 1.06% * 9 = 12.2%.

Technical Review Workgroup for Lead for an Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil" (USEPA, 2003), the ALM "Frequently Asked Questions" (FAQ) website (USEPA, 2013), and the "Transmittal of Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Standard Deviation Parameters" (USEPA, 2009 & 2017). This methodology allows for the calculation of maternal blood lead for comparison to an acceptable blood level of 10 µg/dL to 5% of the population. The adult lead model was used to assess lead in fish tissue exposure for the adult fish eater. The estimated 95% for fetal blood lead levels for the fish eater is shown in Table 12. The 95% fetal blood lead level for the adult fish eater is below the USEPA Technical Review Workgroup (TRW) recommended fetal blood lead of 10 µg/dL. Therefore, lead exposure from fish tissue to the adult fish eater would not potentially pose an unacceptable risk.

3.2 The Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead

The IEUBK model for lead exposure in children was used to determine exposure levels for potential future ingestion of fish by child recreational fish eater of fish from the Quarry Pond based on the assumption that the child is considered to be more sensitive than the adult. The IEUBK model for lead provides a method for predicting blood lead levels in populations exposed to lead in several different media. The impetus for the development of this model was the USEPA's conclusion that a threshold does not exist for many of the non-cancer effects of lead in infants and young children. The IEUBK Model is a simulation model which uses mathematical equations to estimate the lead level in blood (PbB) of a child (or population of children) in the 12- to 72-month1 age group who are exposed to lead in various media such as soil, air, diet, water, and other potential sources. The IEUBKwin32 Model 1.1, Build 11 (USEPA, 2010) was used to determine the blood lead concentration for fish eater from exposure to sediment (see Table C.1 in Attachment C).

For this evaluation, the intake of lead was determined for various direct and secondary exposure pathways, including the ingestion of soil, dust particles and drinking water, inhalation of air and dietary intake (i.e., produce, animal products, and fish). As indicated above, young children are considered to be unimpacted when the model predicts that less than 5% of children will have blood lead levels greater than 10 µg/dL. Default lead concentrations in soil of 200 mg/kg, air of 0.100 µg/m^3, and drinking water of 4 µg/L were used as inputs into the IEUBK model. The model default values were utilized for the dietary lead intake for each age range with the exception that a fish tissue concentration of 0.742 mg/kg was added to the model. Using these default lead concentrations in soil, air, water, and the default dietary lead intake levels, the IEUBK model was run to determine the blood lead level concentration. The default mother’s blood lead concentration at childbirth that is in the IEUBK Model is 1 µg/dL. The IEUBK Model assumes that the maternal blood lead at the time of delivery is stored in the newborn child tissues. Based on the analysis of the NHANES 2009-2014 data, USEPA (2017) has recommended that the Mother's Blood Lead Concentration at Childbirth (MatPb) value in the IEUBK Model be updated to 0.6 µg/dL. Therefore, a value of 0.6 µg/dL was used for the MatPb value.

The IEUBK Model inputs and outputs are presented in Attachment C. The IEUBK model output indicate that the percentage of children with blood lead levels greater than 10 µg/dL is less than 5% (0.631%) as shown in Attachment C. Therefore the lead in sediment will not result in unacceptable risk to children that may eat fish caught from the Quarry Pond.

3.3 Uncertainty Analysis

Thallium was identified as a COPC in surface water. The thallium concentrations in fish tissue were estimated based on the maximum surface water concentration. The only currently available toxicity value for thallium is a Provisional Peer-Reviewed Toxicity Value (PPRTV) which has a high level of uncertainty. The PPRTV for thallium was used to evaluate the potential non-cancer risk associated with consumption of fish, however given the high level of uncertainty associated with this value, the calculated non-cancer risk may be over or under-estimated.

4. Estimate of Quarry Pond Fish Production

The potential yield of edible fish from the Quarry Pond was estimated with the widely used morphoedaphic index method (MEI) (Ryder, 1965; Ryder et al., 1974). The MEI is a simple ratio of average total dissolved solids (TDS), in mg/L, divided by average depth, in feet or meters. The relationship between the MEI and recreational fish yield was originally based on the fish yields of about 50 northern temperate lakes (Ryder, 1965). Since then, the method has been applied to estimate recreational fish yields in lakes and reservoirs across the world (e.g., see Henderson and Welcomme, 1974). The index has been criticized as a less effective predictor than other empirical prediction methods (e.g., see Downing et al., 1990, Hanson and Legget, 1982). However, these alternative models are generally more complicated and/or use predictors that, while having more obvious biological relevance (e.g., algal biomass, benthic biomass) are considerably more complicated to obtain. The MEI models are very valuable because of their simplicity and the relative ease of obtaining the necessary data to run the model. That is, measurements of total dissolved solids are much easier to obtain, and much more stable over time, than those for, for instance, chlorophyll a and macrobenthos biomass.

In the original paper, Ryder (1965) produced two models, one for lakes that were moderately to intensively fished by recreational anglers and a second model for lakes that had "restricted harvests or incomplete catch records". As predicted by the author, the two groups has distinct distributions in the relationship between fish yield (FY) vs. MEI. Linear best fit prediction models for both groups were developed. The model for fish yield, in lbs/acre/year, in the intensively fished lakes was as follows:

$$FY = 2.09 \times MEI^{0.4461} \qquad \text{Equation 1}$$

According to Ryder (1965), the best fit equation for the lakes with restrictions on fishing was essentially a parallel line as shown below:

$$FY = 0.1397 \times MEI^{0.4435} \qquad \text{Equation 2}$$

This would suggest that fish yield in the restricted fishing lakes would be about 1/20th that of moderately to heavily fished lakes. However, the latter equation apparently has a typographical error of some sort because best fit regression of the actual data provided (and also depicted on Figure 1 of that document showing the data) produce the following equation.

$$FY = 0.68 \times MEI^{0.4744} \qquad \text{Equation 3}$$

Equation 3 suggests that fish yield in restricted fishing lakes would be about 1/3rd of that in intensively fished lakes. As Equation 3 is more conservative and, we believe, more correct, it will be used in the discussion below.

Equations 1 and 3 were applied to estimate potential recreational fish yield for the Quarry Pond. The Quarry Pond depths and area vary with hydrological conditions, but available data suggest a surface water area of about 13 acres and an average depth of about 16 feet deep. Total dissolved solid (TDS) was measured in both 2018 and 2019 surface water samples. The TDS results did not vary much across samples and sampling events, although TDS was somewhat higher in water samples collected from the deepest parts of the pond. The mean TDS for 2018 and 2019 samples were about 250 mg/L and 240 mg/L, respectively. Using the higher TDS value (250 mg/L), the MEI is equal to 15.6 mg/(L*ft). That is 250 mg/L divided by 16 feet.

Based on the surface water area of 13 acres, this MEI predicts recreational fish yields of about 92.8 and 32.7 lbs per year (FY of 7.11 lbs/acre/yr and 2.5 lbs/acre/yr), depending on whether the pond is intensively fished or restricted. These estimates pertain to fish on the fin, and cleaning and cooking losses reduce that mass by about 2/3rds or more (Zabik et al. 1993). Thus, the actual fish available for consumption are reduced to about 31 lbs and 11 lbs of fish/year on the table.

These estimates are affected by various sources of uncertainty. Thus, for example, lake productivity is largely due to inputs of phosphorus, which are typically dominated by fluvial inputs. The Quarry Pond is fed by groundwater, suggesting that its productivity will be low. The relatively low productivity of the Quarry Pond is also supported by visual observation – the pond's waters are relatively clear. On the other hand, small size a pond or lake (Scarborough and Peters, 1994; Downing, 2010) and presence of weed beds (e.g., see Wiley et al. 1984) might predict increased fish productivity. Given the small size of the Quarry Pond and presence of moderate but not high densities weed beds around the pond would suggest that the pond could have a higher fish production than is estimated by the above equations.

However, the primary factor controlling fish yield from the Quarry Pond is clearly its limited access. Access to the pond is severely limited by fencing and other constraints, and even trespassers' angling efficiency will be limited by exclusion of boats and interference with shoreline angling by the macrophyte beds. As such, only the perimeter of the Quarry Pond can be fished effectively, and much of the perimeter will be difficult to fish because of the high banks and dense terrestrial vegetation, along with line-tangling of the aquatic weeds.

Given this background, the lower estimate, for the corrected restricted fishing lakes is assumed to be a good, but still conservative estimate of potential fish yields from the Quarry Pond. As noted above, this model predicts a total yield for the Quarry Pond of about 11 lbs per year, of cooked fish. This value is lower than default ingestion rate of 14 lbs to 18 lbs per year, for a single person, used in the development of the surface water screening levels for consumption of organisms, which are therefore conservative.

The fish consumption values assumed in this risk assessment are also conservative. According the assumed ration of fish, an adult would consume 3 pounds per year and a child would consume 1.5 pounds per year. Hence, a single "typical" family of four would consume 9 pounds of fish per year, almost all of the fish that the Quarry Pond is predicted to produce. This illustrates the very limited amount of exposure that may exist related to potential fish tissue consumption.

5. References

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Table 1

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Surface Water Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Surface Water
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Volatile Organic Compounds											
71-55-6	1,1,1-Trichloroethane	ND	ND	µg/L	--	0/32	0.24	N/A	200000	N	N	ND
79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	µg/L	--	0/32	0.13	N/A	3	C	N	ND
79-00-5	1,1,2-Trichloroethane	ND	ND	µg/L	--	0/32	0.09	N/A	8.9	N	N	ND
75-34-3	1,1-Dichloroethane	ND	ND	µg/L	--	0/32	0.17	N/A	--	C	N	ND
75-35-4	1,1-Dichloroethene	ND	ND	µg/L	--	0/32	0.19	N/A	20000	N	N	ND
120-82-1	**1,2,4-Trichlorobenzene**	**0.41 J**	**0.41 J**	**µg/L**	**SW-1 (9/18/2018)**	**1/32**	**0.26**	**0.41**	**0.076**	**N**	**Y**	**ASV**
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	ND	ND	µg/L	--	0/32	0.0086	N/A	--	C	N	ND
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	ND	ND	µg/L	--	0/32	0.0087	N/A	--	C	N	ND
95-50-1	1,2-Dichlorobenzene	ND	ND	µg/L	--	0/32	0.15	N/A	3000	N	N	ND
107-06-2	1,2-Dichloroethane	ND	ND	µg/L	--	0/32	0.21	N/A	650	C	N	ND
78-87-5	1,2-Dichloropropane	ND	ND	µg/L	--	0/32	0.15	N/A	31	N	N	ND
541-73-1	1,3-Dichlorobenzene	ND	ND	µg/L	--	0/32	0.15	N/A	10	N	N	ND
106-46-7	1,4-Dichlorobenzene	ND	ND	µg/L	--	0/32	0.16	N/A	900	C	N	ND
78-93-3	2-Butanone (Methyl ethyl ketone) (MEK)	2.9 J	2.9 J	µg/L	SW-1 (9/18/2018)	1/32	1.2	2.9	--	N	N	NOT BIO
591-78-6	2-Hexanone	1.1 J	1.1 J	µg/L	SW-1 (9/18/2018)	1/32	0.54	1.1	--	N	N	NOT BIO
108-10-1	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	0.88 J	0.88 J	µg/L	SW-1 (9/18/2018)	1/32	0.42	0.88	--	N	N	NOT BIO
67-64-1	Acetone	5.4 J	36	µg/L	SW-7 (9/20/2018)	3/32	5.4 - 13	36	--	N	N	NOT BIO
71-43-2	Benzene	0.21 J	0.21 J	µg/L	SW-1 (9/18/2018)	1/32	0.13 - 0.36	0.21	16	C	N	BSV
75-27-4	Bromodichloromethane	ND	ND	µg/L	--	0/32	0.17	N/A	27	C	N	ND
75-25-2	Bromoform	ND	ND	µg/L	--	0/32	0.76	N/A	120	C	N	ND
74-83-9	Bromomethane (Methyl bromide)	ND	ND	µg/L	--	0/32	0.42	N/A	10000	N	N	ND
75-15-0	Carbon disulfide	ND	ND	µg/L	--	0/32	0.28	N/A	--	N	N	ND
56-23-5	Carbon tetrachloride	ND	ND	µg/L	--	0/32	0.26	N/A	5	C	N	ND
108-90-7	Chlorobenzene	ND	ND	µg/L	--	0/32	0.14	N/A	800	N	N	ND
75-00-3	Chloroethane	ND	ND	µg/L	--	0/32	0.83	N/A	--	N	N	ND
67-66-3	Chloroform (Trichloromethane)	ND	ND	µg/L	--	0/32	0.13	N/A	2000	C	N	ND
74-87-3	Chloromethane (Methyl chloride)	ND	ND	µg/L	--	0/32	0.2	N/A	--	N	N	ND
156-59-2	cis-1,2-Dichloroethene	0.21 J	0.23 J	µg/L	SW-2 (10/2/2019)	3/32	0.16	0.23	--	N	N	NOT BIO
10061-01-5	cis-1,3-Dichloropropene	ND	ND	µg/L	--	0/32	0.61	N/A	12	C	N	ND
110-82-7	Cyclohexane	ND	ND	µg/L	--	0/32	0.24	N/A	--	N	N	ND
124-48-1	Dibromochloromethane	ND	ND	µg/L	--	0/32	0.39	N/A	21	C	N	ND
75-71-8	Dichlorodifluoromethane (CFC-12)	ND	ND	µg/L	--	0/32	0.35	N/A	--	N	N	ND
100-41-4	Ethylbenzene	0.11 J	0.34 J	µg/L	SW-1 (9/18/2018)	4/32	0.11	0.34	130	C	N	BSV
98-82-8	Isopropyl benzene	ND	ND	µg/L	--	0/32	0.09	N/A	--	N	N	ND
79-20-9	Methyl acetate	ND	ND	µg/L	--	0/32	1.7	N/A	--	N	N	ND
108-87-2	Methyl cyclohexane	ND	ND	µg/L	--	0/32	0.33	N/A	--	N	N	ND
1634-04-4	Methyl tert butyl ether (MTBE)	ND	ND	µg/L	--	0/32	0.07	N/A	--	C	N	ND
75-09-2	Methylene chloride	ND	ND	µg/L	--	0/32	2.6	N/A	1000	C	N	ND
100-42-5	Styrene	ND	ND	µg/L	--	0/32	0.1	N/A	--	N	N	ND
127-18-4	Tetrachloroethene	ND	ND	µg/L	--	0/32	0.15	N/A	29	C	N	ND

Table 1

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Surface Water Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Surface Water
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Volatile Organic Compounds (cont.'d)											
108-88-3	Toluene	0.15 J	3.6	µg/L	SW-2 (9/19/2018)	17/32	0.14	3.6	520	N	N	BSV
156-60-5	trans-1,2-Dichloroethene	ND	ND	µg/L	--	0/32	0.19	N/A	4000	N	N	ND
10061-02-6	trans-1,3-Dichloropropene	ND	ND	µg/L	--	0/32	0.67	N/A	12	C	N	ND
79-01-6	Trichloroethene	0.14 J	0.35 J	µg/L	SW-2 (10/2/2019)	6/32	0.1	0.35	7	N	N	BSV
75-69-4	Trichlorofluoromethane (CFC-11)	ND	ND	µg/L	--	0/32	0.45	N/A	--	N	N	ND
76-13-1	Trifluorotrichloroethane (CFC-113)	ND	ND	µg/L	--	0/32	0.41	N/A	--	N	N	ND
75-01-4	Vinyl chloride	ND	ND	µg/L	--	0/32	0.2	N/A	1.6	C	N	ND
1330-20-7	Xylenes (total)	0.15 J	1.8 J	µg/L	SW-1 (9/18/2018)	15/32	0.15	1.8	--	N	N	NOT BIO
	Semi-Volatiles Organic Compounds											
108-60-1	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	ND	ND	µg/L	--	0/32	0.52 - 1.1	N/A	4000	N	N	ND
95-95-4	2,4,5-Trichlorophenol	ND	ND	µg/L	--	0/32	1.9 - 4	N/A	600	N	N	ND
88-06-2	2,4,6-Trichlorophenol	ND	ND	µg/L	--	0/32	1.7 - 3.6	N/A	2.8	N	N	ND
120-83-2	2,4-Dichlorophenol	ND	ND	µg/L	--	0/32	0.25 - 0.52	N/A	60	N	N	ND
105-67-9	2,4-Dimethylphenol	ND	ND	µg/L	--	0/32	0.49 - 1	N/A	3000	N	N	ND
51-28-5	2,4-Dinitrophenol	ND	ND	µg/L	--	0/32	5.9 - 12	N/A	300	N	N	ND
121-14-2	2,4-Dinitrotoluene	ND	ND	µg/L	--	0/32	2 - 4.1	N/A	1.7	C	N	ND
606-20-2	2,6-Dinitrotoluene	ND	ND	µg/L	--	0/32	2 - 4.3	N/A	--	C	N	ND
91-58-7	2-Chloronaphthalene	ND	ND	µg/L	--	0/32	0.46 - 0.97	N/A	1000	N	N	ND
95-57-8	2-Chlorophenol	ND	ND	µg/L	--	0/32	0.26 - 0.55	N/A	800	N	N	ND
91-57-6	2-Methylnaphthalene	0.12 J	0.15 J	µg/L	SW-7 (10/3/2019)	4/32	0.11 - 0.22	0.15	--	N	N	NOT BIO
95-48-7	2-Methylphenol	ND	ND	µg/L	--	0/32	0.2 - 0.42	N/A	--	N	N	ND
88-74-4	2-Nitroaniline	ND	ND	µg/L	--	0/32	0.49 - 1	N/A	--	N	N	ND
88-75-5	2-Nitrophenol	ND	ND	µg/L	--	0/32	0.54 - 1.1	N/A	--		N	ND
3/4-Cresol	3&4-Methylphenol	ND	ND	µg/L	--	0/32	0.18 - 0.38	N/A	--	N	N	ND
91-94-1	3,3'-Dichlorobenzidine	ND	ND	µg/L	--	0/32	1.1 - 2.3	N/A	0.15	C	N	ND
99-09-2	3-Nitroaniline	ND	ND	µg/L	--	0/32	0.54 - 1.1	N/A	--		N	ND
534-52-1	4,6-Dinitro-2-methylphenol	ND	ND	µg/L	--	0/32	2.7 - 5.6	N/A	30	N	N	ND
101-55-3	4-Bromophenyl phenyl ether	ND	ND	µg/L	--	0/32	0.48 - 1	N/A	--		N	ND
59-50-7	4-Chloro-3-methylphenol	ND	ND	µg/L	--	0/32	0.28 - 0.59	N/A	2000	N	N	ND
106-47-8	4-Chloroaniline	ND	ND	µg/L	--	0/31	0.3 - 0.63	N/A	--	C	N	ND
7005-72-3	4-Chlorophenyl phenyl ether	ND	ND	µg/L	--	0/32	0.52 - 1.1	N/A	--		N	ND
100-01-6	4-Nitroaniline	ND	ND	µg/L	--	0/32	0.87 - 1.8	N/A	--	N	N	ND
100-02-7	4-Nitrophenol	ND	ND	µg/L	--	0/32	2.1 - 4.3	N/A	--		N	ND
83-32-9	Acenaphthene	ND	ND	µg/L	--	0/32	0.16 - 0.34	N/A	90	N	N	ND
208-96-8	Acenaphthylene	ND	ND	µg/L	--	0/32	0.12 - 0.25	N/A	90 (5)	N	N	ND
98-86-2	Acetophenone	ND	ND	µg/L	--	0/32	0.35 - 0.73	N/A	--	N	N	ND
120-12-7	Anthracene	ND	ND	µg/L	--	0/32	0.13 - 0.27	N/A	400	N	N	ND
1912-24-9	Atrazine	ND	ND	µg/L	--	0/32	0.91 - 1.9	N/A	--	C	N	ND
100-52-7	Benzaldehyde	ND	ND	µg/L	--	0/32	0.72 - 1.5	N/A	--	N	N	ND

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CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Semi-Volatiles Organic Compounds (cont.'d)											
56-55-3	Benzo(a)anthracene	ND	ND	µg/L	--	0/32	0.16 - 0.34	N/A	0.0013	C	N	ND
50-32-8	Benzo(a)pyrene	ND	ND	µg/L	--	0/32	0.16 - 0.35	N/A	0.00013	C	N	ND
205-99-2	Benzo(b)fluoranthene	ND	ND	µg/L	--	0/32	0.15 - 0.31	N/A	0.0013	C	N	ND
191-24-2	Benzo(g,h,i)perylene	ND	ND	µg/L	--	0/32	0.17 - 0.36	N/A	30 (5)	N	N	ND
207-08-9	Benzo(k)fluoranthene	ND	ND	µg/L	--	0/32	0.13 - 0.28	N/A	0.013	C	N	ND
92-52-4	Biphenyl (1,1-Biphenyl)	ND	ND	µg/L	--	0/32	0.47 - 0.98	N/A	--	N	N	ND
111-91-1	bis(2-Chloroethoxy)methane	ND	ND	µg/L	--	0/32	0.43 - 0.91	N/A	--	N	N	ND
111-44-4	bis(2-Chloroethyl)ether	ND	ND	µg/L	--	0/32	0.38 - 0.8	N/A	2.2	C	N	ND
117-81-7	bis(2-Ethylhexyl)phthalate (DEHP)	ND	ND	µg/L	--	0/32	2.1 - 4.4	N/A	0.37	C	N	ND
85-68-7	**Butyl benzylphthalate (BBP)**	**7.9 J**	**7.9 J**	**µg/L**	**SW-10 (9/18/2018)**	**1/32**	**0.63 - 1.3**	**7.9**	**0.1**	**C**	**Y**	**ASV**
105-60-2	Caprolactam	ND	ND	µg/L	--	0/30	0.89 - 1.9	N/A	--	N	N	ND
86-74-8	Carbazole	ND	ND	µg/L	--	0/32	0.47 - 0.98	N/A	--		N	ND
218-01-9	Chrysene	ND	ND	µg/L	--	0/32	0.18 - 0.37	N/A	0.13	C	N	ND
53-70-3	Dibenz(a,h)anthracene	ND	ND	µg/L	--	0/32	0.14 - 0.3	N/A	0.00013	C	N	ND
132-64-9	Dibenzofuran	ND	ND	µg/L	--	0/32	0.53 - 1.1	N/A	--	N	N	ND
84-66-2	Diethyl phthalate	ND	ND	µg/L	--	0/32	3.6 - 7.6	N/A	600	N	N	ND
131-11-3	Dimethyl phthalate	ND	ND	µg/L	--	0/32	0.49 - 1	N/A	2000	N	N	ND
84-74-2	Di-n-butylphthalate (DBP)	ND	ND	µg/L	--	0/32	1.7 - 3.6	N/A	30	N	N	ND
117-84-0	Di-n-octyl phthalate (DnOP)	ND	ND	µg/L	--	0/32	0.78 - 1.6	N/A	--	N	N	ND
206-44-0	Fluoranthene	ND	ND	µg/L	--	0/32	0.15 - 0.32	N/A	20	N	N	ND
86-73-7	Fluorene	ND	ND	µg/L	--	0/32	0.16 - 0.34	N/A	70	N	N	ND
118-74-1	Hexachlorobenzene	ND	ND	µg/L	--	0/32	0.15 - 0.32	N/A	0.000079	C	N	ND
87-68-3	Hexachlorobutadiene	ND	ND	µg/L	--	0/32	0.52 - 1.1	N/A	0.01	C	N	ND
77-47-4	Hexachlorocyclopentadiene	ND	ND	µg/L	--	0/32	1.7 - 3.5	N/A	4	N	N	ND
67-72-1	Hexachloroethane	ND	ND	µg/L	--	0/32	0.38 - 0.79	N/A	0.1	C	N	ND
193-39-5	Indeno(1,2,3-cd)pyrene	ND	ND	µg/L	--	0/32	0.13 - 0.27	N/A	0.0013	C	N	ND
78-59-1	Isophorone	ND	ND	µg/L	--	0/32	0.31 - 0.65	N/A	1800	C	N	ND
91-20-3	Naphthalene	0.15 J	1.1	µg/L	SW-7 (10/3/2019)	9/32	0.1 - 0.22	1.1	--	C	N	NOT BIO
98-95-3	Nitrobenzene	ND	ND	µg/L	--	0/32	0.49 - 1	N/A	600	C	N	ND
621-64-7	N-Nitrosodi-n-propylamine	ND	ND	µg/L	--	0/32	0.24 - 0.51	N/A	0.51	C	N	ND
86-30-6	N-Nitrosodiphenylamine	ND	ND	µg/L	--	0/32	0.42 - 0.88	N/A	6	C	N	ND
87-86-5	Pentachlorophenol	ND	ND	µg/L	--	0/32	3 - 6.2	N/A	0.04	C	N	ND
85-01-8	Phenanthrene	ND	ND	µg/L	--	0/32	0.16 - 0.33	N/A	30 (5)	N	N	ND
108-95-2	Phenol	0.32 J	0.32 J	µg/L	SW-2 (10/2/2019)	1/32	0.12 - 0.26	0.32	300000	N	N	BSV
129-00-0	Pyrene	ND	ND	µg/L	--	0/32	0.17 - 0.35	N/A	30	N	N	ND
	Metals											
7429-90-5	Aluminum	37 J	110	µg/L	SW-3 (9/20/2018)	6/32	34	110	--	N	N	NOT BIO
7440-36-0	Antimony	0.78 J	0.82 J	µg/L	SW-6 (10/3/2019)	3/32	0.57	0.82	640	N	N	BSV
7440-38-2	**Arsenic**	**1.6 J**	**14**	**µg/L**	**SW-2 (9/19/2018)**	**32/32**	**--**	**14**	**0.14**	**C**	**Y**	**ASV**
7440-39-3	Barium	65	250	µg/L	SW-2 (9/19/2018)	32/32	--	250	--	N	N	NOT BIO

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	Metals (cont.'d)											
7440-41-7	Beryllium	0.47 J	0.67 J	µg/L	SW-1 (9/18/2018)	5/32	0.31 - 0.65	0.67	--	N	N	NOT BIO
7440-43-9	Cadmium	ND	ND	µg/L	--	0/32	0.2 - 0.21	N/A	--	N	N	ND
7440-70-2	Calcium	35000	80000	µg/L	SW-2 (9/19/2018)	32/32	--	80000	--		N	NAT
7440-47-3	Chromium	ND	ND	µg/L	--	0/32	0.98	N/A	--	C	N	ND
7440-48-4	Cobalt	0.60 J	0.67 J	µg/L	SW-2 (10/2/2019)	3/32	0.19	0.67	--	N	N	NOT BIO
7440-50-8	Copper	ND	ND	µg/L	--	0/32	1.7	N/A	--	N	N	ND
57-12-5	Cyanide (total)	ND	ND	µg/L	--	0/32	0.006	N/A	400	N	N	ND
7439-89-6	Iron	47 J	7400	µg/L	SW-2 (9/19/2018)	14/32	47	7400	--	N	N	NOT BIO
7439-92-1	Lead	ND	ND	µg/L	--	0/32	0.45	N/A	--	C	N	ND
7439-95-4	Magnesium	23000	32000	µg/L	SW-2 (9/19/2018)	32/32	--	32000	--		N	NAT
7439-96-5	**Manganese**	**3.6 J**	**3000**	**µg/L**	**SW-2 (10/2/2019)**	**32/32**	**--**	**3000**	**100**	**N**	**Y**	**ASV**
7439-97-6	Mercury	ND	ND	µg/L	--	0/32	0.13	N/A	--	N	N	BIO
7440-02-0	Nickel	1.6 J	1.6 J	µg/L	SW-2 (10/2/2019)	1/32	1.5	1.6	4600	N	N	BSV
7440-09-7	Potassium	4900	6500	µg/L	SW-2 (9/19/2018)	32/32	--	6500	--		N	NAT
7782-49-2	Selenium	1.0 J	1.0 J	µg/L	SW-8 (10/3/2019)	1/32	0.89	1	4200	N	N	BSV
7440-22-4	Silver	ND	ND	µg/L	--	0/32	0.053	N/A	--	N	N	ND
7440-23-5	Sodium	17000	27000	µg/L	SW-2 (9/19/2018)	32/32	--	27000	--		N	NAT
7440-28-0	**Thallium**	**0.23 J**	**0.55 J**	**µg/L**	**SW-1 (10/2/2019)**	**2/32**	**0.2 - 0.82**	**0.55**	**0.47**	**N**	**Y**	**ASV**
7440-62-2	Vanadium	0.89 J	1.4 J	µg/L	SW-2 (9/19/2018)	3/32	0.82	1.4	--	N	N	NOT BIO
7440-66-6	Zinc	ND	ND	µg/L	--	0/32	15	N/A	26000	N	N	ND
	Polychlorinated Biphenyls											
12674-11-2	Aroclor-1016 (PCB-1016)	ND	ND	µg/L	--	0/32	0.053 - 0.58	N/A	0.000064	N	N	ND
11104-28-2	Aroclor-1221 (PCB-1221)	ND	ND	µg/L	--	0/32	0.054 - 0.59	N/A	0.000064	C	N	ND
11141-16-5	Aroclor-1232 (PCB-1232)	ND	ND	µg/L	--	0/32	0.07 - 0.76	N/A	0.000064	C	N	ND
53469-21-9	Aroclor-1242 (PCB-1242)	ND	ND	µg/L	--	0/32	0.072 - 0.78	N/A	0.000064	C	N	ND
12672-29-6	Aroclor-1248 (PCB-1248)	ND	ND	µg/L	--	0/32	0.048 - 0.52	N/A	0.000064	C	N	ND
11097-69-1	**Aroclor-1254 (PCB-1254)**	**0.074 J**	**0.074 J**	**µg/L**	**SW-2 (9/19/2018)**	**1/32**	**0.038 - 0.41**	**0.074**	**0.000064**	**C**	**Y**	**ASV**
11096-82-5	Aroclor-1260 (PCB-1260)	ND	ND	µg/L	--	0/32	0.044 - 0.47	N/A	0.000064	C	N	ND
	Pesticides											
72-54-8	4,4'-DDD	ND	ND	µg/L	--	0/32	0.005 - 0.27	N/A	0.00012	C	N	ND
72-55-9	4,4'-DDE	ND	ND	µg/L	--	0/32	0.0041 - 0.22	N/A	0.000018	C	N	ND
50-29-3	4,4'-DDT	ND	ND	µg/L	--	0/32	0.0046 - 0.25	N/A	0.00003	C	N	ND
309-00-2	Aldrin	ND	ND	µg/L	--	0/32	0.0023 - 0.12	N/A	0.00000077	C	N	ND
319-84-6	alpha-BHC	ND	ND	µg/L	--	0/32	0.0019 - 0.1	N/A	0.00039	C	N	ND
5103-71-9	alpha-Chlordane	ND	ND	µg/L	--	0/32	0.003 - 0.16	N/A	0.00032	C	N	ND
319-85-7	beta-BHC	ND	ND	µg/L	--	0/32	0.0044 - 0.24	N/A	0.014	C	N	ND
319-86-8	delta-BHC	ND	ND	µg/L	--	0/32	0.0041 - 0.22	N/A	0.01	C	N	ND
60-57-1	Dieldrin	ND	ND	µg/L	--	0/32	0.0022 - 0.11	N/A	0.0000012	C	N	ND

Table 1

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Surface Water Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Surface Water
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Pesticides (cont.'d)											
959-98-8	Endosulfan I	ND	ND	µg/L	--	0/32	0.0035 - 0.18	N/A	30	N	N	ND
33213-65-9	Endosulfan II	ND	ND	µg/L	--	0/32	0.0022 - 0.12	N/A	40	N	N	ND
1031-07-8	Endosulfan sulfate	ND	ND	µg/L	--	0/32	0.0035 - 0.19	N/A	40	N	N	ND
72-20-8	Endrin	ND	ND	µg/L	--	0/32	0.0024 - 0.12	N/A	0.03	N	N	ND
7421-93-4	Endrin aldehyde	ND	ND	µg/L	--	0/32	0.0044 - 0.24	N/A	1	N	N	ND
53494-70-5	Endrin ketone	ND	ND	µg/L	--	0/32	0.0038 - 0.21	N/A	--	N	N	ND
58-89-9	gamma-BHC (lindane)	ND	ND	µg/L	--	0/32	0.0024 - 0.13	N/A	4.4	C	N	ND
5103-74-2	gamma-Chlordane	ND	ND	µg/L	--	0/32	0.0048 - 0.25	N/A	0.00032	C	N	ND
76-44-8	Heptachlor	ND	ND	µg/L	--	0/32	0.0031 - 0.16	N/A	0.0000059	C	N	ND
1024-57-3	Heptachlor epoxide	ND	ND	µg/L	--	0/32	0.0025 - 0.13	N/A	0.000032	C	N	ND
72-43-5	Methoxychlor	ND	ND	µg/L	--	0/32	0.0045 - 0.24	N/A	0.02	N	N	ND
8001-35-2	Toxaphene	ND	ND	µg/L	--	0/32	0.055 - 2.8	N/A	0.0071	C	N	ND
	Herbicides											
93-76-5	2,4,5-T	ND	ND	µg/L	--	0/32	0.057 - 0.57	N/A	--	N	N	ND
93-72-1	2,4,5-TP (Silvex)	ND	ND	µg/L	--	0/32	0.43	N/A	400	N	N	ND
94-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)	ND	ND	µg/L	--	0/32	2.2	N/A	12000	N	N	ND

Notes:

(1) Minimum/maximum detected concentration.
(2) Based on data collected from 2018 - 2019 in sampling locations: SW-1, SW-2, SW-3, SW-4, SW-5, SW-6, SW-7, SW-8, SW-9, SW-10, SW-11, SW-12.
(3) National Recommended Water Quality Criteria - Human Health Criteria Table, Human Health for Consumption of Organisms only, (https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table), accessed November 2019.
(4) Rationale Codes

Selection Reason: Maximum detected above Screening Value (ASV)
Chemical detected and considered bioaccumulative according to OEPA (2017) (BIO).
Deletion Reason: Maximum detected below Screening Value (BSV)
Analyte not considered bioaccumulative according to OEPA (2017) (NOTBIO).
Analyte Not Detected (ND)
Naturally Occurring (NAT)

(5) No screening value available, surrogate screening value implemented as follows:

Chemical		Surrogate
acenaphthylene	-	acenaphthene
benzo(g,h,i)perylene	-	pyrene
phenanthrene	-	pyrene

Defintions:

N/A = Not Applicable
-- = Not Available
N = Noncarcinogen
C = Carcinogen
Y = Yes
N = No
J - Estimated concentration.
N - Tentatively identified compound.

Reference:

OEPA, 2017. Ohio Environmental Protection Agency (OEPA) Chapter 3745-1 Water Quality Standards, February 2017.

Table 2

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Volatile Organic Compounds											
71-55-6	1,1,1-Trichloroethane	ND	ND	µg/kg	--	0/27	1 - 6.9	N/A	--	N	N	ND
79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	µg/kg	--	0/27	1.8 - 12	N/A	--	C	N	ND
79-00-5	1,1,2-Trichloroethane	ND	ND	µg/kg	--	0/27	1.4 - 9.5	N/A	--	N	N	ND
75-34-3	1,1-Dichloroethane	ND	ND	µg/kg	--	0/27	0.86 - 5.8	N/A	--	C	N	ND
75-35-4	1,1-Dichloroethene	ND	ND	µg/kg	--	0/27	1.1 - 7.6	N/A	--	N	N	ND
120-82-1	1,2,4-Trichlorobenzene	ND	ND	µg/kg	--	0/27	0.71 - 4.8	N/A	--	N	N	ND
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	ND	ND	µg/kg	--	0/27	4.4 - 30	N/A	--	C	N	ND
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	ND	ND	µg/kg	--	0/27	0.95 - 6.5	N/A	--	C	N	ND
95-50-1	1,2-Dichlorobenzene	ND	ND	µg/kg	--	0/27	1.4 - 9.3	N/A	--	N	N	ND
107-06-2	1,2-Dichloroethane	ND	ND	µg/kg	--	0/27	0.95 - 6.5	N/A	--	C	N	ND
78-87-5	1,2-Dichloropropane	ND	ND	µg/kg	--	0/27	1.1 - 7.1	N/A	--	N	N	ND
541-73-1	1,3-Dichlorobenzene	ND	ND	µg/kg	--	0/27	1 - 6.8	N/A	--	N	N	ND
106-46-7	1,4-Dichlorobenzene	ND	ND	µg/kg	--	0/27	1.1 - 7.4	N/A	--	C	N	ND
78-93-3	2-Butanone (Methyl ethyl ketone) (MEK)	5.2 J	73 J	µg/kg	SD-19: 0-0.5 ft BGS (9/24/2018)	21/27	4.4 - 13	73	--	N	N	NOTBIO
591-78-6	2-Hexanone	ND	ND	µg/kg	--	0/27	5 - 34	N/A	--	N	N	ND
108-10-1	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ND	ND	µg/kg	--	0/27	4.6 - 31	N/A	--	N	N	ND
67-64-1	Acetone	65	210	µg/kg	SD-19: 0-0.5 ft BGS (9/24/2018)	4/27	26 - 180	210	--	N	N	NOTBIO
71-43-2	Benzene	3.9 J	6.4 J	µg/kg	SD-20: 0-0.5 ft BGS (9/21/2018)	3/27	0.86 - 5.9	6.4	--	C	N	NOTBIO
75-27-4	Bromodichloromethane	ND	ND	µg/kg	--	0/27	0.84 - 5.7	N/A	--	C	N	ND
75-25-2	Bromoform	ND	ND	µg/kg	--	0/27	3 - 20	N/A	--	C	N	ND
74-83-9	Bromomethane (Methyl bromide)	ND	ND	µg/kg	--	0/27	1.2 - 8.3	N/A	--	N	N	ND
75-15-0	Carbon disulfide	ND	ND	µg/kg	--	0/27	1.4 - 9.8	N/A	--	N	N	ND
56-23-5	Carbon tetrachloride	ND	ND	µg/kg	--	0/27	4 - 27	N/A	--	C	N	ND
108-90-7	Chlorobenzene	ND	ND	µg/kg	--	0/27	1.1 - 7.7	N/A	--	N	N	ND
75-00-3	Chloroethane	ND	ND	µg/kg	--	0/27	1.5 - 10	N/A	--	N	N	ND
67-66-3	Chloroform (Trichloromethane)	ND	ND	µg/kg	--	0/27	0.97 - 6.6	N/A	--	C	N	ND
74-87-3	Chloromethane (Methyl chloride)	ND	ND	µg/kg	--	0/27	1.3 - 8.7	N/A	--	N	N	ND
156-59-2	cis-1,2-Dichloroethene	ND	ND	µg/kg	--	0/27	0.8 - 5.5	N/A	--	N	N	ND
10061-01-5	cis-1,3-Dichloropropene	ND	ND	µg/kg	--	0/27	1.8 - 12	N/A	--	C	N	ND
110-82-7	Cyclohexane	ND	ND	µg/kg	--	0/27	1.7 - 12	N/A	--	N	N	ND
124-48-1	Dibromochloromethane	ND	ND	µg/kg	--	0/27	3.4 - 23	N/A	--	C	N	ND
75-71-8	Dichlorodifluoromethane (CFC-12)	ND	ND	µg/kg	--	0/27	1.2 - 7.9	N/A	--	N	N	ND
100-41-4	Ethylbenzene	ND	ND	µg/kg	--	0/27	1.3 - 8.8	N/A	--	C	N	ND
98-82-8	Isopropyl benzene	ND	ND	µg/kg	--	0/27	1 - 7	N/A	--	N	N	ND
79-20-9	Methyl acetate	ND	ND	µg/kg	--	0/27	4.2 - 29	N/A	--	N	N	ND
108-87-2	Methyl cyclohexane	ND	ND	µg/kg	--	0/27	1.5 - 10	N/A	--	N	N	ND
1634-04-4	Methyl tert butyl ether (MTBE)	ND	ND	µg/kg	--	0/27	1 - 6.9	N/A	--	C	N	ND
75-09-2	Methylene chloride	ND	ND	µg/kg	--	0/27	15 - 100	N/A	--	N	N	ND
100-42-5	Styrene	ND	ND	µg/kg	--	0/27	1.4 - 9.7	N/A	--	N	N	ND
127-18-4	Tetrachloroethene	ND	ND	µg/kg	--	0/27	0.9 - 6.1	N/A	--	N	N	ND
108-88-3	Toluene	1.5 J	5.8 J	µg/kg	SD-01: 0-0.5 ft BGS (9/25/2018)	3/27	0.95 - 6.5	5.8	--	N	N	NOTBIO
156-60-5	trans-1,2-Dichloroethene	ND	ND	µg/kg	--	0/27	0.57 - 3.9	N/A	--	N	N	ND

Table 2

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Volatile Organic Compounds (cont.'d)											
10061-02-6	trans-1,3-Dichloropropene	4.7 J	4.7 J	µg/kg	SD-07: 0-0.5 ft BGS (9/25/2018)	1/27	1.3 - 8.7	4.7	--	C	N	NOTBIO
79-01-6	Trichloroethene	ND	ND	µg/kg	--	0/27	0.78 - 5.3	N/A	--	N	N	ND
75-69-4	Trichlorofluoromethane (CFC-11)	ND	ND	µg/kg	--	0/27	1.3 - 9	N/A	--	N	N	ND
76-13-1	Trifluorotrichloroethane (CFC-113)	ND	ND	µg/kg	--	0/27	1.6 - 11	N/A	--	N	N	ND
75-01-4	Vinyl chloride	ND	ND	µg/kg	--	0/27	1 - 7	N/A	--	C	N	ND
1330-20-7	Xylenes (total)	ND	ND	µg/kg	--	0/27	2 - 13	N/A	--	N	N	ND
	Semi-Volatiles Organic Compounds											
108-60-1	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	ND	ND	µg/kg	--	0/37	12 - 650	N/A	--	N	N	ND
95-95-4	2,4,5-Trichlorophenol	ND	ND	µg/kg	--	0/37	86 - 4500	N/A	--	N	N	ND
88-06-2	2,4,6-Trichlorophenol	ND	ND	µg/kg	--	0/37	79 - 4100	N/A	--	N	N	ND
120-83-2	2,4-Dichlorophenol	ND	ND	µg/kg	--	0/37	55 - 2900	N/A	--	N	N	ND
105-67-9	2,4-Dimethylphenol	ND	ND	µg/kg	--	0/37	50 - 2600	N/A	--	N	N	ND
51-28-5	2,4-Dinitrophenol	ND	ND	µg/kg	--	0/36	180 - 9200	N/A	--	N	N	ND
121-14-2	2,4-Dinitrotoluene	ND	ND	µg/kg	--	0/37	77 - 4000	N/A	--	C	N	ND
606-20-2	2,6-Dinitrotoluene	ND	ND	µg/kg	--	0/37	69 - 3600	N/A	--	C	N	ND
91-58-7	2-Chloronaphthalene	ND	ND	µg/kg	--	0/37	17 - 910	N/A	--	N	N	ND
95-57-8	2-Chlorophenol	ND	ND	µg/kg	--	0/37	12 - 650	N/A	--	N	N	ND
91-57-6	2-Methylnaphthalene	7.4 J	260 J	µg/kg	SD-17: 0-0.5 ft BGS (9/21/2018)	18/37	2.4 - 11	260 J	--	N	N	NOTBIO
95-48-7	2-Methylphenol	ND	ND	µg/kg	--	0/37	38 - 2000	N/A	--	N	N	ND
88-74-4	2-Nitroaniline	ND	ND	µg/kg	--	0/37	50 - 2600	N/A	--	n	N	ND
88-75-5	2-Nitrophenol	ND	ND	µg/kg	--	0/37	16 - 840	N/A	--		N	ND
3/4-Cresol	3&4-Methylphenol	ND	ND	µg/kg	--	0/37	36 - 1900	N/A	--	N	N	ND
91-94-1	3,3'-Dichlorobenzidine	ND	ND	µg/kg	--	0/37	53 - 2800	N/A	--	c	N	ND
99-09-2	3-Nitroaniline	ND	ND	µg/kg	--	0/37	61 - 3200	N/A	--		N	ND
534-52-1	4,6-Dinitro-2-methylphenol	ND	ND	µg/kg	--	0/37	99 - 5200	N/A	--	N	N	ND
101-55-3	4-Bromophenyl phenyl ether	ND	ND	µg/kg	--	0/37	17 - 910	N/A	--		N	ND
59-50-7	4-Chloro-3-methylphenol	ND	ND	µg/kg	--	0/37	56 - 2900	N/A	--	N	N	ND
106-47-8	4-Chloroaniline	ND	ND	µg/kg	--	0/37	37 - 1900	N/A	--	C	N	ND
7005-72-3	4-Chlorophenyl phenyl ether	ND	ND	µg/kg	--	0/37	17 - 910	N/A	--		N	ND
100-01-6	4-Nitroaniline	ND	ND	µg/kg	--	0/37	74 - 3900	N/A	--	N	N	ND
100-02-7	4-Nitrophenol	ND	ND	µg/kg	--	0/37	120 - 6100	N/A	--		N	ND
83-32-9	**Acenaphthene**	**4.8 J**	**2900**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**22/37**	**3.5 - 16**	**2900**	**--**	**N**	**Y**	**BIO**
208-96-8	**Acenaphthylene**	**11 J**	**120**	**µg/kg**	**SD-05: 0.5-1.5 ft BGS (9/21/2018)**	**14/37**	**5 - 260**	**120**	**--**	**N**	**Y**	**BIO**
98-86-2	Acetophenone	ND	ND	µg/kg	--	0/37	14 - 710	N/A	--	N	N	ND
120-12-7	**Anthracene**	**5.7 J**	**7800**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**35/37**	**5.5 - 8.6**	**7800**	**--**	**N**	**Y**	**BIO**
1912-24-9	Atrazine	ND	ND	µg/kg	--	0/37	45 - 2300	N/A	--	C	N	ND
100-52-7	Benzaldehyde	ND	ND	µg/kg	--	0/37	28 - 1500	N/A	--	N	N	ND
56-55-3	**Benzo(a)anthracene**	**31 J**	**26000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**26000**	**--**	**C**	**Y**	**BIO**
50-32-8	**Benzo(a)pyrene**	**38**	**22000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**22000**	**--**	**C**	**Y**	**BIO**
205-99-2	**Benzo(b)fluoranthene**	**50**	**33000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**33000**	**--**	**C**	**Y**	**BIO**

Table 2

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Semi-Volatiles Organic Compounds (cont.'d)											
191-24-2	**Benzo(g,h,i)perylene**	**20 J**	**11000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**11000**	**--**	**N**	**Y**	**BIO**
207-08-9	**Benzo(k)fluoranthene**	**14 J**	**9300**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**9300**	**--**	**C**	**Y**	**BIO**
92-52-4	Biphenyl (1,1-Biphenyl)	ND	ND	µg/kg	--	0/37	21 - 1100	N/A	--	N	N	ND
111-91-1	bis(2-Chloroethoxy)methane	ND	ND	µg/kg	--	0/37	15 - 780	N/A	--	N	N	ND
111-44-4	bis(2-Chloroethyl)ether	ND	ND	µg/kg	--	0/37	15 - 780	N/A	--	C	N	ND
117-81-7	bis(2-Ethylhexyl)phthalate (DEHP)	120	560	µg/kg	SD-03: 0-0.5 ft BGS (9/21/2018)	9/37	63 - 3300	560	--	C	N	NOTBIO
85-68-7	Butyl benzylphthalate (BBP)	72	72	µg/kg	SD-13: 0-0.5 ft BGS (9/25/2018)	1/37	27 - 1400	72	--	C	N	NOTBIO
105-60-2	Caprolactam	ND	ND	µg/kg	--	0/37	93 - 4900	N/A	--	N	N	ND
86-74-8	Carbazole	35 J	5400	µg/kg	SD-17: 0-0.5 ft BGS (9/21/2018)	12/37	24 - 110	5400	--		N	NOTBIO
218-01-9	**Chrysene**	**38**	**29000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**29000**	**--**	**C**	**Y**	**BIO**
53-70-3	**Dibenz(a,h)anthracene**	**20 J**	**3700**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**21/37**	**8.6 - 40**	**3700**	**--**	**C**	**Y**	**BIO**
132-64-9	Dibenzofuran	22 J	1600 J	µg/kg	SD-17: 0-0.5 ft BGS (9/21/2018)	10/37	16 - 74	1600 J	--	N	N	NOTBIO
84-66-2	Diethyl phthalate	ND	ND	µg/kg	--	0/37	38 - 2000	N/A	--	N	N	ND
131-11-3	Dimethyl phthalate	ND	ND	µg/kg	--	0/37	17 - 910	N/A	--	N	N	ND
84-74-2	Di-n-butylphthalate (DBP)	2900	2900	µg/kg	SD-17D: 0.5-0.92 ft BSS (10/4/2019)	1/37	27 - 1400	2900	--	N	N	NOTBIO
117-84-0	Di-n-octyl phthalate (DnOP)	ND	ND	µg/kg	--	0/37	35 - 1800	N/A	--	N	N	ND
206-44-0	**Fluoranthene**	**67**	**59000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**59000**	**--**	**N**	**Y**	**BIO**
86-73-7	**Fluorene**	**5.1 J**	**3000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**26/37**	**3.8 - 16**	**3000**	**--**	**N**	**Y**	**BIO**
118-74-1	Hexachlorobenzene	ND	ND	µg/kg	--	0/37	3.5 - 180	N/A	--	C	N	ND
87-68-3	Hexachlorobutadiene	ND	ND	µg/kg	--	0/37	15 - 780	N/A	--	C	N	ND
77-47-4	Hexachlorocyclopentadiene	ND	ND	µg/kg	--	0/34	77 - 4000	N/A	--	N	N	ND
67-72-1	Hexachloroethane	ND	ND	µg/kg	--	0/37	11 - 580	N/A	--	C	N	ND
193-39-5	**Indeno(1,2,3-cd)pyrene**	**20 J**	**11000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**36/37**	**15**	**11000**	**--**	**C**	**Y**	**BIO**
78-59-1	Isophorone	ND	ND	µg/kg	--	0/37	15 - 780	N/A	--	C	N	ND
91-20-3	Naphthalene	7.1 J	300 J	µg/kg	SD-17: 0-0.5 ft BGS (9/21/2018)	18/37	3 - 14	300 J	--	C	N	NOTBIO
98-95-3	Nitrobenzene	ND	ND	µg/kg	--	0/37	16 - 840	N/A	--	C	N	ND
621-64-7	N-Nitrosodi-n-propylamine	ND	ND	µg/kg	--	0/37	14 - 710	N/A	--	C	N	ND
86-30-6	N-Nitrosodiphenylamine	ND	ND	µg/kg	--	0/37	15 - 780	N/A	--	C	N	ND
87-86-5	Pentachlorophenol	ND	ND	µg/kg	--	0/37	72 - 3800	N/A	--	C	N	ND
85-01-8	**Phenanthrene**	**25**	**37000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**37000**	**--**	**N**	**Y**	**BIO**
108-95-2	Phenol	ND	ND	µg/kg	--	0/37	9.9 - 520	N/A	--	N	N	ND
129-00-0	**Pyrene**	**57**	**41000**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**37/37**	**--**	**41000**	**--**	**N**	**Y**	**BIO**
	Metals											
7429-90-5	Aluminum	1500	12000 J	mg/kg	SD-10: 0-0.5 ft BGS (9/25/2018)	27/27	--	12000	--	N	N	NOTBIO
7440-36-0	Antimony	0.12 J	0.76	mg/kg	SD-05: 0.5-1.5 ft BGS (9/21/2018)	24/27	0.16 - 0.66	0.76	--	N	N	NOTBIO
7440-38-2	**Arsenic**	**3**	**24**	**mg/kg**	**SD-10: 0-0.5 ft BGS (9/25/2018)**	**27/27**	**--**	**24**	**--**	**C**	**Y**	**BIO**
7440-39-3	Barium	19	290	mg/kg	SD-03: 0-0.5 ft BGS (9/21/2018)	27/27	--	290	--	N	N	NOTBIO
7440-41-7	Beryllium	0.12 J	0.89	mg/kg	SD-10: 0-0.5 ft BGS (9/25/2018)	22/27	0.13 - 0.47	0.89	--	N	N	NOTBIO
7440-43-9	**Cadmium**	**0.059 J**	**0.86**	**mg/kg**	**SD-06: 0.5-1.5 ft BGS (9/25/2018)**	**27/27**	**--**	**0.86**	**--**	**N**	**Y**	**BIO**
7440-70-2	Calcium	49000	210000	mg/kg	SD-15: 0-0.5 ft BGS (9/26/2018)	27/27	--	210000	--		N	NOTBIO, NAT
7440-47-3	**Chromium**	**3.7**	**20**	**mg/kg**	**SD-06: 0.5-1.5 ft BGS (9/25/2018)**	**27/27**	**--**	**20**	**--**	**C**	**Y**	**BIO**
7440-48-4	Cobalt	2.4	11	mg/kg	SD-11: 0.5-1.5 ft BGS (9/25/2018)	27/27	--	11	--	N	N	NOTBIO

Table 2

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Metals (cont.'d)											
7440-50-8	**Copper**	**2.9**	**39**	**mg/kg**	**SD-06: 0.5-1.5 ft BGS (9/25/2018)**	**27/27**	**--**	**39**	**--**	**N**	**Y**	**BIO**
57-12-5	Cyanide (total)	0.58 J	2.6	mg/kg	SD-15: 0-0.5 ft BGS (9/26/2018)	6/27	0.24 - 1.1	2.6	--	N	N	NOTBIO
7439-89-6	Iron	5600	25000	mg/kg	SD-10: 0-0.5 ft BGS (9/25/2018)	27/27	--	25000	--	N	N	NOTBIO
7439-92-1	**Lead**	**3.2**	**140**	**mg/kg**	**SD-01: 0-0.5 ft BGS (9/25/2018)**	**27/27**	**--**	**140**	**--**	**C**	**Y**	**BIO**
7439-95-4	Magnesium	14000	63000	mg/kg	SD-16: 0-0.5 ft BGS (9/26/2018)	27/27	--	63000	--		N	NOTBIO, NAT
7439-96-5	Manganese	240	1000	mg/kg	SD-11: 0.5-1.5 ft BGS (9/25/2018)	27/27	--	1000	--	N	N	NOTBIO
7439-97-6	Mercury	0.049 J	0.17 J	mg/kg	SD-04: 0.5-1.5 ft BGS (9/21/2018)	20/27	0.021 - 0.1	0.17	--	N	N	NOTBIO
22967-92-6	**Methyl mercury**	**0.00014 J**	**0.00069**	**mg/kg**	**SD-14: 0-0.5 ft BGS (9/26/2018)**	**15/27**	**.000087 - 0.0004**	**0.00069**	**--**	**N**	**Y**	**BIO**
7440-02-0	**Nickel**	**4.1**	**26**	**mg/kg**	**SD-11: 0.5-1.5 ft BGS (9/25/2018)**	**27/27**	**--**	**26**	**--**	**N**	**Y**	**BIO**
7440-09-7	Potassium	28	2000 J	mg/kg	SD-10: 0-0.5 ft BGS (9/25/2018)	27/27	--	2000	--		N	NOTBIO, NAT
7782-49-2	**Selenium**	**0.14 J**	**1.8 J**	**mg/kg**	**SD-03: 0-0.5 ft BGS (9/21/2018)**	**26/27**	**0.12 - 0.16**	**1.8**	**--**	**N**	**Y**	**BIO**
7440-22-4	**Silver**	**0.049 J**	**0.35 J**	**mg/kg**	**SD-07: 0-0.5 ft BGS (9/25/2018)**	**22/27**	**0.022 - 0.12**	**0.35**	**--**	**N**	**Y**	**BIO**
7440-23-5	Sodium	120 J	380 J	mg/kg	SD-03: 0-0.5 ft BGS (9/21/2018)	27/27	--	380	--		N	NOTBIO, NAT
7440-28-0	Thallium	0.073 J	0.55 J	mg/kg	SD-10: 0-0.5 ft BGS (9/25/2018)	27/27	--	0.55	--	N	N	NOTBIO
7440-62-2	Vanadium	6.1	29	mg/kg	SD-10: 0-0.5 ft BGS (9/25/2018)	27/27	--	29	--	N	N	NOTBIO
7440-66-6	**Zinc**	**13**	**390**	**mg/kg**	**SD-06: 0.5-1.5 ft BGS (9/25/2018)**	**27/27**	**--**	**390**	**--**	**N**	**Y**	**BIO**
	Polychlorinated Biphenyls											
12674-11-2	Aroclor-1016 (PCB-1016)	ND	ND	µg/kg	--	0/27	26 - 120	N/A	--	N	N	ND
11104-28-2	Aroclor-1221 (PCB-1221)	ND	ND	µg/kg	--	0/27	29 - 130	N/A	--	C	N	ND
11141-16-5	Aroclor-1232 (PCB-1232)	ND	ND	µg/kg	--	0/27	28 - 130	N/A	--	C	N	ND
53469-21-9	**Aroclor-1242 (PCB-1242)**	**43 J**	**130 J**	**µg/kg**	**SD-13: 0-0.5 ft BGS (9/25/2018)**	**10/27**	**23 - 100**	**130**	**--**	**C**	**Y**	**BIO**
12672-29-6	Aroclor-1248 (PCB-1248)	ND	ND	µg/kg	--	0/27	29 - 130	N/A	--	C	N	ND
11097-69-1	**Aroclor-1254 (PCB-1254)**	**69 J**	**420**	**µg/kg**	**SD-17: 0-0.5 ft BGS (9/21/2018)**	**4/27**	**28 - 130**	**420**	**--**	**C**	**Y**	**BIO**
11096-82-5	Aroclor-1260 (PCB-1260)	ND	ND	µg/kg	--	0/27	26 - 120	N/A	--	C	N	ND
	Pesticides											
72-54-8	4,4'-DDD	ND	ND	µg/kg	--	0/27	2 - 540	N/A	--	C	N	ND
72-55-9	4,4'-DDE	ND	ND	µg/kg	--	0/27	1.8 - 49	N/A	--	C	N	ND
50-29-3	4,4'-DDT	ND	ND	µg/kg	--	0/27	1.5 - 410	N/A	--	C	N	ND
309-00-2	Aldrin	ND	ND	µg/kg	--	0/27	0.92 - 25	N/A	--	C	N	ND
319-84-6	alpha-BHC	ND	ND	µg/kg	--	0/27	1.2 - 330	N/A	--	C	N	ND
5103-71-9	**alpha-Chlordane**	**5.5 J**	**5.5 J**	**µg/kg**	**SD-05: 0.5-1.5 ft BGS (9/21/2018)**	**1/27**	**1.8 - 48**	**5.5**	**--**	**C**	**Y**	**BIO**
319-85-7	beta-BHC	ND	ND	µg/kg	--	0/27	2.1 - 56	N/A	--	C	N	ND
319-86-8	delta-BHC	ND	ND	µg/kg	--	0/26	40 - 970	N/A	--	C	N	ND
60-57-1	Dieldrin	ND	ND	µg/kg	--	0/27	1.3 - 35	N/A	--	C	N	ND
959-98-8	Endosulfan I	ND	ND	µg/kg	--	0/27	1.4 - 39	N/A	--	N	N	ND
33213-65-9	Endosulfan II	ND	ND	µg/kg	--	0/27	1.8 - 48	N/A	--	N	N	ND
1031-07-8	Endosulfan sulfate	ND	ND	µg/kg	--	0/27	1.7 - 470	N/A	--	N	N	ND
72-20-8	Endrin	ND	ND	µg/kg	--	0/27	2.3 - 61	N/A	--	N	N	ND
7421-93-4	Endrin aldehyde	ND	ND	µg/kg	--	0/27	1.6 - 760	N/A	--	N	N	ND
53494-70-5	Endrin ketone	ND	ND	µg/kg	--	0/27	1.1 - 180	N/A	--	N	N	ND

Table 2

Occurrence, Distribution, and Identification of Chemicals of Potential Concern (COPCs) in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

CAS Number	Chemical	Minimum Concentration (1, 2)	Maximum Concentration (1, 2)	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits (2)	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)		COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	Pesticides (cont.'d)											
58-89-9	gamma-BHC (lindane)	ND	ND	µg/kg	--	0/27	2.4 - 650	N/A	--	C	N	ND
5103-74-2	**gamma-Chlordane**	**2.3 J**	**12 J**	**µg/kg**	**SD-14: 0-0.5 ft BGS (9/26/2018)**	**5/27**	**1.5 - 40**	**12**	**--**	**C**	**Y**	**BIO**
76-44-8	Heptachlor	ND	ND	µg/kg	--	0/27	1.9 - 51	N/A	--	C	N	ND
1024-57-3	Heptachlor epoxide	ND	ND	µg/kg	--	0/27	1.7 - 46	N/A	--	C	N	ND
72-43-5	Methoxychlor	ND	ND	µg/kg	--	0/27	7.9 - 1300	N/A	--	N	N	ND
8001-35-2	Toxaphene	ND	ND	µg/kg	--	0/27	30 - 800	N/A	--	C	N	ND
	Herbicides											
93-76-5	2,4,5-T	ND	ND	µg/kg	--	0/27	16 - 74	N/A	--	N	N	ND
93-72-1	2,4,5-TP (Silvex)	ND	ND	µg/kg	--	0/27	17 - 80	N/A	--	N	N	ND
94-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)	ND	ND	µg/kg	--	0/27	59 - 280	N/A	--	N	N	ND

Notes:

(1) Minimum/maximum detected concentration.
(2) Based on data collected from sampling locations: SD-01, SD-02, SD-03, SD-04, SD-05, SD-06, SD-07, SD-08, SD-10, SD-11, SD-12, SD-13, SD-14, SD-15, SD-16, SD-17, SD-18, SD-19, SD-20.
(3) Rationale Codes

Selection Reason : Chemical detected and considered bioaccumulative according to USEPA (2000) (BIO).
Deletion Reason : Analyte not considered bioaccumulative according to USEPA (2000) (NOTBIO).
Analyte Not Detected (ND)
Naturally Occurring (NAT)

Defintions:

N/A = Not Applicable
-- = Not Available
N = Noncarcinogen
C = Carcinogen
Y = Yes
N = No
J - Estimated concentration.

References:

USEPA. 2000. Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment. Table 4-2.

Table 3

Exposure Point Concentration (EPC) Summary for Chemicals of Potential Concern in Quarry Pond Surface Water Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Surface Water
Exposure Medium: Fish Tissue

Chemicals of Potential Concern	Units	Mean (1)	Data Distribution (2)	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic (3)	Medium EPC Rationale
Metals									
Manganese	µg/L	2.2E+02	(a)	3.0E+03		µg/L	7.5E+02	95% Chebyshev (Mean, Sd) UCL	(4)
Thallium	µg/L	2.1E-01	(a)	5.5E-01	J	µg/L	5.5E-01	Maximum Detected	(5)

Notes:

J - Estimated concentration.
(1) The Kaplan-Meier estimation method for non-detects was used, as per USEPA (2013).
(2) Data Distribution (Note: data distribution calculated by ProUCL) are based on detected values only:
(a) Data set is neither normally, gamma or lognormally distributed.
(b) Data set is lognormally distributed.
(c) Data set is gamma distributed.
(d) Data set is normally distributed.
(3) Statistics (Note: 95% UCL values are calculated using ProUCL software, Version 5.1).
95% KM (t) UCL = UCL based upon Kaplan-Meier Estimates for non-detects using Student's t-Distribution Critical Value
95% Chebyshev (Mean, Sd) UCL = 95% Chebyshev UCL of mean and standard deviation using the Chebyshev Inequality
95% KM Chebyshev UCL = UCL based upon Kaplan-Meier Estimates for non-detects using the Chebyshev Inequality
(4) ProUCL recommended value is used as the EPC value. In the event of more than one recommended EPC value, the higher EPC value is used.
(5) Insufficient detected data to calculate meaningful statistics and the goodness of fit tests for all distributions could not be calculated, therefore the recommended EPC value is the maximum detected concentration.

Table 4

Exposure Point Concentration (EPC) Summary for Chemicals of Potential Concern in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

Chemicals of Potential Concern	Units	Mean (1)	Data Distribution (2)	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic (3)	Medium EPC Rationale
Semi-Volatiles Organic Compounds									
Acenaphthene	µg/kg	1.1E+02	(b)	2.9E+03		µg/kg	1.3E+02	95% KM H-UCL	(4)
Acenaphthylene	µg/kg	1.8E+01	(b)	1.2E+02		µg/kg	2.3E+01	95% KM H-UCL	(4)
Anthracene	µg/kg	3.2E+02	(b)	7.8E+03		µg/kg	1.2E+03	95% KM Chebyshev UCL	(4)
Benzo(a)anthracene	µg/kg	1.2E+03	(a)	2.6E+04		µg/kg	4.2E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Benzo(a)pyrene	µg/kg	1.1E+03	(b)	2.2E+04		µg/kg	3.6E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Benzo(b)fluoranthene	µg/kg	1.5E+03	(b)	3.3E+04		µg/kg	5.4E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Benzo(g,h,i)perylene	µg/kg	5.5E+02	(a)	1.1E+04		µg/kg	1.8E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Benzo(k)fluoranthene	µg/kg	5.0E+02	(a)	9.3E+03		µg/kg	1.6E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Chrysene	µg/kg	1.3E+03	(b)	2.9E+04		µg/kg	4.7E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Dibenz(a,h)anthracene	µg/kg	1.7E+02	(b)	3.7E+03		µg/kg	2.2E+02	95% KM H-UCL	(4)
Fluoranthene	µg/kg	2.5E+03	(a)	5.9E+04		µg/kg	9.4E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Fluorene	µg/kg	1.2E+02	(b)	3.0E+03		µg/kg	1.4E+02	95% KM H-UCL	(4)
Indeno(1,2,3-cd)pyrene	µg/kg	5.3E+02	(a)	1.1E+04		µg/kg	1.8E+03	95% KM Chebyshev UCL	(4)
Phenanthrene	µg/kg	1.5E+03	(a)	3.7E+04		µg/kg	5.8E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Pyrene	µg/kg	1.9E+03	(b)	4.1E+04		µg/kg	6.7E+03	95% Chebyshev (Mean, Sd) UCL	(4)
Metals									
Arsenic	mg/kg	1.2E+01	(d)	2.4E+01		mg/kg	1.3E+01	95% Student's-t UCL	(4)
Cadmium	mg/kg	4.1E-01	(d)	8.6E-01		mg/kg	4.7E-01	95% Student's-t UCL	(4)
Chromium	mg/kg	1.4E+01	(d)	2.0E+01		mg/kg	1.5E+01	95% Student's-t UCL	(4)
Copper	mg/kg	2.3E+01	(d)	3.9E+01		mg/kg	2.6E+01	95% Student's-t UCL	(4)
Lead	mg/kg	3.6E+01	(c)	1.4E+02		mg/kg	3.6E+01	Mean	(5)
Methyl mercury	mg/kg	2.7E-04	(d)	6.9E-04		mg/kg	3.3E-04	95% KM (t) UCL	(4)
Nickel	mg/kg	1.6E+01	(d)	2.6E+01		mg/kg	1.8E+01	95% Student's-t UCL	(4)
Selenium	mg/kg	8.4E-01	(d)	1.8E+00	J	mg/kg	9.7E-01	95% KM (t) UCL	(4)
Silver	mg/kg	9.4E-02	(d)	3.5E-01	J	mg/kg	1.2E-01	95% KM (t) UCL	(4)
Zinc	mg/kg	9.9E+01	(c)	3.9E+02		mg/kg	1.2E+02	95% Adjusted Gamma UCL	(4)

Table 4

Exposure Point Concentration (EPC) Summary for Chemicals of Potential Concern in Quarry Pond Sediment Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Quarry Pond Sediment
Exposure Medium: Fish Tissue

Chemicals of Potential Concern	Units	Mean (1)	Data Distribution (2)	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic (3)	Medium EPC Rationale
Polychlorinated Biphenyls									
Aroclor-1242 (PCB-1242)	µg/kg	4.4E+01	(d)	1.3E+02	J	µg/kg	5.4E-02	95% KM (t) UCL	(4)
Aroclor-1254 (PCB-1254)	µg/kg	4.9E+01	(a)	4.2E+02		µg/kg	1.2E-01	95% KM Chebyshev UCL	(4)
Pesticides									
alpha-Chlordane	µg/kg	--	--	5.5E+00	J	µg/kg	5.5E+00	Maximum Detected	(6)
gamma-Chlordane	µg/kg	2.5E+00	(a)	1.2E+01	J	µg/kg	3.4E+00	95% KM (t) UCL	(4)

Notes:

J - Estimated concentration.
(1) The Kaplan-Meier estimation method for non-detects was used, as per USEPA (2013).
(2) Data Distribution (Note: data distribution calculated by ProUCL) are based on detected values only:
(a) Data set is neither normally, gamma or lognormally distributed.
(b) Data set is lognormally distributed.
(c) Data set is gamma distributed.
(d) Data set is normally distributed.
(3) Statistics (Note: 95% UCL values are calculated using ProUCL software, Version 5.1).
95% Student's-t UCL = UCL of the mean based upon the student's-t statistic
95% KM (t) UCL = UCL based upon Kaplan-Meier Estimates for non-detects using Student's t-Distribution Critical Value
95% KM Chebyshev UCL = UCL based upon Kaplan-Meier Estimates for non-detects using the Chebyshev Inequality
95% Chebyshev (Mean, Sd) UCL = 95% Chebyshev UCL of mean and standard deviation using the Chebyshev Inequality
95% Adjusted Gamma UCL = gamma adjusted UCL when n<50
95% KM H-UCL = UCL based upon Kaplan-Meier Estimates for non-detects using Land's H-statistic
(4) ProUCL recommended value is used as the EPC value. In the event of more than one recommended EPC value, the higher EPC value is used.
(5) The mean lead concentration is used in the IEUBK model as recommended by USEPA IEUBK User's Guide
Refer to: https://www.epa.gov/superfund/lead-superfund-sites-frequent-questions-risk-assessors-integrated-exposure-uptake#mean
(6) Only one distinct data value was detected. ProUCL (or any other software) should not be used on such a data set, therefore the recommended EPC value is the maximum detected concentration.

Table 5

Values Used for Daily Intake Calculations - Angler Exposure to Fish
South Dayton Dump Site
Moraine, Ohio

Medium: Sediment/ Surface Water
Exposure Medium: Fish Tissue
Receptor Population: Fisher Eater
Receptor Age: Child and Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cfish	Concentration in Fish Tissue	mg/kg	(1)	(1)	Chronic Daily Intake (CDI) (mg/kg-day) =
	CRfish - child	Consumption Rate of Fish	kg/meal	0.085	OEPA, 2019 (3)	Ifish x EF x ED x 1/BW x 1/AT
	CRfish - adult	Consumption Rate of Fish	kg/meal	0.17	OEPA, 2019	
	M-CRfish	Mutagenic Consumption Rate of Fish	yr/meal	0.27	USEPA, 2005 (4)	Ifish (mg/day) =
	F	Fraction of Fish Consumed that is Contaminated	unitless	1	USEPA, 2005a	Cfish x CRfish x F
	EF	Exposure Frequency	meals/year	8	Professional Judgment (2)	
	ED - child	Exposure Duration	years	6	USEPA, 2004	Mutagenic CDI (mg/kg-day) =
	ED - adult	Exposure Duration	years	20	USEPA, 2014	M-Ifish x EF x 1/AT
	BW - child	Body Weight	kg	15	USEPA, 2002	
	BW - adult	Body Weight	kg	80	USEPA, 2014	where M-Ifish (mg-yr/kg-meal) =
	AT-C	Averaging Time (cancer)	days	25,550	USEPA, 1989	Cfish x M-CRfish
	AT-N (child)	Averaging Time (non-cancer) (ED-child x 365 days/year)	days	2,190	USEPA, 1989	
	AT-N (adult)	Averaging Time (non-cancer) (ED-adult x 365 days/year)	days	7,300	USEPA, 1989	

Notes:

(1) For surface water bioaccumulation to fish concentrations, refer to Table 6. For sediment bioaccumulation to fish concentrations, refer to Table 7.
(2) Professional Judgement; based on 1 meal per month for the months of April throught to October (OPEA, 2019).
(3) Based on half the OEPA recommended fish serving size for an adult (6 oz).
(4) Mutagenic fish ingestion factor calculated using default age-dependent adjustment factor of 10 for ages 0-2 year, 3 for ages >2 to 16 years, and 1 for ages >16 years as applied for carcinogens that act via a mutagenic mode of action.

References:

OEPA, 2019: Ohio Sport Fish Consumption Advisory, Ohio Environmental Protection Agency, March 2019.
USEPA, 1989: Risk Assessment Guidance for Superfund (RAGS): Volume 1 – Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December 1989.
USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24, December 2002.
USEPA, 2004: Risk Assessment Guidance for Superfund (RAGS):Volume 1 - Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), EPA/540/R/99/005, July 2004.
USEPA, 2005a: Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, EPA/530-R-05-006, September 2005.
USEPA, 2005: Guidelines for Carcinogenic Risk Assessment and Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens, March 2005.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors, OSWER Directive 9200.1-120, February 2014.

Table 6

Fish Concentration from Bioaccumulation Factors Using Surface Water Concentrations
South Dayton Dump Site
Moraine, Ohio

Inorganics = $C_{fish} = (C_{sw} \times BCF)$

Chemical of Potential Concern	Surface Water Concentration C_{sw} (mg/L)	Bioconcentration Factor BCF_{fish} (L/kg)	Ref	Fish Tissue Concentration C_{fish} (mg/kg)
Metals				
Manganese	7.52E-01	2.20E+02 (1)	ODEQ, 2010	1.65E+02
Thallium	5.50E-04	3.40E+01	USEPA, 1980	1.87E-02

Note:

(1) BCF is the maximum freshwater BCF as presented in Table 5 (ODEQ, 2010).

Reference:

USEPA, 1980: Ambient Water Quality Criteria, October 1980.
ODEQ, 2010: Attachment D, Water Quality Standards Review and Recommendations: Iron and Manganese, Oregon DEQ, December 9, 2010 EQC Meeting (https://www.oregon.gov/deq/FilterDocs/AttDIssuePaperFeMn.pdf).

Table 7

Fish Concentration from Bioaccumulation Factors Using Sediment Concentrations
South Dayton Dump Site
Moraine, Ohio

Organics = $C_{fish} = (C_{sb} \times f_{lipid} \times BSAF) / OC_{sed}$ Inorganics = $C_{fish} = (C_{sb} \times BSAF)$

Chemical of Potential Concern	Sediment Concentration C_{sb} (mg/kg)	Biota-Sediment Accumulation Factor $BSAF_{fish}$ ((mg/kg)/(mg/kg))	Ref	Fish Lipid Content (1) f_{lipid} -	Fraction of Organic Carbon in Bottom Sediment OC_{sed} -	Fish Tissue Concentration (2,3) C_{fish} (mg/kg)
SVOCs						
Acenaphthene	1.28E-01	1.49E-02	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.46E-03
Acenaphthylene	2.25E-02	7.23E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.25E-04
Anthracene	1.23E+00	9.80E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	9.28E-03
Benzo(a)anthracene	4.20E+00	2.31E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	7.46E-03
Benzo(a)pyrene	3.63E+00	5.74E-04	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.60E-03
Benzo(b)fluoranthene	5.36E+00	3.86E-04	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.59E-03
Benzo(g,h,i)perylene	1.84E+00	1.09E-04	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.55E-04
Benzo(k)fluoranthene	1.59E+00	3.86E-04	Thomann and Komlos 1999	2.00E-02	2.60E-02	4.72E-04
Chrysene	4.65E+00	2.02E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	7.23E-03
Dibenz(a,h)anthracene	2.22E-01	8.02E-05	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.37E-05
Fluoranthene	9.43E+00	6.33E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	4.59E-02
Fluorene	1.38E-01	1.29E-02	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.37E-03
Indeno(1,2,3-cd)pyrene	1.82E+00	7.89E-05	Thomann and Komlos 1999	2.00E-02	2.60E-02	1.10E-04
Phenanthrene	5.82E+00	9.57E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	4.28E-02
Pyrene	6.68E+00	7.47E-03	Thomann and Komlos 1999	2.00E-02	2.60E-02	3.84E-02
Metals						
Arsenic	1.35E+01	Regression	Bechtel Jacobs, 1998	NA	NA	9.06E-01
Cadmium	4.66E-01	Regression	Bechtel Jacobs, 1998	NA	NA	1.61E-01
Chromium	1.55E+01	Regression	Bechtel Jacobs, 1998	NA	NA	1.10E+00
Copper	2.64E+01	Regression	Bechtel Jacobs, 1998	NA	NA	7.62E+00
Lead	3.62E+01	Regression	Bechtel Jacobs, 1998	NA	NA	7.42E-01
Methyl mercury	3.34E-04	1.43E+01	(4)	NA	NA	4.78E-03
Nickel	1.81E+01	Regression	Bechtel Jacobs, 1998	NA	NA	2.21E+00
Selenium	9.74E-01	2.50E-01	(5)	NA	NA	2.44E-01
Silver	1.24E-01	2.50E-01	(5)	NA	NA	3.10E-02
Zinc	1.24E+02	Regression	Bechtel Jacobs, 1998	NA	NA	4.30E+01
Polychlorinated Biphenyls						
Aroclor-1242 (PCB-1242)	5.42E-02	2.00E+00	USEPA, 2005	2.00E-02	2.60E-02	8.33E-02
Aroclor-1254 (PCB-1254)	1.22E-01	2.00E+00	USEPA, 2005	2.00E-02	2.60E-02	1.87E-01
Pesticides						
alpha-Chlordane	5.50E-03	2.00E+00	USEPA, 2005	2.00E-02	2.60E-02	8.46E-03
gamma-Chlordane	3.40E-03	2.00E+00	USEPA, 2005	2.00E-02	2.60E-02	5.23E-03

Notes:

(1) The Quarry Pond is warm water habitat with fringe of macrophyte beds. Thus, dominant fish will likely be those adapted to reproduction in small ponds, notably sunfish, predatory bass, and bullheads. EPA (1995) surveyed lipid levels in edible portions of fish native to the Great Lakes, and found that these species had low lipid levels in edible tissues; i.e., less than 1% lipid in the bluegills and largemouth bass and less than 2% in the bullheads. Thus, an average of 2% lipid was used as a conservative value.
(2) Except for metals, C_{fish} calculated consistent with USEPA (2005) equation.
(3) C_{fish} for metals calculated based on Bechtel Jacobs (1998) models for benthos.
(4) Geometric mean of Median Site BSAF (Amec Foster Wheeler Technical Memorandum, 2017).
(5) Dry weight fish to dry weight sediment BSAF of 1.0, divided by 4 to yield wet weight concentrations in fish.

References:

Amec Foster Wheeler Technical Memorandum, Penobscot River Phase III Engineering Study, WO3A-010 Task 2 BSAF Calculations, Summary of Biota-Sediment Accumulation Factor Evaluation, Amec Foster Wheeler Project No. 3616166052, September 14, 2017.
Bechtel Jacobs, 1998. Biota sediment accumulation factors for invertebrates: review and recommendations for the Oak Ridge Reservation. Bechtel Jacobs Company LLC, Oak Ridge, TN. BJC/OR 112. Available from: http://www.hsrd.ornl.gov/ecorisk/bjcor 112a1.pdf
Thomann, R. V. and J. Komlos. 1999. Model of biota-sediment accumulation factor for polycyclic aromatic hydrocarbons. Environ. Toxicol. Chem. 18: 1060–1068.
USEPA, 1995. Great Lakes Water Quality Initiative Technical Support Document for the Procedure to Determine Bioaccumulation Factors. Office of Water EPA-820-B-95-005 March 1995
USEPA, 2005: Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, EPA/530-R-05-006, September 2005.

Table 8

Non-Cancer Toxicity Data - Oral/Dermal Route of Exposure
South Dayton Dump Site
Moraine, Ohio

Chemicals of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Source of RFC	Date of RfC (3) (MM-YY)
SVOCs										
Acenaphthene	chronic	6.00E-02	mg/kg-d	100%	6.00E-02	mg/kg-d	liver	3000	IRIS	Apr-94
Acenaphthylene (4)	chronic	6.00E-02	mg/kg-d	100%	6.00E-02	mg/kg-d	liver	3000	IRIS	Apr-94
Anthracene	chronic	3.00E-01	mg/kg-d	100%	3.00E-01	mg/kg-d	no effects	3000	IRIS	Jul-93
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	chronic	3.00E-04	mg/kg-d	100%	3.00E-04	mg/kg-d	central nervous system	300	IRIS	Jan-17
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene (4)	chronic	3.00E-02	mg/kg-d	100%	3.00E-02	mg/kg-d	kidney	3000	IRIS	Sep-94
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--
Chrysene	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--
Fluoranthene	chronic	4.00E-02	mg/kg-d	100%	4.00E-02	mg/kg-d	liver	3000	IRIS	Jul-93
Fluorene	chronic	4.00E-02	mg/kg-d	100%	4.00E-02	mg/kg-d	blood system	3000	IRIS	Nov-90
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--
Phenanthrene (4)	chronic	3.00E-02	mg/kg-d	100%	3.00E-02	mg/kg-d	kidney	3000	IRIS	Sep-94
Pyrene	chronic	3.00E-02	mg/kg-d	100%	3.00E-02	mg/kg-d	kidney	3000	IRIS	Sep-94
Metals										
Arsenic	chronic	3.00E-04	mg/kg-d	100%	3.00E-04	mg/kg-d	skin	3	IRIS	Feb-93
Cadmium (diet/soil)	chronic	1.00E-03	mg/kg-d	5%	5.00E-05	mg/kg-d	kidney	10	IRIS	Feb-94
Chromium	chronic	1.50E+00	mg/kg-d	1.3%	1.95E-02	mg/kg-d	no effects	100	IRIS	Sep-98
Cobalt	chronic	3.00E-04	mg/kg-d	100%	3.00E-04	mg/kg-d	thyroid effects	3000	PPRTV	Aug-08
Copper	chronic	4.00E-02	mg/kg-d	100%	4.00E-02	mg/kg-d	--	--	HEAST	Dec-11
Lead	--	--	--	--	--	--	--	--	--	--
Manganese (diet)	chronic	1.40E-01	mg/kg-d	--	--	--	central nervous system	1	IRIS	Nov-95
Methyl mercury	chronic	1.00E-03	mg/kg-d	100%	1.00E-03	mg/kg-d	developmental effects	1	IRIS	Jul-01
Nickel	chronic	2.00E-02	mg/kg-d	4%	8.00E-04	mg/kg-d	body weight	300	IRIS	Dec-96
Selenium	chronic	5.00E-03	mg/kg-d	100%	5.00E-03	mg/kg-d	clinical selenosis	3	IRIS	Sep-91
Silver	chronic	5.00E-03	mg/kg-d	4%	2.00E-04	mg/kg-d	skin (argyria)	3	IRIS	Dec-96
Thallium	chronic	1.00E-05	mg/kg-d	100%	1.00E-05	mg/kg-d	hair follicle atrophy	3000	PPRTV	Nov-12
Zinc	chronic	3.00E-01	mg/kg-d	100%	3.00E-01	mg/kg-d	blood system	3	IRIS	Aug-05

Table 8

Non-Cancer Toxicity Data - Oral/Dermal Route of Exposure
South Dayton Dump Site
Moraine, Ohio

Chemicals of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Source of RFC	Date of RfC (3) (MM-YY)
PCBs										
Aroclor-1242 (PCB-1242)	--	--	--	--	--	--	--	--	--	--
Aroclor-1254 (PCB-1254)	chronic	2.00E-05	mg/kg-d	100%	2.00E-05	mg/kg-d	immune system	300	IRIS	Nov-96
Pesticides										
Chlordane	chronic	5.00E-04	mg/kg-d	100%	5.00E-04	mg/kg-d	liver	300	IRIS	Feb-98

Notes:

-- = Not Available

(1) USEPA, Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Part E Supplemental Guidance for Dermal Risk Assessment, EPA/540/R/99/005, July 2004.

(2) Adjusted Dermal RfD = Oral RfD x Oral to Dermal Adjustment Factor

(3) Integrated Risk Information System (IRIS) Database, accessed November 2019.

Note: dates of RfD provided is the last revision date of the IRIS toxicity data provided (http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showSubstanceList).

Note: the oral RfD toxicity value for vanadium is derived from the IRIS oral RfD for vanadium pentoxide by factoring out the molecular weight of the oxide ion.

Provisional Peer Reviewed Toxicity Values (PPRTV) Database, accessed November 2019.

Note: dates of RfD provided is the last revision date of the PPRTV toxicity data provided (https://hhpprtv.ornl.gov/).

HEAST, 2011: Health Effects Assessment Summary Tables (HEAST), On-line Repository, December 2011.

(4) No toxicity data available, surrogate toxicity data implemented as follows:

Chemical		Surrogate
acenaphthylene	-	acenaphthene
benzo(g,h,i)perylene	-	pyrene
phenanthrene	-	pyrene

Table 9

Cancer Toxicity Data - Oral/Dermal Route of Exposure
South Dayton Dump Site
Moraine, Ohio

Chemicals of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source of CSF	Date of CSF (3) (MM-YY)
SVOCs							
Acenaphthene	--	--	--	--	--	--	--
Acenaphthylene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Anthracene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Benzo(a)anthracene	1.00E-01	100%	1.00E-01	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Benzo(a)pyrene	1.00E+00	100%	1.00E+00	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Benzo(b)fluoranthene	1.00E-01	100%	1.00E-01	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Benzo(g,h,i)perylene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Benzo(k)fluoranthene	1.00E-02	100%	1.00E-02	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Chrysene	1.00E-03	100%	1.00E-03	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Dibenz(a,h)anthracene	1.00E+00	100%	1.00E+00	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Fluoranthene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Fluorene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Indeno(1,2,3-cd)pyrene	1.00E-01	100%	1.00E-01	$(mg/kg\text{-}day)^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jan-17
Phenanthrene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Pyrene	--	--	--	--	Not classifiable as a human carcinogen	--	--
Metals							
Arsenic	1.50E+00	100%	1.50E+00	$(mg/kg\text{-}day)^{-1}$	Known human carcinogen	IRIS	Apr-98
Cadmium	--	--	--	--	Probable human carcinogen - sufficient evidence in humans	--	--
Chromium	--	--	--	--	Not classifiable as a human carcinogen	--	--
Cobalt	--	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--
Lead	--	--	--	--	Probable human carcinogen - sufficient evidence in animals	--	--
Manganese (diet)	--	--	--	--	Not classifiable as a human carcinogen	--	--
Methyl mercury	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--
Selenium	--	--	--	--	Not classifiable as a human carcinogen	--	--
Silver	--	--	--	--	Not classifiable as a human carcinogen	--	--
Thallium	--	--	--	--	--	--	--
Zinc	--	--	--	--	Not classifiable as a human carcinogen	--	--

Table 9

Cancer Toxicity Data - Oral/Dermal Route of Exposure
South Dayton Dump Site
Moraine, Ohio

Chemicals of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source of CSF	Date of CSF (3) (MM-YY)
PCBs							
Aroclor-1242 (PCB-1242)	2.00E+00	100%	2.00E+00	(mg/kg-day) $^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jun-97
Aroclor-1254 (PCB-1254)	2.00E+00	100%	2.00E+00	(mg/kg-day) $^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Jun-97
Pesticides							
Chlordane	3.50E-01	100%	3.50E-01	(mg/kg-day) $^{-1}$	Probable human carcinogen - sufficient evidence in animals	IRIS	Feb-98

Notes:

-- = Not Available

(1) USEPA, Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Part E Supplemental Guidance for Dermal Risk Assessment, EPA/540/R/99/005, July 2004.
USEPA, Technical Guidance Manual Risk Assessment, Assessing Dermal Exposure from Soil, EPA/903-k-95-003, December 1995.

(2) Adjusted Dermal CSF = Oral CSF / Oral to Dermal Adjustment Factor

(3) Integrated Risk Information System (IRIS) Database, accessed November 2019.
Note: dates of CSF provided is the last revision date of the IRIS toxicity data provided (http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showSubstanceList).

Note: for carcinogenic PAHs, benzo(a)pyrene relative potency factors were applied as follows:
benzo(a)anthracene = 0.1; benzo(b)fluoranthene = 0.1; benzo(k)fluoranthene = 0.01; chrysene = 0.001; dibenz(a,h)anthracene = 1; indeno(1,2,3-cd)pyrene = 0.1

Table 10

Calculation of Chemical Cancer Risks and Non-Cancer Hazards for Fish Eater
South Dayton Dump Site
Moraine, Ohio

Receptor Population: Fish Eater
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemicals of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations - Child					Non-Cancer Hazard Calculations - Adult				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Fish	Quarry Pond	Ingestion	Acenaphthene	1.46E-03	mg/kg	3.50E-08	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	1.82E-07	mg/kg-d	6.00E-02	mg/kg-d	3E-06	6.81E-08	mg/kg-d	6.00E-02	mg/kg-d	1E-06
				Acenaphthylene	1.25E-04	mg/kg	3.00E-09	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	1.55E-08	mg/kg-d	6.00E-02	mg/kg-d	3E-07	5.83E-09	mg/kg-d	6.00E-02	mg/kg-d	1E-07
				Anthracene	9.28E-03	mg/kg	2.22E-07	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	1.15E-06	mg/kg-d	3.00E-01	mg/kg-d	4E-06	4.32E-07	mg/kg-d	3.00E-01	mg/kg-d	1E-06
				Benzo(a)anthracene	7.46E-03	mg/kg	**6.31E-07**	mg/kg-d	1.00E-01	$(mg/kg\text{-}d)^{-1}$	6E-08	9.27E-07	mg/kg-d	--	mg/kg-d	NC	3.48E-07	mg/kg-d	--	mg/kg-d	NC
				Benzo(a)pyrene	1.60E-03	mg/kg	**1.35E-07**	mg/kg-d	1.00E+00	$(mg/kg\text{-}d)^{-1}$	1E-07	1.99E-07	mg/kg-d	3.00E-04	mg/kg-d	7E-04	7.46E-08	mg/kg-d	3.00E-04	mg/kg-d	2E-04
				Benzo(b)fluoranthene	1.59E-03	mg/kg	**1.35E-07**	mg/kg-d	1.00E-01	$(mg/kg\text{-}d)^{-1}$	1E-08	1.98E-07	mg/kg-d	--	mg/kg-d	NC	7.41E-08	mg/kg-d	--	mg/kg-d	NC
				Benzo(g,h,i)perylene	1.55E-04	mg/kg	**1.31E-08**	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	1.92E-08	mg/kg-d	3.00E-02	mg/kg-d	6E-07	7.20E-09	mg/kg-d	3.00E-02	mg/kg-d	2E-07
				Benzo(k)fluoranthene	4.72E-04	mg/kg	**3.99E-08**	mg/kg-d	1.00E-02	$(mg/kg\text{-}d)^{-1}$	4E-10	5.86E-08	mg/kg-d	--	mg/kg-d	NC	2.20E-08	mg/kg-d	--	mg/kg-d	NC
				Chrysene	7.23E-03	mg/kg	**6.11E-07**	mg/kg-d	1.00E-03	$(mg/kg\text{-}d)^{-1}$	6E-10	8.97E-07	mg/kg-d	--	mg/kg-d	NC	3.37E-07	mg/kg-d	--	mg/kg-d	NC
				Dibenz(a,h)anthracene	1.37E-05	mg/kg	**1.16E-09**	mg/kg-d	1.00E+00	$(mg/kg\text{-}d)^{-1}$	1E-09	1.70E-09	mg/kg-d	--	mg/kg-d	NC	6.37E-10	mg/kg-d	--	mg/kg-d	NC
				Fluoranthene	4.59E-02	mg/kg	1.10E-06	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	5.70E-06	mg/kg-d	4.00E-02	mg/kg-d	1E-04	2.14E-06	mg/kg-d	4.00E-02	mg/kg-d	5E-05
				Fluorene	1.37E-03	mg/kg	3.27E-08	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	1.70E-07	mg/kg-d	4.00E-02	mg/kg-d	4E-06	6.36E-08	mg/kg-d	4.00E-02	mg/kg-d	2E-06
				Indeno(1,2,3-cd)pyrene	1.10E-04	mg/kg	**9.33E-09**	mg/kg-d	1.00E-01	$(mg/kg\text{-}d)^{-1}$	9E-10	1.37E-08	mg/kg-d	--	mg/kg-d	NC	5.14E-09	mg/kg-d	--	mg/kg-d	NC
				Phenanthrene	4.28E-02	mg/kg	1.03E-06	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	5.32E-06	mg/kg-d	3.00E-02	mg/kg-d	2E-04	1.99E-06	mg/kg-d	3.00E-02	mg/kg-d	7E-05
				Pyrene	3.84E-02	mg/kg	9.19E-07	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	4.77E-06	mg/kg-d	3.00E-02	mg/kg-d	2E-04	1.79E-06	mg/kg-d	3.00E-02	mg/kg-d	6E-05
				Arsenic	9.06E-01	mg/kg	2.17E-05	mg/kg-d	1.50E+00	$(mg/kg\text{-}d)^{-1}$	3E-05	1.12E-04	mg/kg-d	3.00E-04	mg/kg-d	4E-01	4.22E-05	mg/kg-d	3.00E-04	mg/kg-d	1E-01
				Cadmium	1.61E-01	mg/kg	3.87E-06	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	2.00E-05	mg/kg-d	1.00E-03	mg/kg-d	2E-02	7.52E-06	mg/kg-d	1.00E-03	mg/kg-d	8E-03
				Chromium	1.10E+00	mg/kg	2.64E-05	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	1.37E-04	mg/kg-d	1.50E+00	mg/kg-d	9E-05	5.12E-05	mg/kg-d	1.50E+00	mg/kg-d	3E-05
				Copper	7.62E+00	mg/kg	1.83E-04	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	9.46E-04	mg/kg-d	4.00E-02	mg/kg-d	2E-02	3.55E-04	mg/kg-d	4.00E-02	mg/kg-d	9E-03
				Lead	7.42E-01	mg/kg	1.78E-05	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	9.22E-05	mg/kg-d	--	mg/kg-d	NC	3.46E-05	mg/kg-d	--	mg/kg-d	NC
				Methyl mercury	4.78E-03	mg/kg	1.14E-07	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	5.93E-07	mg/kg-d	1.00E-03	mg/kg-d	6E-04	2.23E-07	mg/kg-d	1.00E-03	mg/kg-d	2E-04
				Nickel	2.21E+00	mg/kg	5.29E-05	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	2.74E-04	mg/kg-d	2.00E-02	mg/kg-d	1E-02	1.03E-04	mg/kg-d	2.00E-02	mg/kg-d	5E-03
				Selenium	2.44E-01	mg/kg	5.83E-06	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	3.02E-05	mg/kg-d	5.00E-03	mg/kg-d	6E-03	1.13E-05	mg/kg-d	5.00E-03	mg/kg-d	2E-03
				Silver	3.10E-02	mg/kg	7.43E-07	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	3.85E-06	mg/kg-d	5.00E-03	mg/kg-d	8E-04	1.44E-06	mg/kg-d	5.00E-03	mg/kg-d	3E-04
				Zinc	4.30E+01	mg/kg	1.03E-03	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	5.34E-03	mg/kg-d	3.00E-01	mg/kg-d	2E-02	2.00E-03	mg/kg-d	3.00E-01	mg/kg-d	7E-03
				Aroclor-1242 (PCB-1242)	8.33E-02	mg/kg	2.00E-06	mg/kg-d	2.00E+00	$(mg/kg\text{-}d)^{-1}$	4E-06	1.04E-05	mg/kg-d	--	mg/kg-d	NC	3.88E-06	mg/kg-d	--	mg/kg-d	NC
				Aroclor-1254 (PCB-1254)	1.87E-01	mg/kg	4.48E-06	mg/kg-d	2.00E+00	$(mg/kg\text{-}d)^{-1}$	9E-06	2.32E-05	mg/kg-d	2.00E-05	mg/kg-d	1E+00	8.71E-06	mg/kg-d	2.00E-05	mg/kg-d	4E-01
				alpha-Chlordane	8.46E-03	mg/kg	2.03E-07	mg/kg-d	3.50E-01	$(mg/kg\text{-}d)^{-1}$	7E-08	1.05E-06	mg/kg-d	5.00E-04	mg/kg-d	2E-03	3.94E-07	mg/kg-d	5.00E-04	mg/kg-d	8E-04
				gamma-Chlordane	5.23E-03	mg/kg	1.25E-07	mg/kg-d	3.50E-01	$(mg/kg\text{-}d)^{-1}$	4E-08	6.49E-07	mg/kg-d	5.00E-04	mg/kg-d	1E-03	2.43E-07	mg/kg-d	5.00E-04	mg/kg-d	5E-04
			Exposure Route Total								5E-05					2E+00					6E-01
		Exposure Point Total									5E-05					2E+00					6E-01
	Exposure Medium Total										5E-05					2E+00					6E-01
Surface Water	Fish	Quarry Pond	Ingestion	Manganese	1.65E+02	mg/kg	3.96E-03	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	2.05E-02	mg/kg-d	1.40E-01	mg/kg-d	1E-01	7.70E-03	mg/kg-d	1.40E-01	mg/kg-d	6E-02
				Thallium	1.87E-02	mg/kg	4.48E-07	mg/kg-d	--	$(mg/kg\text{-}d)^{-1}$	NC	2.32E-06	mg/kg-d	1.00E-05	mg/kg-d	2E-01	8.71E-07	mg/kg-d	1.00E-05	mg/kg-d	9E-02
			Exposure Route Total								NC					4E-01					1E-01
		Exposure Point Total									NC					4E-01					1E-01
	Exposure Medium Total										NC					4E-01					1E-01
Total of Receptor Risk Across All Media											**5E-05**	**Total of Receptor Hazard Across All Media**				**2E+00**	**Total of Receptor Hazard Across All Media**				**8E-01**

Notes:

BOLD = Carcinogenic intake based on mutagenic mode of action. Refer to Table 5 for exposure assumptions and equation.

NC = Not Calculated

Table 11

Summary of Fish Eater Risks and Hazards
South Dayton Dump Site
Moraine, Ohio

Receptor Population: Fish Eater
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk	Non-Carcinogenic Hazard Quotient		
				Ingestion	Primary	Ingestion	
				Child & Adult	Target Organ	Child	Adult
Sediment	Sediment	Quarry Pond	Acenaphthene	NC	liver	3.0E-06	1.1E-06
			Acenaphthylene	NC	liver	2.6E-07	9.7E-08
			Anthracene	NC	no effects	3.8E-06	1.4E-06
			Benzo(a)anthracene	6.3E-08	--	NC	NC
			Benzo(a)pyrene	1.4E-07	central nervous system	6.6E-04	2.5E-04
			Benzo(b)fluoranthene	1.3E-08	--	NC	NC
			Benzo(g,h,i)perylene	NC	kidney	6.4E-07	2.4E-07
			Benzo(k)fluoranthene	4.0E-10	--	NC	NC
			Chrysene	6.1E-10	--	NC	NC
			Dibenz(a,h)anthracene	1.2E-09	--	NC	NC
			Fluoranthene	NC	liver	1.4E-04	5.3E-05
			Fluorene	NC	blood system	4.2E-06	1.6E-06
			Indeno(1,2,3-cd)pyrene	9.3E-10	--	NC	NC
			Phenanthrene	NC	kidney	1.8E-04	6.6E-05
			Pyrene	NC	kidney	1.6E-04	6.0E-05
			Arsenic	3.3E-05	skin	3.7E-01	1.4E-01
			Cadmium	NC	kidney	2.0E-02	7.5E-03
			Chromium	NC	no effects	9.1E-05	3.4E-05
			Copper	NC	--	2.4E-02	8.9E-03
			Lead	NC	--	NC	NC
			Methyl mercury	NC	developmental effects	5.9E-04	2.2E-04
			Nickel	NC	body weight	1.4E-02	5.1E-03
			Selenium	NC	clinical selenosis	6.0E-03	2.3E-03
			Silver	NC	skin (argyria)	7.2E-04	2.9E-04
			Zinc	NC	blood system	1.8E-02	6.7E-03
			Aroclor-1242 (PCB-1242)	4.0E-06	--	NC	NC
			Aroclor-1254 (PCB-1254)	9.0E-06	immune system	1.2E+00	4.4E-01
			alpha-Chlordane	7.1E-08	liver	2.1E-03	7.9E-04
			gamma-Chlordane	4.4E-08	liver	1.3E-03	4.9E-04
		Exposure Point Total		5E-05		2E+00	6E-01
	Exposure Medium Total			5E-05		2E+00	6E-01
Medium Total				5E-05		2E+00	6E-01
Surface Water	Surface Water	Quarry Pond	Manganese	NC	central nervous system	1.5E-01	5.5E-02
			Thallium	NC	hair follicle atrophy	2.3E-01	8.7E-02
			Chemical Total	NC		4E-01	1E-01
		Exposure Point Total		NC		4E-01	1E-01
	Exposure Medium Total			NC		4E-01	1E-01
Medium Total				NC		4E-01	1E-01
			Total of Receptor Risk Across All Media	**5E-05**	**Total of Receptor Hazard Across All Media**	**2E+00**	**8E-01**

Total Liver HI Across All Media =	4E-03	1E-03
Total Central Nervous System HI Across All Media =	1E-01	6E-02
Total Kidney HI Across All Media =	2E-02	8E-03
Total Blood System HI Across All Media =	2E-02	7E-03
Total Skin HI Across All Media =	4E-01	1E-01
Total Developmental Effects HI Across All Media =	6E-04	2E-04
Total Body Weight HI Across All Media =	1E-02	5E-03
Total Clinical Selenosis HI Across All Media =	6E-03	2E-03
Total Immune System HI Across All Media =	1E+00	4E-01
Total Hiar Follical Atrophy HI Across All Media =	2E-01	9E-02

Note:

NC = Not Calculated

Table 12

Adult Lead Model
South Dayton Dump Site
Moraine, Ohio

Model Parameters	Symbol	Units	Fish Eater Adult	Source
Concentration of Lead in Fish Tissue	Pb	mg/kg	0.74	Refer to Table 7
95th Percentile PbB in fetus	$PbB_{fetal,0.95}$	µg/dL	10	(1)
R (Mean ratio of fetal to maternal PbB)	$R_{fetal/maternal}$	unitless	0.9	(1)
Individual geometric standard deviation	GSD_i	unitless	1.8	(2)
Baseline blood lead value	$PbB_{adult,0}$	µg/dL	0.6	(3)
Biokinetic slope factor	BKSF	µg/dL per µg/day	0.4	(1)
Fish ingestion rate	IR	g/meal	170	Refer to Table 5
Exposure Frequency	EF	meals/yr	8	Refer to Table 5
Absolute absorption fraction of lead in fish	AF	unitless	0.5	(1)
Averaging time	AT	days/yr	365	(1)

Exposure Value	Formula	PbB (µg/dL)
Blood lead contribution from Fish Tissue	PbB_{FISH} = (Pb x BKSF x IR x AF x EF)/AT	5.53E-01
Total from site exposure + non-site exposure	$PbB_{site + non-site} = PbB_{FISH} + PbB_{adult, 0}$	1.15E+00
95th percentile for fetal blood lead	$\mathbf{PbB_{fetal,0.95} = R_{fetal/maternal} \times GSD_i^{1.645} \times PbB_{site + non-site}}$	**2.7**
Probability that fetal PbB > PbB_t, assuming lognormal distribution (%)	**$P(PbB_{fetal} > PbB_t)$**	**0%**

Notes:

(1) USEPA, 2003:Recommendations of the Technical Review Workgroup for Lead for an Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. EPA-540-R-03-001. January 2003.

(2) USEPA, 2009. Transmittal of Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters, dated June 26, 2009

(3) USEPA, 2017. Transmittal of Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters, OLEM Directive 9285.6-56 dated May 17

Attachment A

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-3**	**SW-4**	**SW-5**
Sample ID:		**SW-38443-091818-GL-002**	**SW-38443-091818-GL-001**	**SW-38443-091918-JPF-008**	**SW-38443-091918-JPF-009**	**SW-092018-38443-GL-014**	**SW-092018-38443-GL-015**	**SW-092018-38443-GL-013**	**SW-38443-091918-JPF-012**	**SW-38443-091918-JPF-011**
Sample Date:		**9/18/2018**	**9/18/2018**	**9/19/2018**	**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**
Sample Depth:		**5 ft BWS**	**22.7 ft BWS**	**5 ft BWS**	**28.1 ft BWS**	**5 ft BWS**	**5 ft BWS**	**17.11 ft BWS**	**5 ft BWS**	**5 ft BWS**
							Duplicate			
Parameters	**Units**									
Volatile Organic Compounds										
1,1,1-Trichloroethane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
1,1,2,2-Tetrachloroethane	µg/L	0.13 UJ	0.13 U	0.13 UJ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
1,1,2-Trichloroethane	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
1,1-Dichloroethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
1,2,4-Trichlorobenzene	µg/L	0.26 U	**0.41 J**	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U
1,2-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,2-Dichloroethane	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,3-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,4-Dichlorobenzene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	1.2 U	**2.9 J**	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Hexanone	µg/L	0.54 U	**1.1 J**	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	0.42 U	**0.88 J**	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Acetone	µg/L	5.4 U	13 U	5.4 U	5.4 U	**5.7 J**	**17 J**	5.4 U	5.4 U	5.4 U
Benzene	µg/L	0.13 U	**0.21 J**	0.13 U	0.36 U	0.13 U	0.13 U	0.13 U	0.21 U	0.21 U
Bromodichloromethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Bromoform	µg/L	0.76 UJ	0.76 U	0.76 UJ	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U
Bromomethane (Methyl bromide)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Carbon disulfide	µg/L	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Carbon tetrachloride	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Chlorobenzene	µg/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Chloroethane	µg/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
Chloroform (Trichloromethane)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chloromethane (Methyl chloride)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	µg/L	0.16 U	**0.21 J**	0.16 U	**0.22 J**	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
cis-1,3-Dichloropropene	µg/L	0.61 U	0.61 U	0.61 U	0.61 UJ	0.61 U	0.61 U	0.61 U	0.61 UJ	0.61 UJ
Cyclohexane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Dibromochloromethane	µg/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Dichlorodifluoromethane (CFC-12)	µg/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Ethylbenzene	µg/L	**0.17 J**	**0.34 J**	0.11 U	**0.11 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Isopropyl benzene	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
m&p-Xylenes	µg/L	**0.58 J**	**1.2 J**	**0.29 J**	**0.40 J**	**0.27 J**	**0.23 J**	**0.24 J**	**0.31 J**	**0.23 J**
Methyl acetate	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Methyl cyclohexane	µg/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Methyl tert butyl ether (MTBE)	µg/L	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U
Methylene chloride	µg/L	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
o-Xylene	µg/L	**0.28 J**	**0.56 J**	**0.12 J**	**0.20 J**	0.090 U	**0.18 J**	0.090 U	**0.14 J**	0.090 U
Styrene	µg/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Tetrachloroethene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Toluene	µg/L	**0.82 J**	**2.6**	**0.35 J**	**3.6**	**0.24 J**	**0.22 J**	**0.35 J**	**0.46 J**	**0.30 J**
trans-1,2-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
trans-1,3-Dichloropropene	µg/L	0.67 U	0.67 U	0.67 U	0.67 UJ	0.67 U	0.67 U	0.67 U	0.67 UJ	0.67 UJ
Trichloroethene	µg/L	0.10 U	**0.21 J**	0.10 U	**0.29 J**	0.10 U	0.10 U	**0.20 J**	0.10 U	0.10 U
Trichlorofluoromethane (CFC-11)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Trifluorotrichloroethane (CFC-113)	µg/L	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Vinyl chloride	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Xylenes (total)	µg/L	**0.86 J**	**1.8 J**	**0.41 J**	**0.60 J**	**0.27 J**	**0.41 J**	**0.24 J**	**0.45 J**	**0.23 J**
Semivolatile Organic Compounds										
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/L	0.55 U	0.54 U	0.55 U	0.53 UJ	0.55 U	0.53 U	0.55 U	0.55 UJ	0.55 U
2,4,5-Trichlorophenol	µg/L	2.0 U	1.9 U	2.0 U	1.9 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U
2,4,6-Trichlorophenol	µg/L	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
2,4-Dichlorophenol	µg/L	0.26 U	0.26 U	0.26 U	0.25 U	0.26 U	0.25 U	0.26 U	0.26 U	0.26 U
2,4-Dimethylphenol	µg/L	0.51 U	0.51 U	0.52 U	0.50 U	0.52 U	0.50 U	0.52 U	0.52 U	0.52 U
2,4-Dinitrophenol	µg/L	6.1 U	6.1 U	6.2 U	6.0 U	6.2 U	6.0 U	6.2 U	6.2 U	6.2 U
2,4-Dinitrotoluene	µg/L	2.0 U	2.0 U	2.1 U	2.0 U	2.1 U	2.0 U	2.1 U	2.1 U	2.1 U
2,6-Dinitrotoluene	µg/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.1 U	2.1 U

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-3**	**SW-4**	**SW-5**
Sample ID:		**SW-38443-091818-GL-002**	**SW-38443-091818-GL-001**	**SW-38443-091918-JPF-008**	**SW-38443-091918-JPF-009**	**SW-092018-38443-GL-014**	**SW-092018-38443-GL-015**	**SW-092018-38443-GL-013**	**SW-38443-091918-JPF-012**	**SW-38443-091918-JPF-011**
Sample Date:		**9/18/2018**	**9/18/2018**	**9/19/2018**	**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**
Sample Depth:		**5 ft BWS**	**22.7 ft BWS**	**5 ft BWS**	**28.1 ft BWS**	**5 ft BWS**	**5 ft BWS**	**17.11 ft BWS**	**5 ft BWS**	**5 ft BWS**
							Duplicate			
Parameters	**Units**									
Semivolatile Organic Compounds cont'd										
2-Chloronaphthalene	µg/L	0.48 U	0.47 U	0.48 U	0.47 U	0.48 U	0.46 U	0.48 U	0.48 U	0.48 U
2-Chlorophenol	µg/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.26 U	0.27 U	0.27 U	0.27 U
2-Methylnaphthalene	µg/L	0.11 U	**0.12 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
2-Methylphenol	µg/L	0.21 U	0.20 U	0.21 U	0.20 U	0.21 U	0.20 U	0.21 U	0.21 U	0.21 U
2-Nitroaniline	µg/L	0.50 U	0.50 U	0.51 U	0.50 U	0.51 U	0.49 U	0.51 U	0.51 U	0.51 U
2-Nitrophenol	µg/L	0.56 U	0.55 U	0.56 U	0.55 U	0.56 U	0.54 U	0.56 U	0.56 U	0.56 U
3&4-Methylphenol	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.18 U	0.19 U	0.19 U	0.19 U
3,3'-Dichlorobenzidine	µg/L	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U	1.2 U
3-Nitroaniline	µg/L	0.56 U	0.55 U	0.57 U	0.55 U	0.57 U	0.54 U	0.57 U	0.57 U	0.57 U
4,6-Dinitro-2-methylphenol	µg/L	2.8 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U	2.8 U	2.8 U	2.8 U
4-Bromophenyl phenyl ether	µg/L	0.49 U	0.49 U	0.50 U	0.48 U	0.50 U	0.48 U	0.50 U	0.50 U	0.50 U
4-Chloro-3-methylphenol	µg/L	0.29 U	0.29 U	0.30 U	0.29 U	0.30 U	0.28 U	0.30 U	0.30 U	0.30 U
4-Chloroaniline	µg/L	0.31 U	0.31 U	0.32 U	0.31 U	0.32 U	0.30 U	0.32 U	0.32 U	0.32 U
4-Chlorophenyl phenyl ether	µg/L	0.55 U	0.54 U	0.55 U	0.53 U	0.55 U	0.53 U	0.55 U	0.55 U	0.55 U
4-Nitroaniline	µg/L	0.91 U	0.90 U	0.92 U	0.89 U	0.92 U	0.88 U	0.92 U	0.92 U	0.92 U
4-Nitrophenol	µg/L	2.2 U	2.1 U	2.2 U	2.1 U	2.2 U	2.1 U	2.2 U	2.2 U	2.2 U
Acenaphthene	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Acenaphthylene	µg/L	0.12 U	0.12 U	0.13 U	0.12 U	0.13 U	0.12 U	0.13 U	0.13 U	0.13 U
Acetophenone	µg/L	0.36 U	0.36 U	0.37 U	0.36 U	0.37 U	0.35 U	0.37 U	0.37 U	0.37 U
Anthracene	µg/L	0.13 U	0.13 U	0.14 U	0.13 U	0.14 U	0.13 U	0.14 U	0.14 U	0.14 U
Atrazine	µg/L	0.94 U	0.93 U	0.95 U	0.92 U	0.95 U	0.92 U	0.95 U	0.95 U	0.95 U
Benzaldehyde	µg/L	0.75 U	0.74 U	0.76 U	0.74 U	0.76 U	0.73 U	0.76 U	0.76 U	0.76 U
Benzo(a)anthracene	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U
Benzo(a)pyrene	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Benzo(b)fluoranthene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Benzo(g,h,i)perylene	µg/L	0.18 U	0.17 U	0.18 U	0.17 U	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U
Benzo(k)fluoranthene	µg/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.13 U	0.14 U	0.14 U	0.14 U
Biphenyl (1,1-Biphenyl)	µg/L	0.49 U	0.48 U	0.49 U	0.48 U	0.49 U	0.47 U	0.49 U	0.49 U	0.49 U
bis(2-Chloroethoxy)methane	µg/L	0.45 U	0.45 U	0.46 U	0.44 U	0.46 U	0.44 U	0.46 U	0.46 U	0.46 U
bis(2-Chloroethyl)ether	µg/L	0.40 U	0.39 U	0.40 U	0.39 U	0.40 U	0.39 U	0.40 U	0.40 U	0.40 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.1 U	2.2 U	2.2 U	2.2 U
Butyl benzylphthalate (BBP)	µg/L	0.66 U	0.65 U	0.67 U	0.65 U	0.67 U	0.64 U	0.67 U	0.67 U	0.67 U
Caprolactam	µg/L	0.92 U	0.92 U	0.93 U	0.91 U	0.93 U	0.90 U	0.93 U	0.93 U	R
Carbazole	µg/L	0.49 U	0.48 U	0.49 U	0.48 U	0.49 U	0.47 U	0.49 U	0.49 U	0.49 U
Chrysene	µg/L	0.18 U	0.18 U	0.19 U	0.18 U	0.19 U	0.18 U	0.19 U	0.19 U	0.19 U
Dibenz(a,h)anthracene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Dibenzofuran	µg/L	0.56 U	0.55 U	0.56 U	0.54 U	0.56 U	0.54 U	0.56 U	0.56 U	0.56 U
Diethyl phthalate	µg/L	3.8 U	3.7 U	3.8 U	3.7 U	3.8 U	3.7 U	3.8 U	3.8 U	3.8 U
Dimethyl phthalate	µg/L	0.51 U	0.50 U	0.52 U	0.50 U	0.52 U	0.50 U	0.52 U	0.52 U	0.52 U
Di-n-butylphthalate (DBP)	µg/L	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Di-n-octyl phthalate (DnOP)	µg/L	0.81 U	0.80 U	0.82 U	0.80 U	0.82 U	0.79 U	0.82 U	0.82 U	0.82 U
Fluoranthene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U
Fluorene	µg/L	0.17 U	0.17 U	0.17 U	0.16 U	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U
Hexachlorobenzene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U
Hexachlorobutadiene	µg/L	0.54 U	0.53 U	0.54 U	0.53 U	0.54 U	0.52 U	0.54 U	0.54 U	0.54 U
Hexachlorocyclopentadiene	µg/L	1.7 U	1.7 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Hexachloroethane	µg/L	0.39 U	0.39 U	0.40 U	0.38 U	0.40 U	0.38 U	0.40 U	0.40 U	0.40 U
Indeno(1,2,3-cd)pyrene	µg/L	0.13 U	0.13 U	0.14 U	0.13 U	0.14 U	0.13 U	0.14 U	0.14 U	0.14 U
Isophorone	µg/L	0.32 U	0.32 U	0.32 U	0.31 U	0.32 U	0.31 U	0.32 U	0.32 U	0.32 U
Naphthalene	µg/L	0.11 U	**0.17 J**	0.11 U	0.11 U	0.11 U	0.10 U	0.11 U	0.11 U	0.11 U
Nitrobenzene	µg/L	0.51 U	0.50 U	0.51 U	0.50 U	0.51 U	0.49 U	0.51 U	0.51 U	0.51 U
N-Nitrosodi-n-propylamine	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.24 U	0.25 U	0.25 U	0.25 U
N-Nitrosodiphenylamine	µg/L	0.44 U	0.43 U	0.44 U	0.43 U	0.44 U	0.42 U	0.44 U	0.44 U	0.44 U
Pentachlorophenol	µg/L	3.1 U	3.0 U	3.1 U	3.0 U	3.1 U	3.0 U	3.1 U	3.1 U	3.1 U
Phenanthrene	µg/L	0.17 U	0.16 U	0.17 U	0.16 U	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U
Phenol	µg/L	0.13 U	0.13 U	0.13 U	0.12 U	0.13 U	0.12 U	0.13 U	0.13 U	0.13 U
Pyrene	µg/L	0.17 U	0.17 U	0.18 U	0.17 U	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-3**	**SW-4**	**SW-5**
Sample ID:		**SW-38443-091818-GL-002**	**SW-38443-091818-GL-001**	**SW-38443-091918-JPF-008**	**SW-38443-091918-JPF-009**	**SW-092018-38443-GL-014**	**SW-092018-38443-GL-015**	**SW-092018-38443-GL-013**	**SW-38443-091918-JPF-012**	**SW-38443-091918-JPF-011**
Sample Date:		**9/18/2018**	**9/18/2018**	**9/19/2018**	**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**
Sample Depth:		**5 ft BWS**	**22.7 ft BWS**	**5 ft BWS**	**28.1 ft BWS**	**5 ft BWS**	**5 ft BWS**	**17.11 ft BWS**	**5 ft BWS**	**5 ft BWS**
							Duplicate			
Parameters	**Units**									
Metals										
Aluminum	µg/L	34 U	**39 J**	34 U	34 U	34 U	34 U	**110**	**42 J**	34 U
Aluminum (dissolved)	µg/L	34 U	34 U	34 U	34 U	34 U	34 U	34 U	34 U	34 U
Antimony	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Antimony (dissolved)	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Arsenic	µg/L	**2.1 J**	**13**	**1.8 J**	**14**	**1.7 J**	**1.9 J**	**2.0 J**	**1.8 J**	**2.0 J**
Arsenic (dissolved)	µg/L	**1.7 J**	**10**	**1.6 J**	**12**	**1.6 J**	**1.5 J**	**1.6 J**	**1.8 J**	**1.9 J**
Barium	µg/L	**86**	**180**	**78**	**250**	**76**	**77**	**79**	**81**	**82**
Barium (dissolved)	µg/L	**79**	**150**	**77**	**200**	**79**	**76**	**74**	**80**	**79**
Beryllium	µg/L	0.31 U	**0.67 J**	0.31 U	0.31 U	0.31 U	0.31 U	**0.47 J**	0.31 U	**0.55 J**
Beryllium (dissolved)	µg/L	0.31 U	**0.57 J**	0.31 U	0.31 U	0.31 U	0.31 U	**0.88 J**	0.31 U	**0.75 J**
Cadmium	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Cadmium (dissolved)	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Calcium	µg/L	**40000**	**70000**	**36000**	**80000**	**36000**	**36000**	**46000**	**37000**	**37000**
Calcium (dissolved)	µg/L	**37000**	**64000**	**35000**	**71000**	**37000**	**35000**	**45000**	**37000**	**36000**
Chromium	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
Chromium (dissolved)	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
Cobalt	µg/L	0.19 U	**0.60 J**	0.19 U	**0.64 J**	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Cobalt (dissolved)	µg/L	0.19 U	**0.41 J**	0.19 U	**0.43 J**	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Copper	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Copper (dissolved)	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Iron	µg/L	47 U	**4000**	47 U	**7400**	47 U	47 U	**150**	**60 J**	**49 J**
Iron (dissolved)	µg/L	47 U	**3200**	47 U	**6300**	47 U	47 U	47 U	47 U	47 U
Lead	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Lead (dissolved)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Magnesium	µg/L	**27000**	**30000**	**24000**	**32000**	**24000**	**24000**	**26000**	**25000**	**25000**
Magnesium (dissolved)	µg/L	**25000**	**29000**	**24000**	**29000**	**25000**	**24000**	**26000**	**25000**	**24000**
Manganese	µg/L	**7.4**	**2000**	**5.2**	**1800**	**4.7 J**	**4.9 J**	**17**	**7.6**	**7.4**
Manganese (dissolved)	µg/L	2.1 U	**1600**	2.1 U	**1600**	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Mercury (Low Level)	ng/L	0.48 U	**2.6**	0.44 U	**2.2**	0.21 U	0.28 U	0.34 U	0.38 U	0.35 U
Mercury	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Mercury (dissolved)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Nickel	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Nickel (dissolved)	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Potassium	µg/L	**5900**	**6300**	**5400**	**6500**	**5300**	**5400**	**5600**	**5500**	**5600**
Potassium (dissolved)	µg/L	**5600**	**6200**	**5400**	**6100**	**5500**	**5300**	**5500**	**5600**	**5500**
Selenium	µg/L	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Selenium (dissolved)	µg/L	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Silver	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Silver (dissolved)	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Sodium	µg/L	**22000**	**25000**	**20000**	**27000**	**24000**	**20000**	**21000**	**21000**	**21000**
Sodium (dissolved)	µg/L	**21000**	**24000**	**20000**	**25000**	**21000**	**20000**	**21000**	**21000**	**21000**
Thallium	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Thallium (dissolved)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vanadium	µg/L	0.82 U	**1.0 J**	0.82 U	**1.4 J**	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Vanadium (dissolved)	µg/L	0.82 U	0.82 U	0.82 U	**1.1 J**	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Zinc	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Zinc (dissolved)	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
PCBs										
Aroclor-1016 (PCB-1016)	µg/L	0.056 U	0.58 U	0.054 U	0.055 U	0.058 U	0.057 U	0.058 U	0.055 U	0.055 U
Aroclor-1221 (PCB-1221)	µg/L	0.057 U	0.59 U	0.055 U	0.056 U	0.059 U	0.058 U	0.059 U	0.056 U	0.056 U
Aroclor-1232 (PCB-1232)	µg/L	0.074 U	0.76 U	0.071 U	0.073 U	0.076 U	0.076 U	0.077 U	0.073 U	0.073 U
Aroclor-1242 (PCB-1242)	µg/L	0.076 U	0.78 U	0.073 U	0.075 U	0.078 U	0.078 U	0.079 U	0.075 U	0.075 U
Aroclor-1248 (PCB-1248)	µg/L	0.050 U	0.52 U	0.048 U	0.049 U	0.052 U	0.051 U	0.052 U	0.050 U	0.049 U
Aroclor-1254 (PCB-1254)	µg/L	0.040 U	0.41 U	**0.074 J**	0.039 U	0.041 U	0.041 U	0.042 U	0.040 U	0.039 U
Aroclor-1260 (PCB-1260)	µg/L	0.046 U	0.47 U	0.044 U	0.045 U	0.047 U	0.047 U	0.048 U	0.046 U	0.045 U

Table A.1

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Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-3**	**SW-4**	**SW-5**
Sample ID:		**SW-38443-091818-GL-002**	**SW-38443-091818-GL-001**	**SW-38443-091918-JPF-008**	**SW-38443-091918-JPF-009**	**SW-092018-38443-GL-014**	**SW-092018-38443-GL-015**	**SW-092018-38443-GL-013**	**SW-38443-091918-JPF-012**	**SW-38443-091918-JPF-011**
Sample Date:		**9/18/2018**	**9/18/2018**	**9/19/2018**	**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**
Sample Depth:		**5 ft BWS**	**22.7 ft BWS**	**5 ft BWS**	**28.1 ft BWS**	**5 ft BWS**	**5 ft BWS**	**17.11 ft BWS**	**5 ft BWS**	**5 ft BWS**
							Duplicate			
Parameters	**Units**									
Herbicides										
2,4,5-T	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
2,4,5-TP (Silvex)	µg/L	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
Pesticides										
4,4'-DDD	µg/L	0.0053 U	0.27 U	0.0051 U	0.26 U	0.0055 U	0.0054 U	0.0055 U	0.0054 U	0.0052 U
4,4'-DDE	µg/L	0.0043 U	0.22 U	0.0041 U	0.21 U	0.0044 U	0.0044 U	0.0045 U	0.0044 U	0.0042 U
4,4'-DDT	µg/L	0.0048 U	0.25 U	0.0046 U	0.24 U	0.0049 U	0.0049 U	0.0050 U	0.0049 U	0.0047 U
Aldrin	µg/L	0.0024 U	0.0025 U	0.0023 U	0.12 U	0.0025 U	0.0024 U	0.0025 U	0.0024 U	0.0024 U
alpha-BHC	µg/L	0.0020 U	0.10 U	0.0019 U	0.098 U	0.0021 U	0.0020 U	0.0021 U	0.0020 U	0.0020 U
alpha-Chlordane	µg/L	0.0032 U	0.0033 U	0.0031 U	0.16 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0031 U
beta-BHC	µg/L	0.0046 U	0.24 U	0.0044 U	0.23 U	0.0047 U	0.0047 U	0.0048 U	0.0047 U	0.0045 U
delta-BHC	µg/L	0.0043 U	0.22 U	0.0041 U	0.21 U	0.0044 U	0.0044 U	0.0045 U	0.0044 U	0.0042 U
Dieldrin	µg/L	0.0023 U	0.0024 U	0.0022 U	0.11 U	0.0024 U	0.0023 U	0.0024 U	0.0023 U	0.0023 U
Endosulfan I	µg/L	0.0037 U	0.0038 U	0.0036 U	0.18 U	0.0038 U	0.0038 U	0.0039 U	0.0038 U	0.0036 U
Endosulfan II	µg/L	0.0023 U	0.12 U	0.0022 U	0.11 U	0.0024 U	0.0023 U	0.0024 U	0.0023 U	0.0023 U
Endosulfan sulfate	µg/L	0.0037 U	0.19 U	0.0036 U	0.18 U	0.0038 U	0.0038 U	0.0039 U	0.0038 U	0.0036 U
Endrin	µg/L	0.0025 U	0.0026 U	0.0024 U	0.12 U	0.0026 U	0.0026 U	0.0026 U	0.0026 U	0.0025 U
Endrin aldehyde	µg/L	0.0046 U	0.24 U	0.0044 U	0.23 U	0.0047 U	0.0047 U	0.0048 U	0.0047 U	0.0045 U
Endrin ketone	µg/L	0.0040 U	0.21 U	0.0038 U	0.20 U	0.0041 U	0.0041 U	0.0042 U	0.0041 U	0.0039 U
gamma-BHC (lindane)	µg/L	0.0025 U	0.13 U	0.0024 U	0.12 U	0.0026 U	0.0026 U	0.0026 U	0.0026 U	0.0025 U
gamma-Chlordane	µg/L	0.0050 U	0.0052 U	0.0048 U	0.25 U	0.0052 U	0.0051 U	0.0052 U	0.0051 U	0.0049 U
Heptachlor	µg/L	0.0033 U	0.0034 U	0.0032 U	0.16 U	0.0034 U	0.0034 U	0.0034 U	0.0034 U	0.0032 U
Heptachlor epoxide	µg/L	0.0026 U	0.0027 U	0.0025 U	0.13 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0025 U
Methoxychlor	µg/L	0.0047 U	0.24 U	0.0045 U	0.23 U	0.0048 U	0.0048 U	0.0049 U	0.0048 U	0.0046 U
Toxaphene	µg/L	0.058 U	0.060 U	0.056 U	2.8 U	0.060 U	0.059 U	0.061 U	0.059 U	0.057 U
General Chemistry										
Chloride	mg/L	**30**	**34**	**30**	**36**	**30**	**30**	**31**	**30**	**30**
Cyanide (total)	mg/L	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U
Fluoride	mg/L	**0.15**	**0.17**	**0.19**	**0.19**	**0.16**	**0.16**	**0.17**	**0.17**	**0.17**
Hardness	mg/L	**210**	**300**	**190**	**330**	**190**	**190**	**220**	**200**	**200**
Hardness, carbonate	mg/L	**99**	**170**	**89**	**200**	**89**	**90**	**110**	**92**	**93**
Hardness, magnesium	mg/L	**110**	**120**	**100**	**130**	**99**	**100**	**110**	**100**	**100**
Nitrate (as N)	µg/L	14 U	14 U	14 U	14 U	14 U	14 U	**410**	**14 J**	14 U
Nitrite (as N)	µg/L	14 U	14 U	14 U	14 U	14 U	14 U	14 U	14 U	14 U
Sulfate	mg/L	**22**	**8.7**	**22**	**9.9**	**22**	**22**	**25**	**22**	**22**
Sulfide	mg/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
Total dissolved solids (TDS)	mg/L	**250**	**360**	**240**	**390**	**260**	**250**	**280**	**240**	**250**

Notes:

J - Estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
ft BWS - Feet below water surface

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**	**SW-10**
Sample ID:		**SW-38443-091918-JPF-010**	**SW-092018-38443-GL-016**	**SW-092018-38443-GL-017**	**SW-38443-091918-JPF-006**	**SW-38443-091918-JPF-007**	**SW-38443-091918-JPF-005**	**SW-38443-091818-GL-003**	**SW-38443-091818-GL-004**
Sample Date:		**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**	**9/19/2018**	**9/18/2018**	**9/18/2018**
Sample Depth:		**3.3 ft BWS**	**5 ft BWS**	**12.11 ft BWS**	**5 ft BWS**	**18.7 ft BWS**	**5 ft BWS**	**5 ft BWS**	**5 ft BWS Duplicate**
Parameters	**Units**								
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
1,1,2,2-Tetrachloroethane	µg/L	0.13 UJ	0.13 U	0.13 U	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ
1,1,2-Trichloroethane	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
1,1-Dichloroethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
1,2,4-Trichlorobenzene	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U
1,2-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,2-Dichloroethane	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,3-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,4-Dichlorobenzene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Hexanone	µg/L	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Acetone	µg/L	5.4 U	**36**	**5.4 J**	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U
Benzene	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Bromodichloromethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Bromoform	µg/L	0.76 UJ	0.76 U	0.76 U	0.76 UJ	0.76 UJ	0.76 UJ	0.76 UJ	0.76 UJ
Bromomethane (Methyl bromide)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Carbon disulfide	µg/L	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Carbon tetrachloride	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Chlorobenzene	µg/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Chloroethane	µg/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
Chloroform (Trichloromethane)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chloromethane (Methyl chloride)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
cis-1,3-Dichloropropene	µg/L	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
Cyclohexane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Dibromochloromethane	µg/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Dichlorodifluoromethane (CFC-12)	µg/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Ethylbenzene	µg/L	0.11 U	0.11 U	0.11 U	0.11 U	**0.11 J**	0.11 U	0.11 U	0.11 U
Isopropyl benzene	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
m&p-Xylenes	µg/L	**0.15 J**	**0.26 J**	**0.16 J**	**0.31 J**	**0.38 J**	**0.28 J**	**0.33 J**	**0.30 J**
Methyl acetate	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Methyl cyclohexane	µg/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Methyl tert butyl ether (MTBE)	µg/L	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U
Methylene chloride	µg/L	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
o-Xylene	µg/L	0.090 U	**0.12 J**	0.090 U	**0.10 J**	**0.18 J**	**0.12 J**	**0.13 J**	**0.11 J**
Styrene	µg/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Tetrachloroethene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Toluene	µg/L	**0.20 J**	**0.31 J**	**0.29 J**	**0.40 J**	**0.72 J**	**0.35 J**	**0.45 J**	**0.42 J**
trans-1,2-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
trans-1,3-Dichloropropene	µg/L	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U
Trichloroethene	µg/L	0.10 U	0.10 U	0.10 U	0.10 U	**0.23 J**	0.10 U	0.10 U	0.10 U
Trichlorofluoromethane (CFC-11)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Trifluorotrichloroethane (CFC-113)	µg/L	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Vinyl chloride	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Xylenes (total)	µg/L	**0.15 J**	**0.38 J**	**0.16 J**	**0.41 J**	**0.56 J**	**0.40 J**	**0.46 J**	**0.41 J**
Semivolatile Organic Compounds									
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/L	0.56 U	0.56 U	0.59 U	0.53 U	0.55 U	0.53 U	0.57 U	0.53 U
2,4,5-Trichlorophenol	µg/L	2.0 U	2.0 U	2.1 U	1.9 U	2.0 U	1.9 U	2.0 U	1.9 U
2,4,6-Trichlorophenol	µg/L	1.8 U	1.8 U	1.9 U	1.7 U	1.8 U	1.7 U	1.9 U	1.7 U
2,4-Dichlorophenol	µg/L	0.26 U	0.27 U	0.28 U	0.25 U	0.26 U	0.25 U	0.27 U	0.25 U
2,4-Dimethylphenol	µg/L	0.52 U	0.53 U	0.56 U	0.50 U	0.51 U	0.50 U	0.53 U	0.50 U
2,4-Dinitrophenol	µg/L	6.3 U	6.3 U	6.7 U	6.0 U	6.1 U	6.0 U	6.4 U	6.0 U
2,4-Dinitrotoluene	µg/L	2.1 U	2.1 U	2.2 U	2.0 U	2.0 U	2.0 U	2.1 U	2.0 U
2,6-Dinitrotoluene	µg/L	2.1 U	2.2 U	2.3 U	2.0 U	2.1 U	2.1 U	2.2 U	2.0 U

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**	**SW-10**
Sample ID:		**SW-38443-091918-JPF-010**	**SW-092018-38443-GL-016**	**SW-092018-38443-GL-017**	**SW-38443-091918-JPF-006**	**SW-38443-091918-JPF-007**	**SW-38443-091918-JPF-005**	**SW-38443-091818-GL-003**	**SW-38443-091818-GL-004**
Sample Date:		**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**	**9/19/2018**	**9/18/2018**	**9/18/2018**
Sample Depth:		**3.3 ft BWS**	**5 ft BWS**	**12.11 ft BWS**	**5 ft BWS**	**18.7 ft BWS**	**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
									Duplicate
Parameters	**Units**								
Semivolatile Organic Compounds cont'd									
2-Chloronaphthalene	µg/L	0.49 U	0.49 U	0.52 U	0.46 U	0.48 U	0.47 U	0.50 U	0.46 U
2-Chlorophenol	µg/L	0.28 U	0.28 U	0.29 U	0.26 U	0.27 U	0.27 U	0.28 U	0.26 U
2-Methylnaphthalene	µg/L	0.11 U	0.11 U	0.12 U	**0.14 J**	0.11 U	0.11 U	0.11 U	0.11 U
2-Methylphenol	µg/L	0.21 U	0.21 U	0.22 U	0.20 U	0.21 U	0.20 U	0.22 U	0.20 U
2-Nitroaniline	µg/L	0.52 U	0.52 U	0.55 U	0.49 U	0.50 U	0.50 U	0.53 U	0.49 U
2-Nitrophenol	µg/L	0.57 U	0.58 U	0.61 U	0.54 U	0.56 U	0.55 U	0.58 U	0.54 U
3&4-Methylphenol	µg/L	0.19 U	0.19 U	0.21 U	0.18 U	0.19 U	0.19 U	0.20 U	0.18 U
3,3'-Dichlorobenzidine	µg/L	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U
3-Nitroaniline	µg/L	0.57 U	0.58 U	0.61 U	0.54 U	0.56 U	0.55 U	0.58 U	0.54 U
4,6-Dinitro-2-methylphenol	µg/L	2.8 U	2.9 U	3.0 U	2.7 U	2.8 U	2.7 U	2.9 U	2.7 U
4-Bromophenyl phenyl ether	µg/L	0.50 U	0.51 U	0.54 U	0.48 U	0.49 U	0.48 U	0.51 U	0.48 U
4-Chloro-3-methylphenol	µg/L	0.30 U	0.30 U	0.32 U	0.28 U	0.29 U	0.29 U	0.31 U	0.28 U
4-Chloroaniline	µg/L	0.32 U	0.32 U	0.34 U	0.30 U	0.31 U	0.31 U	0.33 U	0.30 U
4-Chlorophenyl phenyl ether	µg/L	0.56 U	0.56 U	0.59 U	0.53 U	0.55 U	0.53 U	0.57 U	0.53 U
4-Nitroaniline	µg/L	0.93 U	0.94 U	0.99 U	0.88 U	0.91 U	0.89 U	0.95 U	0.88 U
4-Nitrophenol	µg/L	2.2 U	2.2 U	2.3 U	2.1 U	2.2 U	2.1 U	2.2 U	2.1 U
Acenaphthene	µg/L	0.17 U	0.18 U	0.18 U	0.17 U	0.17 U	0.17 U	0.18 U	0.17 U
Acenaphthylene	µg/L	0.13 U	0.13 U	0.13 U	0.12 U	0.12 U	0.12 U	0.13 U	0.12 U
Acetophenone	µg/L	0.37 U	0.37 U	0.39 U	0.35 U	0.36 U	0.36 U	0.38 U	0.35 U
Anthracene	µg/L	0.14 U	0.14 U	0.15 U	0.13 U	0.13 U	0.13 U	0.14 U	0.13 U
Atrazine	µg/L	0.96 U	0.97 U	1.0 U	0.92 U	0.94 U	0.92 U	0.98 U	0.92 U
Benzaldehyde	µg/L	0.77 U	0.77 U	0.82 U	0.73 U	0.75 U	0.74 U	0.78 U	0.73 U
Benzo(a)anthracene	µg/L	0.17 U	0.17 U	0.18 U	0.16 U	0.17 U	0.17 U	0.18 U	0.16 U
Benzo(a)pyrene	µg/L	0.17 U	0.18 U	0.19 U	0.17 U	0.17 U	0.17 U	0.18 U	0.17 U
Benzo(b)fluoranthene	µg/L	0.16 U	0.16 U	0.17 U	0.15 U	0.15 U	0.15 U	0.16 U	0.15 U
Benzo(g,h,i)perylene	µg/L	0.18 U	0.18 U	0.19 U	0.17 U	0.18 U	0.17 U	0.18 U	0.17 U
Benzo(k)fluoranthene	µg/L	0.14 U	0.14 U	0.15 U	0.13 U	0.14 U	0.14 U	0.14 U	0.13 U
Biphenyl (1,1-Biphenyl)	µg/L	0.50 U	0.50 U	0.53 U	0.47 U	0.49 U	0.48 U	0.51 U	0.47 U
bis(2-Chloroethoxy)methane	µg/L	0.46 U	0.46 U	0.49 U	0.44 U	0.45 U	0.44 U	0.47 U	0.44 U
bis(2-Chloroethyl)ether	µg/L	0.41 U	0.41 U	0.43 U	0.39 U	0.40 U	0.39 U	0.41 U	0.39 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	2.2 U	2.3 U	2.4 U	2.1 U	2.2 U	2.2 U	2.3 U	2.1 U
Butyl benzylphthalate (BBP)	µg/L	0.67 U	0.68 U	0.72 U	0.64 U	0.66 U	0.65 U	**7.9 J**	0.64 UJ
Caprolactam	µg/L	0.94 U	0.95 U	1.0 U	0.90 U	0.92 U	0.91 U	0.96 U	0.90 U
Carbazole	µg/L	0.49 U	0.50 U	0.53 U	0.47 U	0.49 U	0.48 U	0.51 U	0.47 U
Chrysene	µg/L	0.19 U	0.19 U	0.20 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U
Dibenz(a,h)anthracene	µg/L	0.15 U	0.15 U	0.16 U	0.15 U	0.15 U	0.15 U	0.16 U	0.15 U
Dibenzofuran	µg/L	0.57 U	0.57 U	0.60 U	0.54 U	0.56 U	0.54 U	0.58 U	0.54 U
Diethyl phthalate	µg/L	3.9 U	3.9 U	4.1 U	3.7 U	3.8 U	3.7 U	3.9 U	3.7 U
Dimethyl phthalate	µg/L	0.52 U	0.53 U	0.55 U	0.50 U	0.51 U	0.50 U	0.53 U	0.50 U
Di-n-butylphthalate (DBP)	µg/L	1.8 U	1.8 U	1.9 U	1.7 U	1.8 U	1.8 U	1.9 U	1.7 U
Di-n-octyl phthalate (DnOP)	µg/L	0.83 U	0.84 U	0.88 U	0.79 U	0.81 U	0.80 U	0.85 U	0.79 U
Fluoranthene	µg/L	0.16 U	0.16 U	0.17 U	0.15 U	0.16 U	0.16 U	0.16 U	0.15 U
Fluorene	µg/L	0.17 U	0.17 U	0.18 U	0.16 U	0.17 U	0.16 U	0.17 U	0.16 U
Hexachlorobenzene	µg/L	0.16 U	0.16 U	0.17 U	0.15 U	0.16 U	0.16 U	0.17 U	0.15 U
Hexachlorobutadiene	µg/L	0.55 U	0.55 U	0.58 U	0.52 U	0.54 U	0.53 U	0.56 U	0.52 U
Hexachlorocyclopentadiene	µg/L	1.8 U	1.8 U	1.9 U	1.7 U	1.7 U	1.7 U	1.8 U	1.7 U
Hexachloroethane	µg/L	0.40 U	0.40 U	0.42 U	0.38 U	0.39 U	0.38 U	0.41 U	0.38 U
Indeno(1,2,3-cd)pyrene	µg/L	0.14 U	0.14 U	0.15 U	0.13 U	0.13 U	0.13 U	0.14 U	0.13 U
Isophorone	µg/L	0.33 U	0.33 U	0.35 U	0.31 U	0.32 U	0.31 U	0.33 U	0.31 U
Naphthalene	µg/L	0.11 U	0.11 U	0.12 U	**0.17 J**	**0.15 J**	0.11 U	0.11 U	0.10 U
Nitrobenzene	µg/L	0.52 U	0.52 U	0.55 U	0.49 U	0.51 U	0.50 U	0.53 U	0.49 U
N-Nitrosodi-n-propylamine	µg/L	0.26 U	0.26 U	0.27 U	0.24 U	0.25 U	0.25 U	0.26 U	0.24 U
N-Nitrosodiphenylamine	µg/L	0.44 U	0.45 U	0.47 U	0.42 U	0.44 U	0.43 U	0.45 U	0.42 U
Pentachlorophenol	µg/L	3.1 U	3.2 U	3.3 U	3.0 U	3.1 U	3.0 U	3.2 U	3.0 U
Phenanthrene	µg/L	0.17 U	0.17 U	0.18 U	0.16 U	0.17 U	0.16 U	0.17 U	0.16 U
Phenol	µg/L	0.13 U	0.13 U	0.14 U	0.12 U	0.13 U	0.12 U	0.13 U	0.12 U
Pyrene	µg/L	0.18 U	0.18 U	0.19 U	0.17 U	0.17 U	0.17 U	0.18 U	0.17 U

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**	**SW-10**
Sample ID:		**SW-38443-091918-JPF-010**	**SW-092018-38443-GL-016**	**SW-092018-38443-GL-017**	**SW-38443-091918-JPF-006**	**SW-38443-091918-JPF-007**	**SW-38443-091918-JPF-005**	**SW-38443-091818-GL-003**	**SW-38443-091818-GL-004**
Sample Date:		**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**	**9/19/2018**	**9/18/2018**	**9/18/2018**
Sample Depth:		**3.3 ft BWS**	**5 ft BWS**	**12.11 ft BWS**	**5 ft BWS**	**18.7 ft BWS**	**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
									Duplicate
Parameters	**Units**								
Metals									
Aluminum	µg/L	34 U	34 U	34 U	34 U	34 U	34 U	34 U	**37 J**
Aluminum (dissolved)	µg/L	34 U	34 U	34 U	34 U	34 U	34 U	34 U	34 U
Antimony	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Antimony (dissolved)	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Arsenic	µg/L	**1.9 J**	**1.8 J**	**2.0 J**	**1.9 J**	**2.2 J**	**2.0 J**	**1.8 J**	**1.8 J**
Arsenic (dissolved)	µg/L	**1.7 J**	**1.7 J**	**1.7 J**	**1.8 J**	**1.8 J**	**1.9 J**	**1.9 J**	**2.0 J**
Barium	µg/L	**82**	**76**	**73**	**79**	**65**	**81**	**84**	**81**
Barium (dissolved)	µg/L	**81**	**77**	**69**	**82**	**62**	**75**	**83**	**82**
Beryllium	µg/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	**0.67 J**	0.31 U	0.31 U
Beryllium (dissolved)	µg/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
Cadmium	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Cadmium (dissolved)	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Calcium	µg/L	**38000**	**35000**	**36000**	**36000**	**47000**	**37000**	**38000**	**37000**
Calcium (dissolved)	µg/L	**37000**	**35000**	**37000**	**38000**	**45000**	**35000**	**38000**	**38000**
Chromium	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
Chromium (dissolved)	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
Cobalt	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Cobalt (dissolved)	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Copper	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Copper (dissolved)	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Iron	µg/L	47 U	47 U	**110**	47 U	**80 J**	47 U	**52 J**	**52 J**
Iron (dissolved)	µg/L	47 U	47 U	47 U	47 U	47 U	**91 J**	47 U	47 U
Lead	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Lead (dissolved)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Magnesium	µg/L	**26000**	**24000**	**24000**	**24000**	**26000**	**25000**	**26000**	**25000**
Magnesium (dissolved)	µg/L	**25000**	**24000**	**24000**	**26000**	**25000**	**23000**	**26000**	**26000**
Manganese	µg/L	**7.7**	**5.2**	**18**	**4.4 J**	**16**	**5.5**	**7.6**	**7.2**
Manganese (dissolved)	µg/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Mercury (Low Level)	ng/L	0.45 U	0.27 U	0.40 U	0.44 U	0.50 U	0.41 U	0.35 U	0.35 U
Mercury	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Mercury (dissolved)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Nickel	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Nickel (dissolved)	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Potassium	µg/L	**5600**	**5300**	**5200**	**5500**	**5700**	**5600**	**5800**	**5600**
Potassium (dissolved)	µg/L	**5500**	**5300**	**5300**	**5700**	**5600**	**5400**	**5700**	**5700**
Selenium	µg/L	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Selenium (dissolved)	µg/L	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Silver	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Silver (dissolved)	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Sodium	µg/L	**21000**	**20000**	**20000**	**21000**	**22000**	**21000**	**22000**	**21000**
Sodium (dissolved)	µg/L	**21000**	**20000**	**20000**	**22000**	**21000**	**20000**	**22000**	**22000**
Thallium	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Thallium (dissolved)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vanadium	µg/L	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Vanadium (dissolved)	µg/L	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Zinc	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Zinc (dissolved)	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	0.057 U	0.054 U	0.057 U	0.053 U	0.055 U	0.057 U	0.057 U	0.054 U
Aroclor-1221 (PCB-1221)	µg/L	0.058 U	0.055 U	0.058 U	0.054 U	0.056 U	0.058 U	0.058 U	0.055 U
Aroclor-1232 (PCB-1232)	µg/L	0.075 U	0.071 U	0.076 U	0.070 U	0.073 U	0.076 U	0.076 U	0.071 U
Aroclor-1242 (PCB-1242)	µg/L	0.077 U	0.073 U	0.078 U	0.072 U	0.075 U	0.078 U	0.078 U	0.073 U
Aroclor-1248 (PCB-1248)	µg/L	0.051 U	0.048 U	0.051 U	0.048 U	0.050 U	0.051 U	0.051 U	0.048 U
Aroclor-1254 (PCB-1254)	µg/L	0.040 U	0.038 U	0.041 U	0.038 U	0.040 U	0.041 U	0.041 U	0.038 U
Aroclor-1260 (PCB-1260)	µg/L	0.046 U	0.044 U	0.047 U	0.044 U	0.046 U	0.047 U	0.047 U	0.044 U

Table A.1

Summary of Analytical Results
Surface Water Samples
September 2018
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**	**SW-10**
Sample ID:		**SW-38443-091918-JPF-010**	**SW-092018-38443-GL-016**	**SW-092018-38443-GL-017**	**SW-38443-091918-JPF-006**	**SW-38443-091918-JPF-007**	**SW-38443-091918-JPF-005**	**SW-38443-091818-GL-003**	**SW-38443-091818-GL-004**
Sample Date:		**9/19/2018**	**9/20/2018**	**9/20/2018**	**9/19/2018**	**9/19/2018**	**9/19/2018**	**9/18/2018**	**9/18/2018**
Sample Depth:		**3.3 ft BWS**	**5 ft BWS**	**12.11 ft BWS**	**5 ft BWS**	**18.7 ft BWS**	**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
									Duplicate
Parameters	**Units**								
Herbicides									
2,4,5-T	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
2,4,5-TP (Silvex)	µg/L	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
Pesticides									
4,4'-DDD	µg/L	0.0054 U	0.0051 U	0.0054 U	0.0050 U	0.0052 U	0.0054 U	0.0054 U	0.0051 U
4,4'-DDE	µg/L	0.0043 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0044 U	0.0044 U	0.0041 U
4,4'-DDT	µg/L	0.0048 U	0.0046 U	0.0049 U	0.0046 U	0.0048 U	0.0049 U	0.0049 U	0.0046 U
Aldrin	µg/L	0.0024 U	0.0023 U	0.0024 U	0.0023 U	0.0024 U	0.0024 U	0.0024 U	0.0023 U
alpha-BHC	µg/L	0.0020 U	0.0019 U	0.0020 U	0.0019 U	0.0020 U	0.0020 U	0.0020 U	0.0019 U
alpha-Chlordane	µg/L	0.0032 U	0.0031 U	0.0033 U	0.0030 U	0.0032 U	0.0033 U	0.0033 U	0.0031 U
beta-BHC	µg/L	0.0046 U	0.0044 U	0.0047 U	0.0044 U	0.0046 U	0.0047 U	0.0047 U	0.0044 U
delta-BHC	µg/L	0.0043 U	0.0041 U	0.0044 U	0.0041 U	0.0043 U	0.0044 U	0.0044 U	0.0041 U
Dieldrin	µg/L	0.0023 U	0.0022 U	0.0023 U	0.0022 U	0.0023 U	0.0023 U	0.0023 U	0.0022 U
Endosulfan I	µg/L	0.0037 U	0.0036 U	0.0038 U	0.0035 U	0.0037 U	0.0038 U	0.0038 U	0.0036 U
Endosulfan II	µg/L	0.0023 U	0.0022 U	0.0023 U	0.0022 U	0.0023 U	0.0023 U	0.0023 U	0.0022 U
Endosulfan sulfate	µg/L	0.0037 U	0.0036 U	0.0038 U	0.0035 U	0.0037 U	0.0038 U	0.0038 U	0.0036 U
Endrin	µg/L	0.0025 U	0.0024 U	0.0026 U	0.0024 U	0.0025 U	0.0026 U	0.0026 U	0.0024 U
Endrin aldehyde	µg/L	0.0046 U	0.0044 U	0.0047 U	0.0044 U	0.0046 U	0.0047 U	0.0047 U	0.0044 U
Endrin ketone	µg/L	0.0040 U	0.0038 U	0.0041 U	0.0038 U	0.0040 U	0.0041 U	0.0041 U	0.0038 U
gamma-BHC (lindane)	µg/L	0.0025 U	0.0024 U	0.0026 U	0.0024 U	0.0025 U	0.0026 U	0.0026 U	0.0024 U
gamma-Chlordane	µg/L	0.0051 U	0.0048 U	0.0051 U	0.0048 U	0.0050 U	0.0051 U	0.0051 U	0.0048 U
Heptachlor	µg/L	0.0033 U	0.0032 U	0.0034 U	0.0031 U	0.0033 U	0.0034 U	0.0034 U	0.0032 U
Heptachlor epoxide	µg/L	0.0026 U	0.0025 U	0.0027 U	0.0025 U	0.0026 U	0.0027 U	0.0027 U	0.0025 U
Methoxychlor	µg/L	0.0047 U	0.0045 U	0.0048 U	0.0045 U	0.0047 U	0.0048 U	0.0048 U	0.0045 U
Toxaphene	µg/L	0.059 U	0.056 U	0.059 U	0.055 U	0.058 U	0.059 U	0.059 U	0.056 U
General Chemistry									
Chloride	mg/L	**30**	**30**	**30**	**30**	**31**	**30**	**30**	**30**
Cyanide (total)	mg/L	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U
Fluoride	mg/L	**0.19**	**0.16**	**0.17**	**0.17**	**0.18**	**0.17**	**0.15**	**0.15**
Hardness	mg/L	**200**	**190**	**190**	**190**	**230**	**190**	**200**	**200**
Hardness, carbonate	mg/L	**94**	**89**	**91**	**90**	**120**	**92**	**96**	**93**
Hardness, magnesium	mg/L	**110**	**99**	**98**	**100**	**110**	**100**	**110**	**100**
Nitrate (as N)	µg/L	14 U	14 U	**56 J**	**15 J**	**340**	**15 J**	**17 J**	**16 J**
Nitrite (as N)	µg/L	14 U	14 U	14 U	14 U	14 U	14 U	14 U	14 U
Sulfate	mg/L	**22**	**22**	**22**	**22**	**24**	**22**	**22**	**22**
Sulfide	mg/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
Total dissolved solids (TDS)	mg/L	**240**	**250**	**250**	**240**	**290**	**240**	**240**	**240**

Notes:

J - Estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
ft BWS - Feet below water surface

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-4**	**SW-4**
Sample ID:		**SW-38443-100219-JPF-001**	**SW-38443-100219-JPF-002**	**SW-38443-100219-JPF-003**	**SW-38443-100219-JPF-004**	**SW-38443-100219-JPF-005**	**SW-38443-100219-JPF-006**	**SW-38443-100319-JPF-016**	**SW-38443-100319-JPF-017**
Sample Date:		**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**20.75 ft BWS**	**5 ft BWS**	**26.92 ft BWS**	**5 ft BWS**	**17 ft BWS**	**3 ft BWS**	**3 ft BWS**
									Duplicate
Parameters	**Units**								
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
1,1,2,2-Tetrachloroethane	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 UJ	0.13 UJ
1,1,2-Trichloroethane	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
1,1-Dichloroethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
1,2,4-Trichlorobenzene	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U
1,2-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,2-Dichloroethane	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,3-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,4-Dichlorobenzene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Hexanone	µg/L	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Acetone	µg/L	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 U	5.4 UJ	5.4 U
Benzene	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Bromodichloromethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Bromoform	µg/L	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.76 UJ	0.76 U
Bromomethane (Methyl bromide)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Carbon disulfide	µg/L	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Carbon tetrachloride	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Chlorobenzene	µg/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Chloroethane	µg/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
Chloroform (Trichloromethane)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chloromethane (Methyl chloride)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	µg/L	0.16 U	0.16 U	0.16 U	**0.23 J**	0.16 U	0.16 U	0.16 U	0.16 U
cis-1,3-Dichloropropene	µg/L	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
Cyclohexane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Dibromochloromethane	µg/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Dichlorodifluoromethane (CFC-12)	µg/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Ethylbenzene	µg/L	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Isopropyl benzene	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
m&p-Xylenes	µg/L	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
Methyl acetate	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Methyl cyclohexane	µg/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Methyl tert butyl ether (MTBE)	µg/L	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U
Methylene chloride	µg/L	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
o-Xylene	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
Styrene	µg/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Tetrachloroethene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Toluene	µg/L	0.14 U	0.14 U	0.14 U	**1.4**	0.14 U	0.14 U	0.14 U	0.14 U
trans-1,2-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
trans-1,3-Dichloropropene	µg/L	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U
Trichloroethene	µg/L	0.10 U	**0.14 J**	0.10 U	**0.35 J**	0.10 U	0.10 U	0.10 U	0.10 U
Trichlorofluoromethane (CFC-11)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Trifluorotrichloroethane (CFC-113)	µg/L	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Vinyl chloride	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Xylenes (total)	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Semivolatile Organic Compounds									
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/L	1.1 U	0.54 U	0.95 U	0.55 U	0.53 U	0.55 U	0.53 U	0.52 U
2,4,5-Trichlorophenol	µg/L	4.0 U	1.9 U	3.4 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U
2,4,6-Trichlorophenol	µg/L	3.6 U	1.8 U	3.1 U	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U
2,4-Dichlorophenol	µg/L	0.52 U	0.26 U	0.45 U	0.26 U	0.25 U	0.26 U	0.25 U	0.25 U
2,4-Dimethylphenol	µg/L	1.0 U	0.51 U	0.89 U	0.52 U	0.50 U	0.51 U	0.50 U	0.49 U
2,4-Dinitrophenol	µg/L	12 U	6.1 U	11 U	6.2 U	6.0 U	6.1 U	6.0 U	5.9 U
2,4-Dinitrotoluene	µg/L	4.1 U	2.0 U	3.6 U	2.1 U	2.0 U	2.0 U	2.0 U	2.0 U
2,6-Dinitrotoluene	µg/L	4.3 U	2.1 U	3.7 U	2.1 U	2.0 U	2.1 U	2.1 U	2.0 U
2-Chloronaphthalene	µg/L	0.97 U	0.47 U	0.83 U	0.48 U	0.46 U	0.48 U	0.47 U	0.46 U
2-Chlorophenol	µg/L	0.55 U	0.27 U	0.47 U	0.27 U	0.26 U	0.27 U	0.27 U	0.26 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-4**	**SW-4**
Sample ID:		**SW-38443-100219-JPF-001**	**SW-38443-100219-JPF-002**	**SW-38443-100219-JPF-003**	**SW-38443-100219-JPF-004**	**SW-38443-100219-JPF-005**	**SW-38443-100219-JPF-006**	**SW-38443-100319-JPF-016**	**SW-38443-100319-JPF-017**
Sample Date:		**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**20.75 ft BWS**	**5 ft BWS**	**26.92 ft BWS**	**5 ft BWS**	**17 ft BWS**	**3 ft BWS**	**3 ft BWS**
									Duplicate
Parameters	**Units**								
Semivolatile Organic Compounds cont'd									
2-Methylnaphthalene	µg/L	0.22 U	0.11 U	0.19 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
2-Methylphenol	µg/L	0.42 U	0.20 U	0.36 U	0.21 U	0.20 U	0.21 U	0.20 U	0.20 U
2-Nitroaniline	µg/L	1.0 U	0.50 U	0.88 U	0.51 U	0.49 U	0.50 U	0.50 U	0.49 U
2-Nitrophenol	µg/L	1.1 U	0.55 U	0.97 U	0.56 U	0.54 U	0.56 U	0.55 U	0.54 U
3&4-Methylphenol	µg/L	0.38 U	0.19 U	0.33 U	0.19 U	0.18 U	0.19 U	0.19 U	0.18 U
3,3'-Dichlorobenzidine	µg/L	2.3 U	1.1 U	2.0 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U
3-Nitroaniline	µg/L	1.1 U	0.55 U	0.98 U	0.57 U	0.54 U	0.56 U	0.55 U	0.54 U
4,6-Dinitro-2-methylphenol	µg/L	5.6 U	2.8 U	4.9 U	2.8 U	2.7 U	2.8 U	2.7 U	2.7 U
4-Bromophenyl phenyl ether	µg/L	1.0 U	0.49 U	0.86 U	0.50 U	0.48 U	0.49 U	0.48 U	0.48 U
4-Chloro-3-methylphenol	µg/L	0.59 U	0.29 U	0.51 U	0.30 U	0.28 U	0.29 U	0.29 U	0.28 U
4-Chloroaniline	µg/L	0.63 U	0.31 U	0.54 U	0.32 U	0.30 U	0.31 U	0.31 U	0.30 U
4-Chlorophenyl phenyl ether	µg/L	1.1 U	0.54 U	0.95 U	0.55 U	0.53 U	0.55 U	0.53 U	0.52 U
4-Nitroaniline	µg/L	1.8 U	0.90 U	1.6 U	0.92 U	0.88 U	0.91 U	0.89 U	0.87 U
4-Nitrophenol	µg/L	4.3 U	2.1 U	3.7 U	2.2 U	2.1 U	2.2 U	2.1 U	2.1 U
Acenaphthene	µg/L	0.34 U	0.17 U	0.30 U	0.17 U	0.17 U	0.17 U	0.17 U	0.16 U
Acenaphthylene	µg/L	0.25 U	0.12 U	0.22 U	0.13 U	0.12 U	0.12 U	0.12 U	0.12 U
Acetophenone	µg/L	0.73 U	0.36 U	0.63 U	0.37 U	0.35 U	0.36 U	0.36 U	0.35 U
Anthracene	µg/L	0.27 U	0.13 U	0.23 U	0.14 U	0.13 U	0.13 U	0.13 U	0.13 U
Atrazine	µg/L	1.9 U	0.93 U	1.6 U	0.95 U	0.92 U	0.94 U	0.92 U	0.91 U
Benzaldehyde	µg/L	1.5 U	0.74 U	1.3 U	0.76 U	0.73 U	0.75 U	0.74 U	0.72 U
Benzo(a)anthracene	µg/L	0.34 U	0.17 U	0.29 U	0.17 U	0.16 U	0.17 U	0.17 U	0.16 U
Benzo(a)pyrene	µg/L	0.35 U	0.17 U	0.30 U	0.17 U	0.17 U	0.17 U	0.17 U	0.16 U
Benzo(b)fluoranthene	µg/L	0.31 U	0.15 U	0.27 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Benzo(g,h,i)perylene	µg/L	0.36 U	0.17 U	0.31 U	0.18 U	0.17 U	0.18 U	0.17 U	0.17 U
Benzo(k)fluoranthene	µg/L	0.28 U	0.14 U	0.24 U	0.14 U	0.13 U	0.14 U	0.14 U	0.13 U
Biphenyl (1,1-Biphenyl)	µg/L	0.98 U	0.48 U	0.85 U	0.49 U	0.47 U	0.49 U	0.48 U	0.47 U
bis(2-Chloroethoxy)methane	µg/L	0.91 U	0.45 U	0.78 U	0.46 U	0.44 U	0.45 U	0.44 U	0.43 U
bis(2-Chloroethyl)ether	µg/L	0.80 U	0.39 U	0.69 U	0.40 U	0.39 U	0.40 U	0.39 U	0.38 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	4.4 U	2.2 U	3.8 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U
Butyl benzylphthalate (BBP)	µg/L	1.3 U	0.65 U	1.1 U	0.67 U	0.64 U	0.66 U	0.65 U	0.63 U
Caprolactam	µg/L	1.9 U	0.92 U	1.6 U	0.93 U	0.90 U	0.92 U	0.91 U	0.89 U
Carbazole	µg/L	0.98 U	0.48 U	0.84 U	0.49 U	0.47 U	0.49 U	0.48 U	0.47 U
Chrysene	µg/L	0.37 U	0.18 U	0.32 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U
Dibenz(a,h)anthracene	µg/L	0.30 U	0.15 U	0.26 U	0.15 U	0.15 U	0.15 U	0.15 U	0.14 U
Dibenzofuran	µg/L	1.1 U	0.55 U	0.97 U	0.56 U	0.54 U	0.56 U	0.54 U	0.53 U
Diethyl phthalate	µg/L	7.6 U	3.7 U	6.6 U	3.8 U	3.7 U	3.8 U	3.7 U	3.6 U
Dimethyl phthalate	µg/L	1.0 U	0.50 U	0.89 U	0.52 U	0.50 U	0.51 U	0.50 U	0.49 U
Di-n-butylphthalate (DBP)	µg/L	3.6 U	1.8 U	3.1 U	1.8 U	1.7 U	1.8 U	1.8 U	1.7 U
Di-n-octyl phthalate (DnOP)	µg/L	1.6 U	0.80 U	1.4 U	0.82 U	0.79 U	0.81 U	0.80 U	0.78 U
Fluoranthene	µg/L	0.32 U	0.16 U	0.28 U	0.16 U	0.15 U	0.16 U	0.16 U	0.15 U
Fluorene	µg/L	0.34 U	0.17 U	0.29 U	0.17 U	0.16 U	0.17 U	0.16 U	0.16 U
Hexachlorobenzene	µg/L	0.32 U	0.16 U	0.28 U	0.16 U	0.15 U	0.16 U	0.16 U	0.15 U
Hexachlorobutadiene	µg/L	1.1 U	0.53 U	0.94 U	0.54 U	0.52 U	0.54 U	0.53 U	0.52 U
Hexachlorocyclopentadiene	µg/L	3.5 U	1.7 U	3.0 U	1.8 U	1.7 U	1.7 U	1.7 U	1.7 U
Hexachloroethane	µg/L	0.79 U	0.39 U	0.68 U	0.40 U	0.38 U	0.39 U	0.38 U	0.38 U
Indeno(1,2,3-cd)pyrene	µg/L	0.27 U	0.13 U	0.23 U	0.14 U	0.13 U	0.13 U	0.13 U	0.13 U
Isophorone	µg/L	0.65 U	0.32 U	0.56 U	0.32 U	0.31 U	0.32 U	0.31 U	0.31 U
Naphthalene	µg/L	0.22 U	0.11 U	0.19 U	0.11 U	0.10 U	0.11 U	**0.35**	**0.25**
Nitrobenzene	µg/L	1.0 U	0.50 U	0.89 U	0.51 U	0.49 U	0.51 U	0.50 U	0.49 U
N-Nitrosodi-n-propylamine	µg/L	0.51 U	0.25 U	0.44 U	0.25 U	0.24 U	0.25 U	0.25 U	0.24 U
N-Nitrosodiphenylamine	µg/L	0.88 U	0.43 U	0.76 U	0.44 U	0.42 U	0.44 U	0.43 U	0.42 U
Pentachlorophenol	µg/L	6.2 U	3.0 U	5.4 U	3.1 U	3.0 U	3.1 U	3.0 U	3.0 U
Phenanthrene	µg/L	0.33 U	0.16 U	0.29 U	0.17 U	0.16 U	0.17 U	0.16 U	0.16 U
Phenol	µg/L	0.26 U	0.13 U	0.22 U	**0.32 J**	0.12 U	0.13 U	0.12 U	0.12 U
Pyrene	µg/L	0.35 U	0.17 U	0.30 U	0.18 U	0.17 U	0.17 U	0.17 U	0.17 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-4**	**SW-4**
Sample ID:		**SW-38443-100219-JPF-001**	**SW-38443-100219-JPF-002**	**SW-38443-100219-JPF-003**	**SW-38443-100219-JPF-004**	**SW-38443-100219-JPF-005**	**SW-38443-100219-JPF-006**	**SW-38443-100319-JPF-016**	**SW-38443-100319-JPF-017**
Sample Date:		**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**20.75 ft BWS**	**5 ft BWS**	**26.92 ft BWS**	**5 ft BWS**	**17 ft BWS**	**3 ft BWS**	**3 ft BWS**
									Duplicate
Parameters	**Units**								
Metals									
Aluminum	µg/L	34 U	34 U	34 U	**49 J**	34 U	**38 J**	34 U	34 U
Aluminum (dissolved)	µg/L	34 U	34 U	34 U	34 U	34 U	34 U	34 U	34 U
Antimony	µg/L	**0.78 J**	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Antimony (dissolved)	µg/L	**0.92 J**	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Arsenic	µg/L	**1.9 J**	**2.7 J**	**2.0 J**	**5.8**	**1.7 J**	**2.1 J**	**1.7 J**	**1.8 J**
Arsenic (dissolved)	µg/L	**1.9 J**	**2.3 J**	**1.6 J**	**4.8 J**	**1.8 J**	**2.0 J**	**1.8 J**	**1.5 J**
Barium	µg/L	**88**	**93**	**87**	**230**	**88**	**88**	**87**	**90**
Barium (dissolved)	µg/L	**87**	**82**	**92**	**230**	**93**	**88**	**90**	**86**
Beryllium	µg/L	**0.57 J**	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
Beryllium (dissolved)	µg/L	**0.78 J**	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
Cadmium	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (dissolved)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Calcium	µg/L	**36000**	**49000**	**36000**	**76000**	**36000**	**39000**	**36000**	**36000**
Calcium (dissolved)	µg/L	**36000**	**49000**	**37000**	**77000**	**38000**	**39000**	**37000**	**35000**
Chromium	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
Chromium (dissolved)	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
Cobalt	µg/L	0.19 U	0.19 U	0.19 U	**0.67 J**	0.19 U	0.19 U	0.19 U	0.19 U
Cobalt (dissolved)	µg/L	0.19 U	0.19 U	0.19 U	**0.42 J**	0.19 U	0.19 U	0.19 U	0.19 U
Copper	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Copper (dissolved)	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Iron	µg/L	47 U	**150**	47 U	**3400**	47 U	**150**	47 U	47 U
Iron (dissolved)	µg/L	47 U	47 U	47 U	**3400**	47 U	47 U	47 U	47 U
Lead	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Lead (dissolved)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Magnesium	µg/L	**25000**	**26000**	**25000**	**31000**	**24000**	**25000**	**24000**	**25000**
Magnesium (dissolved)	µg/L	**24000**	**26000**	**25000**	**31000**	**26000**	**26000**	**25000**	**24000**
Manganese	µg/L	**4.1 J**	**50**	**3.6 J**	**3000**	**4.4 J**	**20**	**4.9 J**	**4.9 J**
Manganese (dissolved)	µg/L	**3.5 J**	**8.1**	2.1 U	**2800**	2.1 U	**2.5 J**	2.1 U	2.1 U
Mercury (Low Level)	ng/L	0.46 U	0.46 U	0.14 U	**1.8**	0.14 U	0.14 U	0.14 U	0.25 U
Mercury	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Mercury (dissolved)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Nickel	µg/L	1.5 U	1.5 U	1.5 U	**1.6 J**	1.5 U	1.5 U	1.5 U	1.5 U
Nickel (dissolved)	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Potassium	µg/L	**5200**	**5400**	**5100**	**6100**	**5100**	**5200**	**5100**	**5100**
Potassium (dissolved)	µg/L	**5200**	**5300**	**5300**	**6000**	**5400**	**5400**	**5200**	**4900**
Selenium	µg/L	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Selenium (dissolved)	µg/L	**1.1 J**	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Silver	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Silver (dissolved)	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Sodium	µg/L	**18000**	**19000**	**18000**	**24000**	**18000**	**18000**	**17000**	**18000**
Sodium (dissolved)	µg/L	**18000**	**19000**	**19000**	**24000**	**19000**	**19000**	**18000**	**17000**
Thallium	µg/L	**0.55 J**	**0.23 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Thallium (dissolved)	µg/L	**0.73 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vanadium	µg/L	0.82 U	0.82 U	0.82 U	**0.89 J**	0.82 U	0.82 U	0.82 U	0.82 U
Vanadium (dissolved)	µg/L	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Zinc	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
Zinc (dissolved)	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	0.053 U	0.055 U	0.054 U	0.054 U	0.053 U	0.054 U	0.055 U	0.054 U
Aroclor-1221 (PCB-1221)	µg/L	0.054 U	0.056 U	0.055 U	0.055 U	0.054 U	0.055 U	0.056 U	0.055 U
Aroclor-1232 (PCB-1232)	µg/L	0.070 U	0.072 U	0.071 U	0.071 U	0.070 U	0.072 U	0.073 U	0.072 U
Aroclor-1242 (PCB-1242)	µg/L	0.072 U	0.074 U	0.073 U	0.073 U	0.072 U	0.074 U	0.075 U	0.074 U
Aroclor-1248 (PCB-1248)	µg/L	0.048 U	0.049 U	0.048 U	0.048 U	0.048 U	0.049 U	0.050 U	0.049 U
Aroclor-1254 (PCB-1254)	µg/L	0.038 U	0.039 U	0.038 U	0.038 U	0.038 U	0.039 U	0.040 U	0.039 U
Aroclor-1260 (PCB-1260)	µg/L	0.044 U	0.045 U	0.044 U	0.044 U	0.044 U	0.045 U	0.046 U	0.045 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-1**	**SW-1**	**SW-2**	**SW-2**	**SW-3**	**SW-3**	**SW-4**	**SW-4**
Sample ID:		**SW-38443-100219-JPF-001**	**SW-38443-100219-JPF-002**	**SW-38443-100219-JPF-003**	**SW-38443-100219-JPF-004**	**SW-38443-100219-JPF-005**	**SW-38443-100219-JPF-006**	**SW-38443-100319-JPF-016**	**SW-38443-100319-JPF-017**
Sample Date:		**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**20.75 ft BWS**	**5 ft BWS**	**26.92 ft BWS**	**5 ft BWS**	**17 ft BWS**	**3 ft BWS**	**3 ft BWS**
									Duplicate
Parameters	**Units**								
Herbicides									
2,4,5-T	µg/L	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 UJ	0.57 UJ
2,4,5-TP (Silvex)	µg/L	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 UJ	0.43 UJ
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 UJ	2.2 UJ
Pesticides									
4,4'-DDD	µg/L	0.0050 U	0.0052 U	0.0051 U	0.25 U	0.0050 U	0.0051 U	0.0052 U	0.0051 U
4,4'-DDE	µg/L	0.0041 U	0.0042 U	0.0041 U	0.0041 U	0.0041 U	0.0042 U	0.0043 U	0.0042 U
4,4'-DDT	µg/L	0.0046 U	0.0047 U	0.0046 U	0.23 U	0.0046 U	0.0047 U	0.0048 U	0.0047 U
Aldrin	µg/L	0.0023 U	0.0023 U	0.0023 U	0.0023 U	0.0023 U	0.0023 U	0.0024 U	0.0023 U
alpha-BHC	µg/L	0.0019 U	0.0020 U	0.0019 U	0.096 U	0.0019 U	0.0019 U	0.0020 U	0.0019 U
alpha-Chlordane	µg/L	0.0030 U	0.0031 U	0.0031 U	0.0031 U	0.0030 U	0.0031 U	0.0032 U	0.0031 U
beta-BHC	µg/L	0.0044 U	0.0045 U	0.0044 U	0.0044 U	0.0044 U	0.0045 U	0.0046 U	0.0045 U
delta-BHC	µg/L	0.0041 U	0.0042 U	0.0041 U	0.21 U	0.0041 U	0.0042 U	0.0043 U	0.0042 U
Dieldrin	µg/L	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0023 U	0.0022 U
Endosulfan I	µg/L	0.0035 U	0.0036 U	0.0036 U	0.0036 U	0.0035 U	0.0036 U	0.0037 U	0.0036 U
Endosulfan II	µg/L	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0023 U	0.0022 U
Endosulfan sulfate	µg/L	0.0035 U	0.0036 U	0.0036 U	0.18 U	0.0035 U	0.0036 U	0.0037 U	0.0036 U
Endrin	µg/L	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0025 U	0.0024 U
Endrin aldehyde	µg/L	0.0044 U	0.0045 U	0.0044 U	0.22 U	0.0044 U	0.0045 U	0.0046 U	0.0045 U
Endrin ketone	µg/L	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0040 U	0.0039 U
gamma-BHC (lindane)	µg/L	0.0024 U	0.0024 U	0.0024 U	0.12 U	0.0024 U	0.0024 U	0.0025 U	0.0024 U
gamma-Chlordane	µg/L	0.0048 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.0050 U	0.0049 U
Heptachlor	µg/L	0.0031 U	0.0032 U	0.0032 U	0.0032 U	0.0031 U	0.0032 U	0.0033 U	0.0032 U
Heptachlor epoxide	µg/L	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0025 U
Methoxychlor	µg/L	0.0045 U	0.0046 U	0.0045 U	0.0045 U	0.0045 U	0.0046 U	0.0047 U	0.0046 U
Toxaphene	µg/L	0.055 U	0.057 U	0.056 U	0.056 U	0.055 U	0.056 U	0.058 U	0.056 U
General Chemistry									
Chloride	mg/L	**27**	**28**	**27**	**34**	**27**	**27**	**27**	**27**
Cyanide (total)	mg/L	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U
Fluoride	mg/L	**0.18**	**0.18**	**0.17**	**0.18**	**0.17**	**0.17**	**0.16**	**0.17**
Hardness	mg/L	**190**	**230**	**190**	**320**	**190**	**200**	**190**	**190**
Hardness, carbonate	mg/L	**91**	**120**	**90**	**190**	**90**	**97**	**90**	**91**
Hardness, magnesium	mg/L	**100**	**110**	**100**	**130**	**100**	**100**	**99**	**100**
Nitrate (as N)	µg/L	R	R	R	R	R	R	R	R
Nitrite (as N)	µg/L	14 U	14 U	14 U	14 U	14 U	14 U	14 U	14 U
Sulfate	mg/L	**20**	**19**	**20**	**2.7**	**20**	**19**	**20**	**20**
Sulfide	mg/L	0.58 U	0.58 U	**0.80 J**	0.58 U	**0.60 J**	0.58 U	0.58 U	0.58 U
Total dissolved solids (TDS)	mg/L	**250**	**280**	**230**	**390**	**240**	**240**	**250**	**260**

Notes:

J - Estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
ft BWS - Feet below water surface

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-5**	**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**
Sample ID:		**SW-38443-100319-JPF-015**	**SW-38443-100319-JPF-014**	**SW-38443-100319-JPF-012**	**SW-38443-100319-JPF-013**	**SW-38443-100319-JPF-010**	**SW-38443-100319-JPF-011**	**SW-38443-100219-JPF-009**	**SW-38443-100219-JPF-007**
Sample Date:		**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/2/2019**	**10/2/2019**
Sample Depth:		**5 ft BWS**	**1.92 ft BWS**	**5 ft BWS**	**12.42 ft BWS**	**5 ft BWS**	**15.75 ft BWS**	**5 ft BWS**	**5 ft BWS**
Parameters	**Units**								
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
1,1,2,2-Tetrachloroethane	µg/L	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	0.13 U	0.13 U
1,1,2-Trichloroethane	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
1,1-Dichloroethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
1,2,4-Trichlorobenzene	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U	0.0086 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U	0.0087 U
1,2-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,2-Dichloroethane	µg/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,3-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,4-Dichlorobenzene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Hexanone	µg/L	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Acetone	µg/L	5.4 U	5.4 UJ	5.4 UJ	5.4 UJ	5.4 UJ	5.4 UJ	5.4 U	5.4 U
Benzene	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Bromodichloromethane	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Bromoform	µg/L	0.76 U	0.76 UJ	0.76 UJ	0.76 UJ	0.76 UJ	0.76 UJ	0.76 U	0.76 U
Bromomethane (Methyl bromide)	µg/L	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Carbon disulfide	µg/L	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Carbon tetrachloride	µg/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Chlorobenzene	µg/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Chloroethane	µg/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
Chloroform (Trichloromethane)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chloromethane (Methyl chloride)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
cis-1,3-Dichloropropene	µg/L	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
Cyclohexane	µg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Dibromochloromethane	µg/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Dichlorodifluoromethane (CFC-12)	µg/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Ethylbenzene	µg/L	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Isopropyl benzene	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
m&p-Xylenes	µg/L	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
Methyl acetate	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Methyl cyclohexane	µg/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Methyl tert butyl ether (MTBE)	µg/L	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U	0.070 U
Methylene chloride	µg/L	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
o-Xylene	µg/L	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
Styrene	µg/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Tetrachloroethene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Toluene	µg/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	**0.15 J**	0.14 U	0.14 U
trans-1,2-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
trans-1,3-Dichloropropene	µg/L	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U
Trichloroethene	µg/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Trichlorofluoromethane (CFC-11)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Trifluorotrichloroethane (CFC-113)	µg/L	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Vinyl chloride	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Xylenes (total)	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Semivolatile Organic Compounds									
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/L	0.53 U	0.52 U	0.53 U	0.53 U	0.53 U	0.53 U	1.0 U	0.54 U
2,4,5-Trichlorophenol	µg/L	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	3.7 U	1.9 U
2,4,6-Trichlorophenol	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	3.3 U	1.8 U
2,4-Dichlorophenol	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.49 U	0.26 U
2,4-Dimethylphenol	µg/L	0.50 U	0.49 U	0.50 U	0.50 U	0.50 U	0.50 U	0.96 U	0.51 U
2,4-Dinitrophenol	µg/L	6.0 U	5.9 U	6.0 U	6.0 U	6.0 U	6.0 U	12 U	6.1 U
2,4-Dinitrotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	3.8 U	2.0 U
2,6-Dinitrotoluene	µg/L	2.1 U	2.0 U	2.0 U	2.1 U	2.1 U	2.0 U	3.9 U	2.1 U
2-Chloronaphthalene	µg/L	0.47 U	0.46 U	0.46 U	0.47 U	0.47 U	0.46 U	0.89 U	0.47 U
2-Chlorophenol	µg/L	0.27 U	0.26 U	0.26 U	0.27 U	0.27 U	0.26 U	0.51 U	0.27 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-5**	**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**
Sample ID:		**SW-38443-100319-JPF-015**	**SW-38443-100319-JPF-014**	**SW-38443-100319-JPF-012**	**SW-38443-100319-JPF-013**	**SW-38443-100319-JPF-010**	**SW-38443-100319-JPF-011**	**SW-38443-100219-JPF-009**	**SW-38443-100219-JPF-007**
Sample Date:		**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/2/2019**	**10/2/2019**
Sample Depth:		**5 ft BWS**	**1.92 ft BWS**	**5 ft BWS**	**12.42 ft BWS**	**5 ft BWS**	**15.75 ft BWS**	**5 ft BWS**	**5 ft BWS**
Parameters	**Units**								
Semivolatile Organic Compounds cont'd									
2-Methylnaphthalene	µg/L	0.11 U	0.11 U	**0.15 J**	0.11 U	0.11 U	**0.12 J**	0.21 U	0.11 U
2-Methylphenol	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.39 U	0.20 U
2-Nitroaniline	µg/L	0.50 U	0.49 U	0.49 U	0.50 U	0.50 U	0.49 U	0.94 U	0.50 U
2-Nitrophenol	µg/L	0.55 U	0.54 U	0.54 U	0.55 U	0.55 U	0.54 U	1.0 U	0.55 U
3&4-Methylphenol	µg/L	0.19 U	0.18 U	0.18 U	0.19 U	0.19 U	0.18 U	0.35 U	0.19 U
3,3'-Dichlorobenzidine	µg/L	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	1.1 U
3-Nitroaniline	µg/L	0.55 U	0.54 U	0.54 U	0.55 U	0.55 U	0.54 U	1.0 U	0.55 U
4,6-Dinitro-2-methylphenol	µg/L	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	5.2 U	2.8 U
4-Bromophenyl phenyl ether	µg/L	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.92 U	0.49 U
4-Chloro-3-methylphenol	µg/L	0.29 U	0.28 U	0.28 U	0.29 U	0.29 U	0.28 U	0.55 U	0.29 U
4-Chloroaniline	µg/L	0.31 U	R	0.30 U	0.31 U	0.31 U	0.30 U	0.59 U	0.31 U
4-Chlorophenyl phenyl ether	µg/L	0.53 U	0.52 U	0.53 U	0.53 U	0.53 U	0.53 U	1.0 U	0.54 U
4-Nitroaniline	µg/L	0.89 U	0.87 U	0.88 U	0.89 U	0.89 U	0.88 U	1.7 U	0.90 U
4-Nitrophenol	µg/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	4.0 U	2.1 U
Acenaphthene	µg/L	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U	0.17 U	0.32 U	0.17 U
Acenaphthylene	µg/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.23 U	0.12 U
Acetophenone	µg/L	0.36 U	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.68 U	0.36 U
Anthracene	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.25 U	0.13 U
Atrazine	µg/L	0.92 U	0.91 U	0.92 U	0.92 U	0.92 U	0.92 U	1.8 U	0.93 U
Benzaldehyde	µg/L	0.74 U	0.72 U	0.73 U	0.74 U	0.74 U	0.73 U	1.4 U	0.74 U
Benzo(a)anthracene	µg/L	0.17 U	0.16 U	0.16 U	0.17 U	0.17 U	0.16 U	0.32 U	0.17 U
Benzo(a)pyrene	µg/L	0.17 U	0.16 U	0.17 U	0.17 U	0.17 U	0.17 U	0.32 U	0.17 U
Benzo(b)fluoranthene	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.29 U	0.15 U
Benzo(g,h,i)perylene	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.33 U	0.17 U
Benzo(k)fluoranthene	µg/L	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.13 U	0.26 U	0.14 U
Biphenyl (1,1-Biphenyl)	µg/L	0.48 U	0.47 U	0.47 U	0.48 U	0.48 U	0.47 U	0.91 U	0.48 U
bis(2-Chloroethoxy)methane	µg/L	0.44 U	0.43 U	0.44 U	0.44 U	0.44 U	0.44 U	0.84 U	0.45 U
bis(2-Chloroethyl)ether	µg/L	0.39 U	0.38 U	0.39 U	0.39 U	0.39 U	0.39 U	0.74 U	0.39 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	2.2 U	2.1 U	2.1 U	2.2 U	2.2 U	2.1 U	4.1 U	2.2 U
Butyl benzylphthalate (BBP)	µg/L	0.65 U	0.63 U	0.64 U	0.65 U	0.65 U	0.64 U	1.2 U	0.65 U
Caprolactam	µg/L	0.91 U	R	0.90 U	0.91 U	0.91 U	0.90 U	1.7 U	0.92 U
Carbazole	µg/L	0.48 U	0.47 U	0.47 U	0.48 U	0.48 U	0.47 U	0.91 U	0.48 U
Chrysene	µg/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.34 U	0.18 U
Dibenz(a,h)anthracene	µg/L	0.15 U	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U	0.28 U	0.15 U
Dibenzofuran	µg/L	0.54 U	0.53 U	0.54 U	0.54 U	0.54 U	0.54 U	1.0 U	0.55 U
Diethyl phthalate	µg/L	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.7 U	7.1 U	3.7 U
Dimethyl phthalate	µg/L	0.50 U	0.49 U	0.50 U	0.50 U	0.50 U	0.50 U	0.95 U	0.50 U
Di-n-butylphthalate (DBP)	µg/L	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.7 U	3.3 U	1.8 U
Di-n-octyl phthalate (DnOP)	µg/L	0.80 U	0.78 U	0.79 U	0.80 U	0.80 U	0.79 U	1.5 U	0.80 U
Fluoranthene	µg/L	0.16 U	0.15 U	0.15 U	0.16 U	0.16 U	0.15 U	0.30 U	0.16 U
Fluorene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.31 U	0.17 U
Hexachlorobenzene	µg/L	0.16 U	0.15 U	0.15 U	0.16 U	0.16 U	0.15 U	0.30 U	0.16 U
Hexachlorobutadiene	µg/L	0.53 U	0.52 U	0.52 U	0.53 U	0.53 U	0.52 U	1.0 U	0.53 U
Hexachlorocyclopentadiene	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	3.3 U	1.7 U
Hexachloroethane	µg/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.73 U	0.39 U
Indeno(1,2,3-cd)pyrene	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.25 U	0.13 U
Isophorone	µg/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.60 U	0.32 U
Naphthalene	µg/L	**0.34**	0.10 U	**1.1**	**1.1**	0.11 U	**0.86**	0.20 U	0.11 U
Nitrobenzene	µg/L	0.50 U	0.49 U	0.49 U	0.50 U	0.50 U	0.49 U	0.95 U	0.50 U
N-Nitrosodi-n-propylamine	µg/L	0.25 U	0.24 U	0.24 U	0.25 U	0.25 U	0.24 U	0.47 U	0.25 U
N-Nitrosodiphenylamine	µg/L	0.43 U	0.42 U	0.42 U	0.43 U	0.43 U	0.42 U	0.81 U	0.43 U
Pentachlorophenol	µg/L	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	5.7 U	3.0 U
Phenanthrene	µg/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.31 U	0.16 U
Phenol	µg/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.24 U	0.13 U
Pyrene	µg/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.32 U	0.17 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-5**	**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**
Sample ID:		**SW-38443-100319-JPF-015**	**SW-38443-100319-JPF-014**	**SW-38443-100319-JPF-012**	**SW-38443-100319-JPF-013**	**SW-38443-100319-JPF-010**	**SW-38443-100319-JPF-011**	**SW-38443-100219-JPF-009**	**SW-38443-100219-JPF-007**
Sample Date:		**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/2/2019**	**10/2/2019**
Sample Depth:		**5 ft BWS**	**1.92 ft BWS**	**5 ft BWS**	**12.42 ft BWS**	**5 ft BWS**	**15.75 ft BWS**	**5 ft BWS**	**5 ft BWS**
Parameters	**Units**								
Metals									
Aluminum	µg/L	34 U	34 U	34 U	34 U	34 U	34 U	34 U	34 U
Aluminum (dissolved)	µg/L	34 U	34 U	34 U	34 U	34 U	34 U	34 U	34 U
Antimony	µg/L	0.57 U	**0.82 J**	0.57 U	0.57 U	**0.80 J**	0.57 U	0.57 U	0.57 U
Antimony (dissolved)	µg/L	0.57 U	**0.83 J**	0.57 U	0.57 U	**0.62 J**	0.57 U	0.57 U	0.57 U
Arsenic	µg/L	**1.7 J**	**1.8 J**	**1.8 J**	**2.0 J**	**2.0 J**	**2.0 J**	**1.8 J**	**1.6 J**
Arsenic (dissolved)	µg/L	**1.9 J**	**1.6 J**	**1.5 J**	**2.0 J**	**1.8 J**	**1.8 J**	**1.8 J**	**1.8 J**
Barium	µg/L	**88**	**89**	**90**	**93**	**86**	**89**	**91**	**85**
Barium (dissolved)	µg/L	**89**	**85**	**82**	**87**	**87**	**89**	**91**	**86**
Beryllium	µg/L	0.31 U	0.63 U	0.31 U	0.31 U	0.65 U	0.31 U	0.31 U	0.31 U
Beryllium (dissolved)	µg/L	0.31 U	0.72 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
Cadmium	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (dissolved)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Calcium	µg/L	**36000**	**36000**	**36000**	**38000**	**35000**	**39000**	**37000**	**35000**
Calcium (dissolved)	µg/L	**36000**	**35000**	**33000**	**37000**	**36000**	**38000**	**37000**	**36000**
Chromium	µg/L	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 UJ
Chromium (dissolved)	µg/L	**1.1 J**	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U	**6.4 J**
Cobalt	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Cobalt (dissolved)	µg/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Copper	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Copper (dissolved)	µg/L	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Iron	µg/L	47 U	47 U	47 U	**140**	47 U	**66 J**	47 U	47 U
Iron (dissolved)	µg/L	47 U	47 U	47 U	**49 J**	47 U	47 U	47 U	47 U
Lead	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Lead (dissolved)	µg/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Magnesium	µg/L	**24000**	**24000**	**24000**	**25000**	**23000**	**25000**	**25000**	**24000**
Magnesium (dissolved)	µg/L	**24000**	**24000**	**22000**	**25000**	**24000**	**24000**	**26000**	**25000**
Manganese	µg/L	**5.8**	**3.7 J**	**6.8**	**36**	**3.7 J**	**7.8**	**3.9 J**	**5.3 J**
Manganese (dissolved)	µg/L	**2.9 J**	2.1 U	2.1 U	**11**	2.1 U	2.1 U	2.1 U	**8.1 J**
Mercury (Low Level)	ng/L	0.14 U	**0.27 J**	0.14 U	0.25 U	0.25 U	0.25 U	0.23 U	0.33 U
Mercury	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Mercury (dissolved)	µg/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Nickel	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 UJ
Nickel (dissolved)	µg/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**4.0 J**
Potassium	µg/L	**5000**	**5000**	**5000**	**5300**	**4900**	**5100**	**5200**	**5000**
Potassium (dissolved)	µg/L	**5000**	**4900**	**4600**	**5200**	**5100**	**5100**	**5300**	**5300**
Selenium	µg/L	0.89 U	0.89 U	0.89 U	0.89 U	**1.0 J**	0.89 U	0.89 U	0.89 U
Selenium (dissolved)	µg/L	0.89 U	**1.0 J**	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
Silver	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Silver (dissolved)	µg/L	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
Sodium	µg/L	**18000**	**18000**	**18000**	**18000**	**17000**	**18000**	**19000**	**18000**
Sodium (dissolved)	µg/L	**17000**	**17000**	**16000**	**18000**	**18000**	**18000**	**19000**	**18000**
Thallium	µg/L	0.20 U	0.82 U	0.20 U	0.20 U	0.82 U	0.20 U	0.20 U	0.20 U
Thallium (dissolved)	µg/L	0.20 U	0.75 U	0.20 U	0.20 U	0.63 U	0.20 U	0.20 U	0.20 U
Vanadium	µg/L	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Vanadium (dissolved)	µg/L	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
Zinc	µg/L	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 UJ
Zinc (dissolved)	µg/L	**15 J**	15 U	15 U	15 U	15 U	15 U	15 U	**89 J**
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	0.054 U	0.053 U	0.054 U	0.054 U	0.055 U	0.053 U	0.053 U	0.054 U
Aroclor-1221 (PCB-1221)	µg/L	0.055 U	0.054 U	0.055 U	0.055 U	0.056 U	0.054 U	0.054 U	0.055 U
Aroclor-1232 (PCB-1232)	µg/L	0.071 U	0.070 U	0.072 U	0.072 U	0.073 U	0.070 U	0.070 U	0.072 U
Aroclor-1242 (PCB-1242)	µg/L	0.073 U	0.072 U	0.074 U	0.074 U	0.075 U	0.072 U	0.072 U	0.074 U
Aroclor-1248 (PCB-1248)	µg/L	0.048 U	0.048 U	0.049 U	0.049 U	0.050 U	0.048 U	0.048 U	0.049 U
Aroclor-1254 (PCB-1254)	µg/L	0.038 U	0.038 U	0.039 U	0.039 U	0.040 U	0.038 U	0.038 U	0.039 U
Aroclor-1260 (PCB-1260)	µg/L	0.044 U	0.044 U	0.045 U	0.045 U	0.046 U	0.044 U	0.044 U	0.045 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-5**	**SW-6**	**SW-7**	**SW-7**	**SW-8**	**SW-8**	**SW-9**	**SW-10**
Sample ID:		**SW-38443-100319-JPF-015**	**SW-38443-100319-JPF-014**	**SW-38443-100319-JPF-012**	**SW-38443-100319-JPF-013**	**SW-38443-100319-JPF-010**	**SW-38443-100319-JPF-011**	**SW-38443-100219-JPF-009**	**SW-38443-100219-JPF-007**
Sample Date:		**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/3/2019**	**10/2/2019**	**10/2/2019**
Sample Depth:		**5 ft BWS**	**1.92 ft BWS**	**5 ft BWS**	**12.42 ft BWS**	**5 ft BWS**	**15.75 ft BWS**	**5 ft BWS**	**5 ft BWS**
Parameters	**Units**								
Herbicides									
2,4,5-T	µg/L	0.57 UJ	0.57 UJ	0.57 UJ	0.57 UJ	0.57 UJ	0.57 UJ	0.57 U	0.57 U
2,4,5-TP (Silvex)	µg/L	0.43 UJ	0.43 UJ	0.43 UJ	0.43 UJ	0.43 UJ	0.43 UJ	0.43 U	0.43 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	2.2 UJ	2.2 UJ	2.2 UJ	2.2 UJ	2.2 UJ	2.2 UJ	2.2 U	2.2 U
Pesticides									
4,4'-DDD	µg/L	0.0051 U	0.0050 U	0.0051 U	0.0051 U	0.0052 U	0.0050 U	0.0050 U	0.0051 U
4,4'-DDE	µg/L	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0043 U	0.0041 U	0.0041 U	0.0042 U
4,4'-DDT	µg/L	0.0046 U	0.0046 U	0.0047 U	0.0047 U	0.0048 U	0.0046 U	0.0046 U	0.0047 U
Aldrin	µg/L	0.0023 U	0.0023 U	0.0023 U	0.0023 U	0.0024 U	0.0023 U	0.0023 U	0.0023 U
alpha-BHC	µg/L	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0020 U	0.0019 U	0.0019 U	0.0019 U
alpha-Chlordane	µg/L	0.0031 U	0.0030 U	0.0031 U	0.0031 U	0.0032 U	0.0030 U	0.0030 U	0.0031 U
beta-BHC	µg/L	0.0044 U	0.0044 U	0.0045 U	0.0045 U	0.0046 U	0.0044 U	0.0044 U	0.0045 U
delta-BHC	µg/L	0.0041 U	0.0041 U	0.0042 U	0.0042 U	0.0043 U	0.0041 U	0.0041 U	0.0042 U
Dieldrin	µg/L	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0023 U	0.0022 U	0.0022 U	0.0022 U
Endosulfan I	µg/L	0.0036 U	0.0035 U	0.0036 U	0.0036 U	0.0037 U	0.0035 U	0.0035 U	0.0036 U
Endosulfan II	µg/L	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0023 U	0.0022 U	0.0022 U	0.0022 U
Endosulfan sulfate	µg/L	0.0036 U	0.0035 U	0.0036 U	0.0036 U	0.0037 U	0.0035 U	0.0035 U	0.0036 U
Endrin	µg/L	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0025 U	0.0024 U	0.0024 U	0.0024 U
Endrin aldehyde	µg/L	0.0044 U	0.0044 U	0.0045 U	0.0045 U	0.0046 U	0.0044 U	0.0044 U	0.0045 U
Endrin ketone	µg/L	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.0040 U	0.0038 U	0.0038 U	0.0039 U
gamma-BHC (lindane)	µg/L	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0025 U	0.0024 U	0.0024 U	0.0024 U
gamma-Chlordane	µg/L	0.0048 U	0.0048 U	0.0049 U	0.0049 U	0.0050 U	0.0048 U	0.0048 U	0.0049 U
Heptachlor	µg/L	0.0032 U	0.0031 U	0.0032 U	0.0032 U	0.0033 U	0.0031 U	0.0031 U	0.0032 U
Heptachlor epoxide	µg/L	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0026 U	0.0025 U	0.0025 U	0.0025 U
Methoxychlor	µg/L	0.0045 U	0.0045 U	0.0046 U	0.0046 U	0.0047 U	0.0045 U	0.0045 U	0.0046 U
Toxaphene	µg/L	0.056 U	0.055 U	0.056 U	0.056 U	0.058 U	0.055 U	0.055 U	0.056 U
General Chemistry									
Chloride	mg/L	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**
Cyanide (total)	mg/L	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U
Fluoride	mg/L	**0.17**	**0.16**	**0.17**	**0.17**	**0.18**	**0.17**	**0.17**	**0.17**
Hardness	mg/L	**190**	**190**	**190**	**200**	**180**	**200**	**200**	**190**
Hardness, carbonate	mg/L	**90**	**90**	**91**	**95**	**88**	**97**	**92**	**87**
Hardness, magnesium	mg/L	**100**	**98**	**100**	**100**	**96**	**100**	**100**	**99**
Nitrate (as N)	µg/L	R	R	R	R	R	R	14 U	14 U
Nitrite (as N)	µg/L	14 U	14 U	14 U	14 U	14 U	14 U	14 U	14 U
Sulfate	mg/L	**20**	**20**	**20**	**19**	**20**	**20**	**20**	**20**
Sulfide	mg/L	**0.93 J**	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	**0.80 J**	**1.6**
Total dissolved solids (TDS)	mg/L	**250**	**260**	**270**	**270**	**240**	**270**	**250**	**220**

Notes:

J - Estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
ft BWS - Feet below water surface

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-10**	**SW-11**	**SW-12**
Sample ID:		**SW-38443-100219-JPF-008**	**SW-38443-100319-JPF-018**	**SW-38443-100319-JPF-019**
Sample Date:		**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
		Duplicate		
Parameters	**Units**			
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/L	0.24 U	0.24 U	0.24 U
1,1,2,2-Tetrachloroethane	µg/L	0.13 U	0.13 UJ	0.13 UJ
1,1,2-Trichloroethane	µg/L	0.090 U	0.090 U	0.090 U
1,1-Dichloroethane	µg/L	0.17 U	0.17 U	0.17 U
1,1-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U
1,2,4-Trichlorobenzene	µg/L	0.26 U	0.26 U	0.26 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.0086 U	0.0086 U	0.0086 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.0087 U	0.0087 U	0.0087 U
1,2-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U
1,2-Dichloroethane	µg/L	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	µg/L	0.15 U	0.15 U	0.15 U
1,3-Dichlorobenzene	µg/L	0.15 U	0.15 U	0.15 U
1,4-Dichlorobenzene	µg/L	0.16 U	0.16 U	0.16 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	1.2 U	1.2 U	1.2 U
2-Hexanone	µg/L	0.54 U	0.54 U	0.54 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	0.42 U	0.42 U	0.42 U
Acetone	µg/L	5.4 U	5.4 UJ	5.4 UJ
Benzene	µg/L	0.13 U	0.13 U	0.13 U
Bromodichloromethane	µg/L	0.17 U	0.17 U	0.17 U
Bromoform	µg/L	0.76 U	0.76 UJ	0.76 UJ
Bromomethane (Methyl bromide)	µg/L	0.42 U	0.42 U	0.42 U
Carbon disulfide	µg/L	0.28 U	0.28 U	0.28 U
Carbon tetrachloride	µg/L	0.26 U	0.26 U	0.26 U
Chlorobenzene	µg/L	0.14 U	0.14 U	0.14 U
Chloroethane	µg/L	0.83 U	0.83 U	0.83 U
Chloroform (Trichloromethane)	µg/L	0.13 U	0.13 U	0.13 U
Chloromethane (Methyl chloride)	µg/L	0.20 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	µg/L	0.16 U	0.16 U	0.16 U
cis-1,3-Dichloropropene	µg/L	0.61 U	0.61 U	0.61 U
Cyclohexane	µg/L	0.24 U	0.24 U	0.24 U
Dibromochloromethane	µg/L	0.39 U	0.39 U	0.39 U
Dichlorodifluoromethane (CFC-12)	µg/L	0.35 U	0.35 U	0.35 U
Ethylbenzene	µg/L	0.11 U	0.11 U	0.11 U
Isopropyl benzene	µg/L	0.090 U	0.090 U	0.090 U
m&p-Xylenes	µg/L	0.080 U	0.080 U	0.080 U
Methyl acetate	µg/L	1.7 U	1.7 U	1.7 U
Methyl cyclohexane	µg/L	0.33 U	0.33 U	0.33 U
Methyl tert butyl ether (MTBE)	µg/L	0.070 U	0.070 U	0.070 U
Methylene chloride	µg/L	2.6 U	2.6 U	2.6 U
o-Xylene	µg/L	0.090 U	0.090 U	0.090 U
Styrene	µg/L	0.10 U	0.10 U	0.10 U
Tetrachloroethene	µg/L	0.15 U	0.15 U	0.15 U
Toluene	µg/L	0.14 U	0.14 U	0.14 U
trans-1,2-Dichloroethene	µg/L	0.19 U	0.19 U	0.19 U
trans-1,3-Dichloropropene	µg/L	0.67 U	0.67 U	0.67 U
Trichloroethene	µg/L	0.10 U	0.10 U	0.10 U
Trichlorofluoromethane (CFC-11)	µg/L	0.45 U	0.45 U	0.45 U
Trifluorotrichloroethane (CFC-113)	µg/L	0.41 U	0.41 U	0.41 U
Vinyl chloride	µg/L	0.20 U	0.20 U	0.20 U
Xylenes (total)	µg/L	0.15 U	0.15 U	0.15 U
Semivolatile Organic Compounds				
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/L	1.0 U	0.53 U	0.54 U
2,4,5-Trichlorophenol	µg/L	3.6 U	1.9 U	1.9 U
2,4,6-Trichlorophenol	µg/L	3.3 U	1.7 U	1.8 U
2,4-Dichlorophenol	µg/L	0.48 U	0.25 U	0.26 U
2,4-Dimethylphenol	µg/L	0.94 U	0.50 U	0.51 U
2,4-Dinitrophenol	µg/L	11 U	6.0 U	6.1 U
2,4-Dinitrotoluene	µg/L	3.8 U	2.0 U	2.0 U
2,6-Dinitrotoluene	µg/L	3.9 U	2.0 U	2.1 U
2-Chloronaphthalene	µg/L	0.88 U	0.46 U	0.47 U
2-Chlorophenol	µg/L	0.50 U	0.26 U	0.27 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-10**	**SW-11**	**SW-12**
Sample ID:		**SW-38443-100219-JPF-008**	**SW-38443-100319-JPF-018**	**SW-38443-100319-JPF-019**
Sample Date:		**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
		Duplicate		
Parameters	**Units**			
Semivolatile Organic Compounds cont'd				
2-Methylnaphthalene	µg/L	0.20 U	0.11 U	0.11 U
2-Methylphenol	µg/L	0.38 U	0.20 U	0.20 U
2-Nitroaniline	µg/L	0.93 U	0.49 U	0.50 U
2-Nitrophenol	µg/L	1.0 U	0.54 U	0.55 U
3&4-Methylphenol	µg/L	0.35 U	0.18 U	0.19 U
3,3'-Dichlorobenzidine	µg/L	2.1 U	1.1 U	1.1 U
3-Nitroaniline	µg/L	1.0 U	0.54 U	0.55 U
4,6-Dinitro-2-methylphenol	µg/L	5.1 U	2.7 U	2.8 U
4-Bromophenyl phenyl ether	µg/L	0.91 U	0.48 U	0.49 U
4-Chloro-3-methylphenol	µg/L	0.54 U	0.28 U	0.29 U
4-Chloroaniline	µg/L	0.57 U	0.30 U	0.31 U
4-Chlorophenyl phenyl ether	µg/L	1.0 U	0.53 U	0.54 U
4-Nitroaniline	µg/L	1.7 U	0.88 U	0.90 U
4-Nitrophenol	µg/L	4.0 U	2.1 U	2.1 U
Acenaphthene	µg/L	0.31 U	0.17 U	0.17 U
Acenaphthylene	µg/L	0.23 U	0.12 U	0.12 U
Acetophenone	µg/L	0.67 U	0.35 U	0.36 U
Anthracene	µg/L	0.25 U	0.13 U	0.13 U
Atrazine	µg/L	1.7 U	0.92 U	0.93 U
Benzaldehyde	µg/L	1.4 U	0.73 U	0.74 U
Benzo(a)anthracene	µg/L	0.31 U	0.16 U	0.17 U
Benzo(a)pyrene	µg/L	0.31 U	0.17 U	0.17 U
Benzo(b)fluoranthene	µg/L	0.28 U	0.15 U	0.15 U
Benzo(g,h,i)perylene	µg/L	0.32 U	0.17 U	0.17 U
Benzo(k)fluoranthene	µg/L	0.25 U	0.13 U	0.14 U
Biphenyl (1,1-Biphenyl)	µg/L	0.89 U	0.47 U	0.48 U
bis(2-Chloroethoxy)methane	µg/L	0.83 U	0.44 U	0.45 U
bis(2-Chloroethyl)ether	µg/L	0.73 U	0.39 U	0.39 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	4.0 U	2.1 U	2.2 U
Butyl benzylphthalate (BBP)	µg/L	1.2 U	0.64 U	0.65 U
Caprolactam	µg/L	1.7 U	0.90 U	0.92 U
Carbazole	µg/L	0.89 U	0.47 U	0.48 U
Chrysene	µg/L	0.34 U	0.18 U	0.18 U
Dibenz(a,h)anthracene	µg/L	0.27 U	0.15 U	0.15 U
Dibenzofuran	µg/L	1.0 U	0.54 U	0.55 U
Diethyl phthalate	µg/L	6.9 U	3.7 U	3.7 U
Dimethyl phthalate	µg/L	0.94 U	0.50 U	0.50 U
Di-n-butylphthalate (DBP)	µg/L	3.3 U	1.7 U	1.8 U
Di-n-octyl phthalate (DnOP)	µg/L	1.5 U	0.79 U	0.80 U
Fluoranthene	µg/L	0.29 U	0.15 U	0.16 U
Fluorene	µg/L	0.31 U	0.16 U	0.17 U
Hexachlorobenzene	µg/L	0.29 U	0.15 U	0.16 U
Hexachlorobutadiene	µg/L	0.99 U	0.52 U	0.53 U
Hexachlorocyclopentadiene	µg/L	3.2 U	1.7 U	1.7 U
Hexachloroethane	µg/L	0.72 U	0.38 U	0.39 U
Indeno(1,2,3-cd)pyrene	µg/L	0.25 U	0.13 U	0.13 U
Isophorone	µg/L	0.59 U	0.31 U	0.32 U
Naphthalene	µg/L	0.20 U	0.10 U	**0.17 J**
Nitrobenzene	µg/L	0.93 U	0.49 U	0.50 U
N-Nitrosodi-n-propylamine	µg/L	0.46 U	0.24 U	0.25 U
N-Nitrosodiphenylamine	µg/L	0.80 U	0.42 U	0.43 U
Pentachlorophenol	µg/L	5.6 U	3.0 U	3.0 U
Phenanthrene	µg/L	0.30 U	0.16 U	0.16 U
Phenol	µg/L	0.23 U	0.12 U	0.13 U
Pyrene	µg/L	0.32 U	0.17 U	0.17 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-10**	**SW-11**	**SW-12**
Sample ID:		**SW-38443-100219-JPF-008**	**SW-38443-100319-JPF-018**	**SW-38443-100319-JPF-019**
Sample Date:		**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
		Duplicate		
Parameters	**Units**			
Metals				
Aluminum	µg/L	34 U	34 U	34 U
Aluminum (dissolved)	µg/L	34 U	34 U	34 U
Antimony	µg/L	0.57 U	0.57 U	0.57 U
Antimony (dissolved)	µg/L	0.57 U	0.57 U	0.57 U
Arsenic	µg/L	**1.8 J**	**1.6 J**	**1.7 J**
Arsenic (dissolved)	µg/L	**1.7 J**	**1.7 J**	**1.7 J**
Barium	µg/L	**92**	**90**	**91**
Barium (dissolved)	µg/L	**92**	**87**	**88**
Beryllium	µg/L	0.31 U	0.31 U	0.31 U
Beryllium (dissolved)	µg/L	0.31 U	0.31 U	0.31 U
Cadmium	µg/L	0.20 U	0.20 U	0.20 U
Cadmium (dissolved)	µg/L	0.20 U	0.20 U	0.20 U
Calcium	µg/L	**37000**	**37000**	**37000**
Calcium (dissolved)	µg/L	**38000**	**36000**	**36000**
Chromium	µg/L	0.98 U	0.98 U	0.98 U
Chromium (dissolved)	µg/L	0.98 UJ	0.98 U	0.98 U
Cobalt	µg/L	0.19 U	0.19 U	0.19 U
Cobalt (dissolved)	µg/L	0.19 U	0.19 U	0.19 U
Copper	µg/L	1.7 U	1.7 U	1.7 U
Copper (dissolved)	µg/L	1.7 U	1.7 U	1.7 U
Iron	µg/L	**47 J**	47 U	47 U
Iron (dissolved)	µg/L	47 U	47 U	47 U
Lead	µg/L	0.45 U	0.45 U	0.45 U
Lead (dissolved)	µg/L	0.45 U	0.45 U	0.45 U
Magnesium	µg/L	**26000**	**24000**	**25000**
Magnesium (dissolved)	µg/L	**26000**	**24000**	**25000**
Manganese	µg/L	**5.2**	**5.0**	**5.4**
Manganese (dissolved)	µg/L	2.1 U	2.1 U	2.1 U
Mercury (Low Level)	ng/L	0.23 U	0.14 U	0.14 U
Mercury	µg/L	0.13 U	0.13 U	0.13 U
Mercury (dissolved)	µg/L	0.13 U	0.13 U	0.13 U
Nickel	µg/L	1.5 U	1.5 U	1.5 U
Nickel (dissolved)	µg/L	1.5 UJ	1.5 U	1.5 U
Potassium	µg/L	**5300**	**5100**	**5200**
Potassium (dissolved)	µg/L	**5400**	**5000**	**5100**
Selenium	µg/L	0.89 U	0.89 U	0.89 U
Selenium (dissolved)	µg/L	0.89 U	0.89 U	0.89 U
Silver	µg/L	0.053 U	0.053 U	0.053 U
Silver (dissolved)	µg/L	0.053 U	0.053 U	0.053 U
Sodium	µg/L	**19000**	**18000**	**18000**
Sodium (dissolved)	µg/L	**19000**	**18000**	**18000**
Thallium	µg/L	0.20 U	0.20 U	0.20 U
Thallium (dissolved)	µg/L	0.20 U	0.20 U	0.20 U
Vanadium	µg/L	0.82 U	0.82 U	0.82 U
Vanadium (dissolved)	µg/L	0.82 U	0.82 U	0.82 U
Zinc	µg/L	15 U	15 U	15 U
Zinc (dissolved)	µg/L	15 UJ	15 U	15 U
PCBs				
Aroclor-1016 (PCB-1016)	µg/L	0.053 U	0.054 U	0.055 U
Aroclor-1221 (PCB-1221)	µg/L	0.054 U	0.055 U	0.056 U
Aroclor-1232 (PCB-1232)	µg/L	0.070 U	0.071 U	0.073 U
Aroclor-1242 (PCB-1242)	µg/L	0.072 U	0.073 U	0.075 U
Aroclor-1248 (PCB-1248)	µg/L	0.048 U	0.048 U	0.049 U
Aroclor-1254 (PCB-1254)	µg/L	0.038 U	0.038 U	0.039 U
Aroclor-1260 (PCB-1260)	µg/L	0.044 U	0.044 U	0.045 U

Table A.2

Summary Of Analytical Results
Surface Water Samples
October 2019
South Dayton Dump And Landfill Site
Moraine, Ohio

Sample Location:		**SW-10**	**SW-11**	**SW-12**
Sample ID:		**SW-38443-100219-JPF-008**	**SW-38443-100319-JPF-018**	**SW-38443-100319-JPF-019**
Sample Date:		**10/2/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**5 ft BWS**	**5 ft BWS**	**5 ft BWS**
		Duplicate		
Parameters	**Units**			
Herbicides				
2,4,5-T	µg/L	0.57 U	0.57 UJ	0.57 UJ
2,4,5-TP (Silvex)	µg/L	0.43 U	0.43 UJ	0.43 UJ
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	2.2 U	2.2 UJ	2.2 UJ
Pesticides				
4,4'-DDD	µg/L	0.0050 U	0.0051 U	0.0052 U
4,4'-DDE	µg/L	0.0041 U	0.0041 U	0.0042 U
4,4'-DDT	µg/L	0.0046 U	0.0046 U	0.0047 U
Aldrin	µg/L	0.0023 U	0.0023 U	0.0024 U
alpha-BHC	µg/L	0.0019 U	0.0019 U	0.0020 U
alpha-Chlordane	µg/L	0.0030 U	0.0031 U	0.0031 U
beta-BHC	µg/L	0.0044 U	0.0044 U	0.0045 U
delta-BHC	µg/L	0.0041 U	0.0041 U	0.0042 U
Dieldrin	µg/L	0.0022 U	0.0022 U	0.0023 U
Endosulfan I	µg/L	0.0035 U	0.0036 U	0.0036 U
Endosulfan II	µg/L	0.0022 U	0.0022 U	0.0023 U
Endosulfan sulfate	µg/L	0.0035 U	0.0036 U	0.0036 U
Endrin	µg/L	0.0024 U	0.0024 U	0.0025 U
Endrin aldehyde	µg/L	0.0044 U	0.0044 U	0.0045 U
Endrin ketone	µg/L	0.0038 U	0.0038 U	0.0039 U
gamma-BHC (lindane)	µg/L	0.0024 U	0.0024 U	0.0025 U
gamma-Chlordane	µg/L	0.0048 U	0.0048 U	0.0049 U
Heptachlor	µg/L	0.0031 U	0.0032 U	0.0032 U
Heptachlor epoxide	µg/L	0.0025 U	0.0025 U	0.0025 U
Methoxychlor	µg/L	0.0045 U	0.0045 U	0.0046 U
Toxaphene	µg/L	0.055 U	0.056 U	0.057 U
General Chemistry				
Chloride	mg/L	**27**	**27**	**27**
Cyanide (total)	mg/L	0.0060 U	0.0060 U	0.0060 U
Fluoride	mg/L	**0.17**	**0.17**	**0.16**
Hardness	mg/L	**200**	**190**	**190**
Hardness, carbonate	mg/L	**93**	**92**	**92**
Hardness, magnesium	mg/L	**110**	**100**	**100**
Nitrate (as N)	µg/L	14 U	R	R
Nitrite (as N)	µg/L	14 U	14 U	14 U
Sulfate	mg/L	**20**	**20**	**20**
Sulfide	mg/L	**0.60 J**	0.58 U	0.58 U
Total dissolved solids (TDS)	mg/L	**240**	**260**	**270**

Notes:

J - Estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
ft BWS - Feet below water surface

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-01**	**SD-02**	**SD-02**	**SD-03**	**SD-04**	**SD-04**	**SD-05**	**SD-05**	**SD-05A**	**SD-05B**
Sample ID:		**SED-092518-38443-JPF-021**	**SED-092118-38443-JPF-006**	**SED-092118-38443-JPF-007**	**SED-092118-38443-JPF-005**	**SED-092118-38443-JPF-003**	**SED-092118-38443-JPF-004**	**SED-092018-38443-JPF-001**	**SED-092118-38443-JPF-002**	**SED-38443-100419-JPF-010**	**SED-38443-100419-JPF-011**
Sample Date:		**9/25/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/20/2018**	**9/21/2018**	**10/4/2019**	**10/4/2019**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/kg	3.4 U	1.1 U	1.0 U	6.9 U	3.5 U	1.9 U	3.7 U	1.2 U	-	-
1,1,2,2-Tetrachloroethane	µg/kg	6.0 U	1.9 U	1.8 U	12 U	6.1 U	3.4 U	6.5 U	2.1 U	-	-
1,1,2-Trichloroethane	µg/kg	4.8 U	1.5 U	1.4 U	9.5 U	4.8 U	2.7 U	5.1 U	1.6 U	-	-
1,1-Dichloroethane	µg/kg	2.9 U	0.92 U	0.86 U	5.8 U	3.0 U	1.6 U	3.1 U	1.0 U	-	-
1,1-Dichloroethene	µg/kg	3.8 U	1.2 U	1.1 U	7.6 U	3.9 U	2.1 U	4.1 U	1.3 U	-	-
1,2,4-Trichlorobenzene	µg/kg	2.4 U	0.76 U	0.71 U	4.8 U	2.4 U	1.4 U	2.6 U	0.82 U	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/kg	15 U	4.8 U	4.4 U	30 U	15 U	8.5 U	16 U	5.2 U	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/kg	3.2 U	1.0 U	0.95 U	6.5 U	3.3 U	1.8 U	3.5 U	1.1 U	-	-
1,2-Dichlorobenzene	µg/kg	4.7 U	1.5 U	1.4 U	9.3 U	4.8 U	2.6 U	5.0 U	1.6 U	-	-
1,2-Dichloroethane	µg/kg	3.2 U	1.0 U	0.95 U	6.5 U	3.3 U	1.8 U	3.5 U	1.1 U	-	-
1,2-Dichloropropane	µg/kg	3.6 U	1.1 U	1.1 U	7.1 U	3.6 U	2.0 U	3.8 U	1.2 U	-	-
1,3-Dichlorobenzene	µg/kg	3.4 U	1.1 U	1.0 U	6.8 U	3.5 U	1.9 U	3.7 U	1.2 U	-	-
1,4-Dichlorobenzene	µg/kg	3.7 U	1.2 U	1.1 U	7.4 U	3.8 U	2.1 U	4.0 U	1.3 U	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/kg	**39 J**	4.7 U	4.4 U	**65 J**	**21 J**	8.4 U	**21 J**	**5.2 J**	-	-
2-Hexanone	µg/kg	17 U	5.4 U	5.0 U	34 U	17 U	9.7 U	18 U	5.9 U	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/kg	16 U	4.9 U	4.6 U	31 U	16 U	8.8 U	17 U	5.3 U	-	-
Acetone	µg/kg	88 U	28 U	26 U	180 U	90 U	50 U	95 U	30 U	-	-
Benzene	µg/kg	**3.9 J**	0.93 U	0.86 U	5.9 U	3.0 U	1.7 U	**4.3 J**	1.0 U	-	-
Bromodichloromethane	µg/kg	2.9 U	0.90 U	0.84 U	5.7 U	2.9 U	1.6 U	3.1 U	0.98 U	-	-
Bromoform	µg/kg	10 U	3.2 U	3.0 U	20 U	10 U	5.7 U	11 U	3.4 U	-	-
Bromomethane (Methyl bromide)	µg/kg	4.2 U	1.3 UJ	1.2 UJ	8.3 UJ	4.2 UJ	2.3 UJ	4.5 UJ	1.4 UJ	-	-
Carbon disulfide	µg/kg	4.9 U	1.5 U	1.4 U	9.8 U	5.0 U	2.8 U	5.2 U	1.7 U	-	-
Carbon tetrachloride	µg/kg	14 U	4.3 U	4.0 U	27 U	14 U	7.7 U	15 U	4.7 U	-	-
Chlorobenzene	µg/kg	3.9 U	1.2 U	1.1 U	7.7 U	3.9 U	2.2 U	4.1 U	1.3 U	-	-
Chloroethane	µg/kg	5.1 U	1.6 U	1.5 U	10 U	5.2 U	2.9 U	5.5 U	1.8 U	-	-
Chloroform (Trichloromethane)	µg/kg	3.3 U	1.0 U	0.97 U	6.6 U	3.4 U	1.9 U	3.6 U	1.1 U	-	-
Chloromethane (Methyl chloride)	µg/kg	4.4 U	1.4 U	1.3 U	8.7 U	4.5 U	2.5 U	4.7 U	1.5 U	-	-
cis-1,2-Dichloroethene	µg/kg	2.7 U	0.87 U	0.80 U	5.5 U	2.8 U	1.5 U	2.9 U	0.94 U	-	-
cis-1,3-Dichloropropene	µg/kg	6.0 U	1.9 U	1.8 U	12 U	6.1 U	3.4 U	6.5 U	2.1 U	-	-
Cyclohexane	µg/kg	5.8 U	1.8 U	1.7 U	12 U	5.9 U	3.3 U	6.2 U	2.0 U	-	-
Dibromochloromethane	µg/kg	12 U	3.7 U	3.4 U	23 U	12 U	6.6 U	13 U	4.0 U	-	-
Dichlorodifluoromethane (CFC-12)	µg/kg	4.0 U	1.3 U	1.2 U	7.9 U	4.0 U	2.2 U	4.3 U	1.4 U	-	-
Ethylbenzene	µg/kg	4.4 U	1.4 U	1.3 U	8.8 U	4.5 U	2.5 U	4.7 U	1.5 U	-	-
Isopropyl benzene	µg/kg	3.5 U	1.1 U	1.0 U	7.0 U	3.6 U	2.0 U	3.8 U	1.2 U	-	-
Methyl acetate	µg/kg	14 U	4.5 U	4.2 U	29 U	15 U	8.0 U	15 U	4.9 U	-	-
Methyl cyclohexane	µg/kg	5.2 U	1.6 U	1.5 U	10 U	5.2 U	2.9 U	5.5 U	1.8 U	-	-
Methyl tert butyl ether (MTBE)	µg/kg	3.4 U	1.1 U	1.0 U	6.9 U	3.5 U	1.9 U	3.7 U	1.2 U	-	-
Methylene chloride	µg/kg	50 U	16 U	15 U	100 U	51 U	28 U	54 U	17 U	-	-
Styrene	µg/kg	4.9 U	1.5 U	1.4 U	9.7 U	5.0 U	2.7 U	5.2 U	1.7 U	-	-
Tetrachloroethene	µg/kg	3.1 U	0.97 U	0.90 U	6.1 U	3.1 U	1.7 U	3.3 U	1.0 U	-	-
Toluene	µg/kg	**5.8 J**	1.0 U	0.95 U	6.5 U	3.3 U	1.8 U	3.5 U	1.1 U	-	-
trans-1,2-Dichloroethene	µg/kg	2.0 U	0.62 U	0.57 U	3.9 U	2.0 U	1.1 U	2.1 U	0.67 U	-	-
trans-1,3-Dichloropropene	µg/kg	4.3 U	1.4 U	1.3 U	8.7 U	4.4 U	2.4 U	4.7 U	1.5 U	-	-
Trichloroethene	µg/kg	2.7 U	0.84 U	0.78 U	5.3 U	2.7 U	1.5 U	2.9 U	0.91 U	-	-
Trichlorofluoromethane (CFC-11)	µg/kg	4.5 U	1.4 U	1.3 U	9.0 U	4.6 U	2.6 U	4.9 U	1.5 U	-	-
Trifluorotrichloroethane (CFC-113)	µg/kg	5.4 U	1.7 U	1.6 U	11 U	5.5 U	3.0 U	5.8 U	1.8 U	-	-
Vinyl chloride	µg/kg	3.5 U	1.1 U	1.0 U	7.0 U	3.6 U	2.0 U	3.8 U	1.2 U	-	-
Xylenes (total)	µg/kg	6.7 U	2.1 U	2.0 U	13 U	6.8 U	3.8 U	7.1 U	2.3 U	-	-

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-01**	**SD-02**	**SD-02**	**SD-03**	**SD-04**	**SD-04**	**SD-05**	**SD-05**	**SD-05A**	**SD-05B**
Sample ID:		**SED-092518-38443-JPF-021**	**SED-092118-38443-JPF-006**	**SED-092118-38443-JPF-007**	**SED-092118-38443-JPF-005**	**SED-092118-38443-JPF-003**	**SED-092118-38443-JPF-004**	**SED-092018-38443-JPF-001**	**SED-092118-38443-JPF-002**	**SED-38443-100419-JPF-010**	**SED-38443-100419-JPF-011**
Sample Date:		**9/25/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/20/2018**	**9/21/2018**	**10/4/2019**	**10/4/2019**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
Semivolatile Organic Compounds											
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	27 U	14 U	14 U	57 U	27 U	39 U	27 U	38 U	20 U	20 U
2,4,5-Trichlorophenol	µg/kg	190 U	94 U	95 U	400 U	190 U	270 U	190 U	260 U	140 U	140 U
2,4,6-Trichlorophenol	µg/kg	170 U	87 U	88 U	370 U	170 U	250 U	180 U	240 U	130 U	130 U
2,4-Dichlorophenol	µg/kg	120 U	60 U	61 U	250 U	120 U	170 U	120 U	170 U	88 U	89 U
2,4-Dimethylphenol	µg/kg	110 U	54 U	55 U	230 U	110 U	160 U	110 U	150 U	80 U	81 U
2,4-Dinitrophenol	µg/kg	390 U	190 U	200 U	810 U	380 U	550 U	390 U	540 U	280 U	290 U
2,4-Dinitrotoluene	µg/kg	170 U	84 U	85 U	360 U	170 U	240 U	170 U	240 U	120 U	120 U
2,6-Dinitrotoluene	µg/kg	150 U	76 U	77 U	320 U	150 U	220 U	150 U	210 U	110 U	110 U
2-Chloronaphthalene	µg/kg	38 U	19 U	19 U	80 U	38 U	54 U	38 U	53 U	28 U	28 U
2-Chlorophenol	µg/kg	27 U	14 U	14 U	57 U	27 U	39 U	27 U	38 U	20 U	20 U
2-Methylphenol	µg/kg	84 U	42 U	43 U	180 U	83 U	120 U	85 U	120 U	62 U	62 U
2-Nitroaniline	µg/kg	110 U	54 U	55 U	230 U	110 U	160 U	110 U	150 U	80 U	81 U
2-Nitrophenol	µg/kg	35 U	18 U	18 U	74 U	35 U	50 U	36 U	49 U	26 U	26 U
3&4-Methylphenol	µg/kg	79 U	40 U	40 U	170 U	78 U	110 U	80 U	110 U	58 U	58 U
3,3'-Dichlorobenzidine	µg/kg	120 U	59 U	59 U	250 U	120 U	170 U	120 U	160 U	86 U	87 U
3-Nitroaniline	µg/kg	130 U	67 U	67 U	280 U	130 U	190 U	130 U	190 U	98 U	99 U
4,6-Dinitro-2-methylphenol	µg/kg	220 U	110 U	110 U	460 U	210 U	310 U	220 U	300 U	160 U	160 U
4-Bromophenyl phenyl ether	µg/kg	38 U	19 U	19 U	80 U	38 U	54 U	38 U	53 U	28 U	28 U
4-Chloro-3-methylphenol	µg/kg	120 U	61 U	62 U	260 U	120 U	170 U	120 U	170 U	90 U	91 U
4-Chloroaniline	µg/kg	81 U	41 U	41 U	170 U	81 U	120 U	82 U	110 U	60 U	60 U
4-Chlorophenyl phenyl ether	µg/kg	38 U	19 U	19 U	80 U	38 U	54 U	38 U	53 U	28 U	28 U
4-Nitroaniline	µg/kg	160 U	82 U	83 U	340 U	160 U	230 U	160 U	230 U	120 U	120 U
4-Nitrophenol	µg/kg	260 U	130 U	130 U	540 U	250 U	370 U	260 U	360 U	190 U	190 U
Acetophenone	µg/kg	30 U	15 U	15 U	63 U	30 U	43 U	30 U	42 U	22 U	22 U
Atrazine	µg/kg	98 U	49 U	50 U	210 U	97 U	140 U	99 U	140 U	72 U	73 U
Benzaldehyde	µg/kg	62 U	31 U	32 U	130 U	62 U	89 U	63 U	87 U	46 U	46 U
Biphenyl (1,1-Biphenyl)	µg/kg	46 U	23 U	23 U	97 U	46 U	66 U	47 U	65 U	34 U	34 U
bis(2-Chloroethoxy)methane	µg/kg	33 U	16 U	17 U	69 U	32 U	47 U	33 U	46 U	24 U	24 U
bis(2-Chloroethyl)ether	µg/kg	33 U	16 U	17 U	69 U	32 U	47 U	33 U	46 U	24 U	24 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	140 U	**120**	**140**	**560**	**330**	255 U	140 U	190 U	100 U	100 U
Butyl benzylphthalate (BBP)	µg/kg	60 U	30 U	30 U	130 U	59 U	85 U	60 U	84 U	44 U	44 U
Caprolactam	µg/kg	200 U	100 U	100 U	430 U	200 U	290 U	210 U	290 U	150 U	150 U
Carbazole	µg/kg	52 U	26 U	26 U	110 U	51 U	**100 J**	52 U	**150 J**	38 U	38 U
Dibenzofuran	µg/kg	35 U	18 U	18 U	74 U	35 U	**50 J**	36 U	**65 J**	26 U	26 U
Diethyl phthalate	µg/kg	84 U	42 U	43 U	180 U	83 U	120 U	85 U	120 U	62 U	62 U
Dimethyl phthalate	µg/kg	38 U	19 U	19 U	80 U	38 U	54 U	38 U	53 U	28 U	28 U
Di-n-butylphthalate (DBP)	µg/kg	60 U	30 U	30 U	130 U	59 U	85 U	60 U	84 U	44 U	44 U
Di-n-octyl phthalate (DnOP)	µg/kg	76 U	38 U	39 U	160 U	75 U	110 U	77 U	110 U	56 U	56 U
Hexachlorobenzene	µg/kg	7.7 U	3.9 U	3.9 U	16 U	7.7 U	11 U	7.8 U	11 U	5.7 U	5.7 U
Hexachlorobutadiene	µg/kg	33 U	16 U	17 U	69 U	32 U	47 U	33 U	46 U	24 U	24 U
Hexachlorocyclopentadiene	µg/kg	170 U	84 U	85 U	360 U	170 U	240 U	170 U	240 U	120 U	120 U
Hexachloroethane	µg/kg	24 U	12 U	12 U	52 U	24 U	35 U	25 U	34 U	18 U	18 U
Isophorone	µg/kg	33 U	16 U	17 U	69 U	32 U	47 U	33 U	46 U	24 U	24 U
Nitrobenzene	µg/kg	35 U	18 U	18 U	74 U	35 U	50 U	36 U	49 U	26 U	26 U
N-Nitrosodi-n-propylamine	µg/kg	30 U	15 U	15 U	63 U	30 U	43 U	30 U	42 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg	33 U	16 U	17 U	69 U	32 U	47 U	33 U	46 U	24 U	24 U
Pentachlorophenol	µg/kg	160 U	79 U	80 U	330 U	160 U	230 U	160 U	220 U	120 U	120 U
Phenol	µg/kg	22 U	11 U	11 U	46 U	21 U	31 U	22 U	30 U	16 U	16 U
LMW-PAHs											
2-Methylnaphthalene	µg/kg	**65**	**15 J**	2.7 U	11 U	5.3 U	**21 J**	5.4 U	**36 J**	3.9 U	3.9 U
Acenaphthene	µg/kg	7.8 U	**4.8 J**	3.9 U	16 U	**15 J**	**80**	**13 J**	**160**	5.7 U	5.8 U
Acenaphthylene	µg/kg	11 U	5.5 U	5.5 U	23 U	**17 J**	**88**	**20 J**	**120**	8.0 U	8.1 U
Anthracene	µg/kg	**24 J**	**6.5 J**	**5.7 J**	**28 J**	**49**	**290**	**46**	**390**	**16 J**	**6.8 J**
Fluorene	µg/kg	7.4 U	**5.1 J**	3.8 U	16 U	**19 J**	**99**	**16 J**	**220**	**6.8 J**	5.5 U
Naphthalene	µg/kg	**49**	**7.1 J**	3.3 U	14 U	6.5 U	**32 J**	6.6 U	**48 J**	4.8 U	4.9 U
Phenanthrene	µg/kg	**110**	**48**	**25**	**120**	**200**	**1100**	**180**	**1800**	**63**	**35**
Total LMW-PAHs	µg/kg	**248**	**86.5**	**30.7**	**148**	**300**	**1710**	**275**	**2774**	**85.8**	**41.8**

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-01**	**SD-02**	**SD-02**	**SD-03**	**SD-04**	**SD-04**	**SD-05**	**SD-05**	**SD-05A**	**SD-05B**
Sample ID:		**SED-092518-38443-JPF-021**	**SED-092118-38443-JPF-006**	**SED-092118-38443-JPF-007**	**SED-092118-38443-JPF-005**	**SED-092118-38443-JPF-003**	**SED-092118-38443-JPF-004**	**SED-092018-38443-JPF-001**	**SED-092118-38443-JPF-002**	**SED-38443-100419-JPF-010**	**SED-38443-100419-JPF-011**
Sample Date:		**9/25/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/20/2018**	**9/21/2018**	**10/4/2019**	**10/4/2019**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
HMW-PAHs											
Benzo(a)anthracene	µg/kg	**150**	**41**	**33**	**180**	**310**	**1200**	**300**	**1800**	**74**	**46**
Benzo(a)pyrene	µg/kg	**160**	**44**	**43**	**230**	**360**	**1200**	**310**	**1700**	**96**	**54**
Benzo(b)fluoranthene	µg/kg	**220**	**79**	**51**	**290**	**490**	**1700**	**450**	**2400**	**130**	**67**
Benzo(g,h,i)perylene	µg/kg	**95**	**36**	**29**	**140**	**220**	**730**	**180**	**1100**	**58**	**41**
Benzo(k)fluoranthene	µg/kg	**98**	**14 J**	**19 J**	**100**	**180**	**470**	**140**	**950**	**46**	**26 J**
Chrysene	µg/kg	**160**	**54**	**39**	**220**	**370**	**1300**	**330**	**1800**	**85**	**47**
Dibenz(a,h)anthracene	µg/kg	**25 J**	9.4 U	9.5 U	40 U	**52**	**220**	**42**	**260**	14 U	14 U
Fluoranthene	µg/kg	**300**	**92**	**67**	**380**	**610**	**2900**	**570**	**4600**	**160**	**68**
Indeno(1,2,3-cd)pyrene	µg/kg	**79**	**31**	**24**	**140**	**220**	**650**	**170**	**910**	**58**	15 U
Pyrene	µg/kg	**240**	**76**	**58**	**330**	**540**	**2100**	**500**	**3400**	**130**	**73**
Total HMW-PAHs	µg/kg	**1527**	**467**	**363**	**2010**	**3352**	**12470**	**2992**	**18920**	**837**	**422**
Total PAHs	µg/kg	**1775**	**553.5**	**393.7**	**2158**	**3652**	**14180**	**3267**	**21694**	**922.8**	**463.8**
Metals											
Aluminum	mg/kg	**6300**	**2100**	**1900**	**6800**	**6800**	**8200**	**5400**	**6300**	-	-
Antimony	mg/kg	**0.45 J**	**0.14 J**	0.16 U	0.66 U	**0.29 J**	**0.39 J**	0.31 U	**0.76**	-	-
Arsenic	mg/kg	**8.7**	**3.1**	**3.0**	**11**	**11**	**11**	**8.4**	**7.9**	-	-
Barium	mg/kg	**140**	**33**	**30**	**290**	**130**	**130**	**94**	**78**	-	-
Beryllium	mg/kg	**0.37 J**	**0.12 J**	**0.12 J**	**0.41 J**	**0.40 J**	**0.50**	**0.30 J**	**0.43**	-	-
Cadmium	mg/kg	**0.35 J**	**0.11 J**	**0.12 J**	**0.36 J**	**0.26 J**	**0.49**	**0.21 J**	**0.46**	-	-
Calcium	mg/kg	**110000**	**90000**	**95000**	**200000**	**110000**	**110000**	**130000**	**90000**	-	-
Chromium	mg/kg	**16**	**5.6**	**6.0**	**13**	**11**	**14**	**10**	**11**	-	-
Cobalt	mg/kg	**5.2**	**2.4**	**2.6**	**5.0**	**5.3**	**6.4**	**5.1**	**5.6**	-	-
Copper	mg/kg	**23**	**3.8**	**5.5**	**23**	**17**	**26**	**12**	**20**	-	-
Iron	mg/kg	**13000**	**5600**	**5900**	**14000**	**14000**	**16000**	**11000**	**12000**	-	-
Lead	mg/kg	**140**	**8.6**	**7.5**	**25**	**18**	**65**	**16**	**52**	-	-
Magnesium	mg/kg	**22000**	**26000**	**36000**	**19000**	**24000**	**28000**	**37000**	**34000**	-	-
Manganese	mg/kg	**380**	**240**	**260**	**340**	**630**	**550**	**590**	**430**	-	-
Mercury	mg/kg	**0.051 J**	0.023 U	0.023 U	0.10 U	**0.059 J**	**0.17 J**	**0.057 J**	**0.097 J**	-	-
Methyl mercury	µg/kg	**0.65**	0.097 U	0.098 U	0.42 U	**0.26 J**	**0.14 J**	**0.26 J**	**0.31**	-	-
Nickel	mg/kg	**14**	**4.7**	**6.0**	**15**	**14**	**17**	**12**	**13**	-	-
Potassium	mg/kg	**960**	**340**	**280**	**1200**	**1300**	**1400**	**1100**	**910**	-	-
Selenium	mg/kg	**0.89 J**	**0.14 J**	0.16 U	**1.8 J**	**0.61 J**	**0.77 J**	**0.40 J**	**0.47 J**	-	-
Silver	mg/kg	**0.080 J**	0.025 U	0.029 U	0.12 U	**0.049 J**	**0.086 J**	0.054 U	**0.061 J**	-	-
Sodium	mg/kg	**170 J**	**120 J**	**130 J**	**380 J**	**180 J**	**160 J**	**210 J**	**170 J**	-	-
Thallium	mg/kg	**0.24 J**	**0.077 J**	**0.073 J**	**0.32 J**	**0.27 J**	**0.31**	**0.21 J**	**0.22**	-	-
Vanadium	mg/kg	**17**	**7.9**	**6.8**	**17**	**17**	**20**	**14**	**17**	-	-
Zinc	mg/kg	**76**	**27**	**29**	**86**	**65**	**110**	**52**	**71**	-	-
SEM Metals											
Cadmium	umol/g	**0.0027**	**0.00096 J**	**0.00092 J**	**0.0027 J**	**0.0024 J**	**0.0043**	**0.0020 J**	**0.0037**	-	-
Copper	umol/g	**0.23**	**0.069**	**0.069**	**0.19**	**0.21**	**0.21**	**0.18**	**0.15**	-	-
Lead	umol/g	**0.16**	**0.040**	**0.036**	**0.11**	**0.089**	**0.32**	**0.067**	**0.22**	-	-
Mercury	umol/g	0.000020 U	0.000012 U	0.000012 U	0.000031 U	0.000023 U	0.000018 U	0.000025 U	0.000013 U	-	-
Nickel	umol/g	**0.16**	**0.057**	**0.054**	**0.17**	**0.15**	**0.20**	**0.13**	**0.12**	-	-
Simultaneously extracted metals (SEM)/Acid-volatile sulfide ratio (AVS)	none	**0.044**	**0.13**	**0.12**	**0.064**	**0.12**	**0.47**	**0.067**	**0.36**	-	-
Zinc	umol/g	**0.85**	**0.37**	**0.35**	**0.95**	**0.71**	**1.4**	**0.61**	**0.68**	-	-
PCBs											
Aroclor-1016 (PCB-1016)	µg/kg	57 U	30 U	30 U	120 U	59 U	41 U	60 U	33 U	-	-
Aroclor-1221 (PCB-1221)	µg/kg	62 U	33 U	32 U	130 U	64 U	45 U	65 U	36 U	-	-
Aroclor-1232 (PCB-1232)	µg/kg	60 U	32 U	31 U	130 U	61 U	43 U	63 U	35 U	-	-
Aroclor-1242 (PCB-1242)	µg/kg	49 U	26 U	26 U	100 U	51 U	36 U	52 U	29 U	-	-
Aroclor-1248 (PCB-1248)	µg/kg	62 U	33 U	32 U	130 U	64 U	45 U	65 U	36 U	-	-
Aroclor-1254 (PCB-1254)	µg/kg	60 U	32 U	31 U	130 U	61 U	43 U	63 U	**75 J**	-	-
Aroclor-1260 (PCB-1260)	µg/kg	57 U	30 U	30 U	120 U	59 U	41 U	60 U	33 U	-	-
Herbicides											
2,4,5-T	µg/kg	34 U	17 UJ	17 UJ	74 UJ	35 UJ	25 UJ	35 UJ	20 UJ	-	-
2,4,5-TP (Silvex)	µg/kg	37 U	19 U	19 U	80 U	38 U	27 UJ	37 U	22 U	-	-
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/kg	130 U	66 U	65 U	280 U	130 U	95 UJ	130 U	76 U	-	-

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-01**	**SD-02**	**SD-02**	**SD-03**	**SD-04**	**SD-04**	**SD-05**	**SD-05**	**SD-05A**	**SD-05B**
Sample ID:		**SED-092518-38443-JPF-021**	**SED-092118-38443-JPF-006**	**SED-092118-38443-JPF-007**	**SED-092118-38443-JPF-005**	**SED-092118-38443-JPF-003**	**SED-092118-38443-JPF-004**	**SED-092018-38443-JPF-001**	**SED-092118-38443-JPF-002**	**SED-38443-100419-JPF-010**	**SED-38443-100419-JPF-011**
Sample Date:		**9/25/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/21/2018**	**9/20/2018**	**9/21/2018**	**10/4/2019**	**10/4/2019**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
Pesticides											
4,4'-DDD	µg/kg	3.8 U	2.0 U	2.1 U	8.6 U	3.8 U	2.9 U	4.1 U	2.2 U	-	-
4,4'-DDE	µg/kg	3.9 U	2.0 U	2.2 U	8.8 U	3.9 U	2.9 U	4.2 U	2.3 U	-	-
4,4'-DDT	µg/kg	2.9 U	1.5 U	1.6 U	6.6 U	2.9 U	2.2 U	3.1 U	1.7 U	-	-
Aldrin	µg/kg	2.0 U	1.0 U	1.1 U	4.5 U	2.0 U	1.5 U	2.1 U	1.2 U	-	-
alpha-BHC	µg/kg	2.4 U	1.2 U	1.3 U	5.3 U	2.4 U	1.8 U	2.5 U	1.4 U	-	-
alpha-Chlordane	µg/kg	3.9 U	2.0 U	2.1 U	8.7 U	3.9 U	2.9 U	4.1 U	**5.5 J**	-	-
beta-BHC	µg/kg	4.5 U	2.3 U	2.5 U	10 U	4.5 U	3.4 U	4.8 U	2.6 U	-	-
delta-BHC	µg/kg	240 UJ	120 UJ	120 UJ	970 UJ	93 UJ	68 UJ	R	53 UJ	-	-
Dieldrin	µg/kg	2.9 U	1.5 U	1.6 U	6.4 U	2.9 U	2.1 U	3.0 U	1.6 U	-	-
Endosulfan I	µg/kg	3.1 U	1.6 U	1.7 U	7.0 U	3.1 U	2.3 U	3.3 U	1.8 U	-	-
Endosulfan II	µg/kg	3.8 U	2.0 U	2.1 U	8.6 U	3.8 U	2.9 U	4.1 U	2.2 U	-	-
Endosulfan sulfate	µg/kg	170 U	1.7 U	1.8 U	7.4 U	3.3 U	2.5 U	3.5 U	1.9 U	-	-
Endrin	µg/kg	4.9 U	2.6 U	2.7 U	11 U	4.9 U	3.7 U	5.2 U	2.8 U	-	-
Endrin aldehyde	µg/kg	170 U	89 U	94 U	760 U	170 U	130 U	72 U	39 U	-	-
Endrin ketone	µg/kg	2.3 U	1.2 U	1.3 U	5.2 U	2.3 U	1.7 U	2.5 U	1.3 U	-	-
gamma-BHC (lindane)	µg/kg	4.6 U	2.4 U	2.6 U	10 U	4.6 U	3.5 U	4.9 U	2.7 U	-	-
gamma-Chlordane	µg/kg	3.2 U	1.7 U	1.8 U	7.2 U	3.2 U	2.4 U	3.4 U	**4.7 J**	-	-
Heptachlor	µg/kg	4.1 U	2.1 U	2.3 U	9.2 U	4.1 U	3.1 U	4.4 U	2.4 U	-	-
Heptachlor epoxide	µg/kg	3.7 U	1.9 U	2.1 U	8.4 U	3.7 U	2.8 U	4.0 U	2.2 U	-	-
Methoxychlor	µg/kg	17 U	8.9 UJ	9.4 UJ	38 UJ	17 UJ	13 UJ	18 UJ	9.8 UJ	-	-
Toxaphene	µg/kg	65 U	34 U	36 U	150 U	65 U	49 U	69 U	37 U	-	-
General Chemistry											
Cyanide (total)	mg/kg	0.46 U	0.25 U	0.24 U	1.1 U	0.50 U	0.34 U	0.53 U	0.26 U	-	-
Soot carbon	mg/kg	**6600**	**9200**	**6000**	**8400**	**14000**	**12000**	**9300**	**6500**	-	-
Sulfide	umol/g	**32**	**4.1 J**	**4.2 J**	**22 J**	**9.7 J**	**4.5 J**	**15 J**	**3.3 J**	-	-
Total organic carbon (TOC)	mg/kg	**28000**	**3800**	**3100**	**56000**	**21000**	**15000**	**15000**	**9900**	-	-

Notes:

J - Estimated concentration.
NJ - Tentatively identified compound, estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
- - Not applicable.

Criteria Notes:
AL - Aquatic life.
WB - Wildlife based.

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-06**	**SD-06**	**SD-07**	**SD-08**	**SD-08**	**SD-10**	**SD-11**	**SD-11**	**SD-12**	**SD-13**
Sample ID:		**SED-092118-38443-JPF-008**	**SED-092518-38443-JPF-018**	**SED-092518-38443-JPF-017**	**SED-092518-38443-JPF-015**	**SED-092518-38443-JPF-014**	**SED-092518-38443-JPF-016**	**SED-092518-38443-JPF-019**	**SED-092518-38443-JPF-020**	**SED-092618-38443-JPF-030**	**SED-092518-38443-JPF-022**
Sample Date:		**9/21/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/26/2018**	**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.4 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
Parameters	**Units**										
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/kg	4.6 U	2.3 U	1.5 U	4.1 U	2.4 U	5.9 U	3.4 U	2.5 U	3.0 U	4.3 U
1,1,2,2-Tetrachloroethane	µg/kg	8.0 U	3.9 U	2.6 U	7.2 U	4.3 U	10 U	5.9 U	4.4 U	5.3 U	7.6 U
1,1,2-Trichloroethane	µg/kg	6.3 U	3.1 U	2.0 U	5.7 U	3.4 U	8.1 U	4.7 U	3.4 U	4.2 U	6.0 U
1,1-Dichloroethane	µg/kg	3.9 U	1.9 U	1.2 U	3.5 U	2.1 U	5.0 U	2.9 U	2.1 U	2.6 U	3.7 U
1,1-Dichloroethene	µg/kg	5.0 U	2.5 U	1.6 U	4.5 U	2.7 U	6.5 U	3.7 U	2.7 U	3.3 U	4.8 U
1,2,4-Trichlorobenzene	µg/kg	3.2 U	1.6 U	1.0 U	2.9 U	1.7 U	4.1 U	2.4 U	1.7 U	2.1 U	3.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/kg	20 U	9.9 U	6.5 U	18 U	11 U	26 U	15 U	11 U	13 U	19 U
1,2-Dibromoethane (Ethylene dibromide)	µg/kg	4.3 U	2.1 U	1.4 U	3.9 U	2.3 U	5.5 U	3.2 U	2.3 U	2.8 U	4.1 U
1,2-Dichlorobenzene	µg/kg	6.2 U	3.1 U	2.0 U	5.6 U	3.3 U	8.0 U	4.6 U	3.4 U	4.1 U	5.9 U
1,2-Dichloroethane	µg/kg	4.3 U	2.1 U	1.4 U	3.9 U	2.3 U	5.5 U	3.2 U	2.3 U	2.9 U	4.1 U
1,2-Dichloropropane	µg/kg	4.7 U	2.3 U	1.5 U	4.3 U	2.5 U	6.1 U	3.5 U	2.6 U	3.1 U	4.5 U
1,3-Dichlorobenzene	µg/kg	4.5 U	2.3 U	1.5 U	4.1 U	2.4 U	5.8 U	3.4 U	2.5 U	3.0 U	4.3 U
1,4-Dichlorobenzene	µg/kg	4.9 U	2.4 U	1.6 U	4.4 U	2.6 U	6.3 U	3.6 U	2.7 U	3.3 U	4.7 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/kg	**39 J**	**15 J**	6.4 U	**18 J**	**12 J**	**42 J**	**20 J**	11 U	**17 J**	**22 J**
2-Hexanone	µg/kg	23 U	11 U	7.3 U	21 U	12 U	29 U	17 U	12 U	15 U	22 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/kg	21 U	10 U	6.7 U	19 U	11 U	27 U	15 U	11 U	14 U	20 U
Acetone	µg/kg	120 U	58 U	38 U	110 U	63 U	150 U	87 U	64 U	78 U	110 U
Benzene	µg/kg	3.9 U	1.9 U	1.3 U	3.5 U	2.1 U	5.0 U	2.9 U	2.1 U	2.6 U	3.7 U
Bromodichloromethane	µg/kg	3.8 U	1.9 U	1.2 U	3.4 U	2.0 U	4.9 U	2.8 U	2.1 U	2.5 U	3.6 U
Bromoform	µg/kg	13 U	6.6 U	4.3 U	12 U	7.2 U	17 U	9.9 U	7.3 U	8.9 U	13 U
Bromomethane (Methyl bromide)	µg/kg	5.5 UJ	2.7 U	1.8 U	5.0 U	2.9 U	7.1 U	4.1 U	3.0 U	3.7 U	5.2 U
Carbon disulfide	µg/kg	6.5 U	3.2 U	2.1 U	5.8 U	3.5 U	8.3 U	4.8 U	3.5 U	4.3 U	6.2 U
Carbon tetrachloride	µg/kg	18 U	9.0 U	5.8 U	16 U	9.7 U	23 U	13 U	9.9 U	12 U	17 U
Chlorobenzene	µg/kg	5.1 U	2.5 U	1.6 U	4.6 U	2.7 U	6.6 U	3.8 U	2.8 U	3.4 U	4.8 U
Chloroethane	µg/kg	6.8 U	3.4 U	2.2 U	6.1 U	3.6 U	8.7 U	5.0 U	3.7 U	4.5 U	6.5 U
Chloroform (Trichloromethane)	µg/kg	4.4 U	2.2 U	1.4 U	4.0 U	2.3 U	5.6 U	3.3 U	2.4 U	2.9 U	4.2 U
Chloromethane (Methyl chloride)	µg/kg	5.8 U	2.9 U	1.9 U	5.2 U	3.1 U	7.5 U	4.3 U	3.2 U	3.9 U	5.5 U
cis-1,2-Dichloroethene	µg/kg	3.6 U	1.8 U	1.2 U	3.3 U	1.9 U	4.7 U	2.7 U	2.0 U	2.4 U	3.4 U
cis-1,3-Dichloropropene	µg/kg	8.0 U	4.0 U	2.6 U	7.2 U	4.3 U	10 U	5.9 U	4.4 U	5.3 U	7.6 U
Cyclohexane	µg/kg	7.7 U	3.8 U	2.5 U	6.9 U	4.1 U	9.8 U	5.7 U	4.2 U	5.1 U	7.3 U
Dibromochloromethane	µg/kg	16 U	7.7 U	5.0 U	14 U	8.3 U	20 U	11 U	8.5 U	10 U	15 U
Dichlorodifluoromethane (CFC-12)	µg/kg	5.3 U	2.6 U	1.7 U	4.7 U	2.8 U	6.7 U	3.9 U	2.9 U	3.5 U	5.0 U
Ethylbenzene	µg/kg	5.8 U	2.9 U	1.9 U	5.3 U	3.1 U	7.5 U	4.3 U	3.2 U	3.9 U	5.5 U
Isopropyl benzene	µg/kg	4.6 U	2.3 U	1.5 U	4.2 U	2.5 U	5.9 U	3.4 U	2.5 U	3.1 U	4.4 U
Methyl acetate	µg/kg	19 U	9.4 U	6.1 U	17 U	10 U	24 U	14 U	10 U	13 U	18 U
Methyl cyclohexane	µg/kg	6.8 U	3.4 U	2.2 U	6.2 U	3.7 U	8.8 U	5.1 U	3.7 U	4.5 U	6.5 U
Methyl tert butyl ether (MTBE)	µg/kg	4.6 U	2.3 U	1.5 U	4.1 U	2.4 U	5.9 U	3.4 U	2.5 U	3.0 U	4.3 U
Methylene chloride	µg/kg	67 U	33 U	22 U	60 U	36 U	86 U	50 U	36 U	44 U	63 U
Styrene	µg/kg	6.5 U	3.2 U	2.1 U	5.8 U	3.5 U	8.3 U	4.8 U	3.5 U	4.3 U	6.1 U
Tetrachloroethene	µg/kg	4.1 U	2.0 U	1.3 U	3.7 U	2.2 U	5.2 U	3.0 U	2.2 U	2.7 U	3.9 U
Toluene	µg/kg	4.3 U	2.1 U	1.4 U	3.9 U	2.3 U	5.5 U	3.2 U	2.3 U	2.9 U	4.1 U
trans-1,2-Dichloroethene	µg/kg	2.6 U	1.3 U	0.83 U	2.3 U	1.4 U	3.3 U	1.9 U	1.4 U	1.7 U	2.5 U
trans-1,3-Dichloropropene	µg/kg	5.8 U	2.9 U	**4.7 J**	5.2 U	3.1 U	7.4 U	4.3 U	3.1 U	3.8 U	5.5 U
Trichloroethene	µg/kg	3.5 U	1.7 U	1.1 U	3.2 U	1.9 U	4.5 U	2.6 U	1.9 U	2.3 U	3.3 U
Trichlorofluoromethane (CFC-11)	µg/kg	6.0 U	3.0 U	1.9 U	5.4 U	3.2 U	7.7 U	4.4 U	3.3 U	4.0 U	5.7 U
Trifluorotrichloroethane (CFC-113)	µg/kg	7.1 U	3.5 U	2.3 U	6.4 U	3.8 U	9.2 U	5.3 U	3.9 U	4.7 U	6.8 U
Vinyl chloride	µg/kg	4.7 U	2.3 U	1.5 U	4.2 U	2.5 U	6.0 U	3.5 U	2.5 U	3.1 U	4.4 U
Xylenes (total)	µg/kg	8.8 U	4.4 U	2.8 U	8.0 U	4.7 U	11 U	6.5 U	4.8 U	5.9 U	8.4 U

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-06**	**SD-06**	**SD-07**	**SD-08**	**SD-08**	**SD-10**	**SD-11**	**SD-11**	**SD-12**	**SD-13**
Sample ID:		**SED-092118-38443-JPF-008**	**SED-092518-38443-JPF-018**	**SED-092518-38443-JPF-017**	**SED-092518-38443-JPF-015**	**SED-092518-38443-JPF-014**	**SED-092518-38443-JPF-016**	**SED-092518-38443-JPF-019**	**SED-092518-38443-JPF-020**	**SED-092618-38443-JPF-030**	**SED-092518-38443-JPF-022**
Sample Date:		**9/21/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/26/2018**	**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.4 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
Parameters	**Units**										
Semivolatile Organic Compounds											
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	37 U	19 U	19 U	31 U	19 U	40 U	28 U	23 U	29 U	32 U
2,4,5-Trichlorophenol	µg/kg	260 U	130 U	130 U	220 U	130 U	280 U	190 U	160 U	200 U	220 U
2,4,6-Trichlorophenol	µg/kg	240 U	120 U	120 U	200 U	120 U	260 U	180 U	150 U	180 U	200 U
2,4-Dichlorophenol	µg/kg	160 U	85 U	84 U	140 U	85 U	180 U	120 U	100 U	130 U	140 U
2,4-Dimethylphenol	µg/kg	150 U	77 U	76 U	120 U	77 U	160 U	110 U	91 U	110 U	130 U
2,4-Dinitrophenol	µg/kg	530 U	270 U	270 U	440 U	270 U	570 U	400 U	320 U	400 U	450 U
2,4-Dinitrotoluene	µg/kg	230 U	120 U	120 U	190 U	120 U	250 U	180 U	140 U	180 U	200 U
2,6-Dinitrotoluene	µg/kg	210 U	110 U	110 U	170 U	110 U	230 U	160 U	130 U	160 U	180 U
2-Chloronaphthalene	µg/kg	52 U	27 U	27 U	44 U	27 U	56 U	40 U	32 U	40 U	44 U
2-Chlorophenol	µg/kg	37 U	19 U	19 U	31 U	19 U	40 U	28 U	23 U	29 U	32 U
2-Methylphenol	µg/kg	120 U	60 U	59 U	97 U	60 U	130 U	88 U	71 U	88 U	98 U
2-Nitroaniline	µg/kg	150 U	77 U	76 U	120 U	77 U	160 U	110 U	91 U	110 U	130 U
2-Nitrophenol	µg/kg	48 U	25 U	25 U	41 U	25 U	52 U	37 U	30 U	37 U	41 U
3&4-Methylphenol	µg/kg	110 U	56 U	55 U	91 U	56 U	120 U	82 U	66 U	83 U	92 U
3,3'-Dichlorobenzidine	µg/kg	160 U	83 U	82 U	130 U	83 U	170 U	120 U	98 U	120 U	140 U
3-Nitroaniline	µg/kg	180 U	95 U	94 U	150 U	95 U	200 U	140 U	110 U	140 U	160 U
4,6-Dinitro-2-methylphenol	µg/kg	300 U	150 U	150 U	250 U	150 U	320 U	230 U	180 U	230 U	250 U
4-Bromophenyl phenyl ether	µg/kg	52 U	27 U	27 U	44 U	27 U	56 U	40 U	32 U	40 U	44 U
4-Chloro-3-methylphenol	µg/kg	170 U	87 U	86 U	140 U	87 U	180 U	130 U	100 U	130 U	140 U
4-Chloroaniline	µg/kg	110 U	58 U	57 U	94 U	58 U	120 U	85 U	69 U	86 U	95 U
4-Chlorophenyl phenyl ether	µg/kg	52 U	27 U	27 U	44 U	27 U	56 U	40 U	32 U	40 U	44 U
4-Nitroaniline	µg/kg	220 U	120 U	110 U	190 U	120 U	240 U	170 U	140 U	170 U	190 U
4-Nitrophenol	µg/kg	350 U	180 U	180 U	290 U	180 U	380 U	270 U	210 U	270 U	300 U
Acetophenone	µg/kg	41 U	21 U	21 U	34 U	21 U	44 U	31 U	25 U	31 U	35 U
Atrazine	µg/kg	130 U	70 U	69 U	110 U	69 U	150 U	100 U	82 U	100 U	110 U
Benzaldehyde	µg/kg	86 U	45 U	44 U	72 U	44 U	93 U	65 U	52 U	65 U	73 U
Biphenyl (1,1-Biphenyl)	µg/kg	63 U	33 U	32 U	53 U	33 U	69 U	48 U	39 U	48 U	54 U
bis(2-Chloroethoxy)methane	µg/kg	45 U	23 U	23 U	37 U	23 U	48 U	34 U	27 U	34 U	38 U
bis(2-Chloroethyl)ether	µg/kg	45 U	23 U	23 U	37 U	23 U	48 U	34 U	27 U	34 U	38 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	**330**	98 U	97 U	160 U	98 U	**220 J**	140 U	120 U	150 U	160 U
Butyl benzylphthalate (BBP)	µg/kg	82 U	42 U	42 U	69 U	42 U	89 U	62 U	50 U	63 U	70 U
Caprolactam	µg/kg	280 U	140 U	140 U	230 U	140 U	300 U	210 U	170 U	210 U	240 U
Carbazole	µg/kg	71 U	37 U	36 U	59 U	37 U	77 U	54 U	43 U	54 U	60 U
Dibenzofuran	µg/kg	48 U	25 U	25 U	41 U	25 U	52 U	37 U	30 U	37 U	41 U
Diethyl phthalate	µg/kg	120 U	60 U	59 U	97 U	60 U	130 U	88 U	71 U	88 U	98 U
Dimethyl phthalate	µg/kg	52 U	27 U	27 U	44 U	27 U	56 U	40 U	32 U	40 U	44 U
Di-n-butylphthalate (DBP)	µg/kg	82 U	42 U	42 U	69 U	42 U	89 U	62 U	50 U	63 U	70 U
Di-n-octyl phthalate (DnOP)	µg/kg	100 U	54 U	54 U	87 U	54 U	110 U	79 U	64 U	80 U	89 U
Hexachlorobenzene	µg/kg	11 U	5.5 U	5.4 U	8.9 U	5.5 U	11 U	8.0 U	6.5 U	8.1 U	9.1 U
Hexachlorobutadiene	µg/kg	45 U	23 U	23 U	37 U	23 U	48 U	34 U	27 U	34 U	38 U
Hexachlorocyclopentadiene	µg/kg	R	120 U	120 U	190 U	120 U	R	180 U	140 U	180 U	200 U
Hexachloroethane	µg/kg	33 U	17 U	17 U	28 U	17 U	36 U	25 U	21 U	26 U	29 U
Isophorone	µg/kg	45 U	23 U	23 U	37 U	23 U	48 U	34 U	27 U	34 U	38 U
Nitrobenzene	µg/kg	48 U	25 U	25 U	41 U	25 U	52 U	37 U	30 U	37 U	41 U
N-Nitrosodi-n-propylamine	µg/kg	41 U	21 U	21 U	34 U	21 U	44 U	31 U	25 U	31 U	35 U
N-Nitrosodiphenylamine	µg/kg	45 U	23 U	23 U	37 U	23 U	48 U	34 U	27 U	34 U	38 U
Pentachlorophenol	µg/kg	220 U	110 U	110 U	180 U	110 U	230 U	160 U	130 U	170 U	180 U
Phenol	µg/kg	30 U	15 U	15 U	25 U	15 U	32 U	23 U	18 U	23 U	25 U
LMW-PAHs											
2-Methylnaphthalene	µg/kg	7.3 U	**8.3 J**	3.7 U	6.1 U	**7.4 J**	7.9 U	5.5 U	4.5 U	5.6 U	6.2 U
Acenaphthene	µg/kg	11 U	**9.7 J**	5.5 U	**14 J**	**14 J**	12 U	8.1 U	6.5 U	8.2 U	**31 J**
Acenaphthylene	µg/kg	15 U	**11 J**	7.7 U	13 U	**14 J**	16 U	11 U	9.2 U	11 U	13 U
Anthracene	µg/kg	**13 J**	**22 J**	**7.0 J**	**35 J**	**31**	**15 J**	**12 J**	5.5 U	**13 J**	**74**
Fluorene	µg/kg	10 U	**11 J**	5.2 U	**15 J**	**15 J**	11 U	7.7 U	6.3 U	7.8 U	**30 J**
Naphthalene	µg/kg	9.0 U	**10 J**	4.6 U	**12 J**	**8.3 J**	9.7 U	6.8 U	5.5 U	6.9 U	**11 J**
Phenanthrene	µg/kg	**53 J**	**110**	**38**	**160**	**110**	**71**	**57**	**27 J**	**58**	**340**
Total LMW-PAHs	µg/kg	**66**	**182**	**45**	**236**	**199.7**	**86**	**69**	**27**	**71**	**486**

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-06**	**SD-06**	**SD-07**	**SD-08**	**SD-08**	**SD-10**	**SD-11**	**SD-11**	**SD-12**	**SD-13**
Sample ID:		**SED-092118-38443-JPF-008**	**SED-092518-38443-JPF-018**	**SED-092518-38443-JPF-017**	**SED-092518-38443-JPF-015**	**SED-092518-38443-JPF-014**	**SED-092518-38443-JPF-016**	**SED-092518-38443-JPF-019**	**SED-092518-38443-JPF-020**	**SED-092618-38443-JPF-030**	**SED-092518-38443-JPF-022**
Sample Date:		**9/21/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/26/2018**	**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.4 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
Parameters	**Units**										
HMW-PAHs											
Benzo(a)anthracene	µg/kg	**77**	**110**	**52**	**180**	**170**	**79**	**76**	**31 J**	**72**	**390**
Benzo(a)pyrene	µg/kg	**97**	**140**	**68**	**220**	**200**	**110**	**99**	**38**	**89**	**410**
Benzo(b)fluoranthene	µg/kg	**130**	**160**	**99**	**310**	**290**	**170**	**150**	**50**	**110**	**680**
Benzo(g,h,i)perylene	µg/kg	**83**	**85**	**42**	**100**	**80**	**76**	**67**	**20 J**	**59**	**140**
Benzo(k)fluoranthene	µg/kg	**48 J**	**69**	**36**	**120**	**98**	**66**	**50**	**23 J**	**42 J**	**210**
Chrysene	µg/kg	**94**	**130**	**68**	**210**	**190**	**100**	**93**	**38**	**82**	**430**
Dibenz(a,h)anthracene	µg/kg	26 U	**20 J**	13 U	**29 J**	**24 J**	28 U	20 U	16 U	20 U	**52**
Fluoranthene	µg/kg	**160**	**280**	**110**	**420**	**380**	**210**	**170**	**78**	**150**	**830**
Indeno(1,2,3-cd)pyrene	µg/kg	**66**	**76**	**32**	**95**	**76**	**73**	**59**	**20 J**	**47**	**140**
Pyrene	µg/kg	**150**	**210**	**96**	**330**	**320**	**170**	**130**	**57**	**130**	**670**
Total HMW-PAHs	µg/kg	**905**	**1280**	**603**	**2014**	**1828**	**1054**	**894**	**355**	**781**	**3952**
Total PAHs	µg/kg	**971**	**1462**	**648**	**2250**	**2027.7**	**1140**	**963**	**382**	**852**	**4438**
Metals											
Aluminum	mg/kg	**11000 J**	**8600**	**2900**	**8200**	**8800**	**12000 J**	**8300**	**10000**	**4600**	**9400**
Antimony	mg/kg	**0.63 J**	**0.72**	0.24 U	**0.42 J**	**0.27 J**	**0.63 J**	**0.36 J**	**0.53 J**	**0.41 J**	**0.48 J**
Arsenic	mg/kg	**20**	**13**	**7.6**	**14**	**12**	**24**	**14**	**23**	**6.8**	**15**
Barium	mg/kg	**190**	**140**	**96**	**170**	**120**	**230**	**140**	**150**	**190**	**190**
Beryllium	mg/kg	**0.66 J**	**0.59**	**0.22 J**	**0.55**	**0.70**	**0.89**	**0.46**	**0.61**	0.13 U	**0.59**
Cadmium	mg/kg	**0.52 J**	**0.86**	**0.13 J**	**0.45 J**	**0.43**	**0.61 J**	**0.38 J**	**0.54**	**0.24 J**	**0.58**
Calcium	mg/kg	**110000**	**91000**	**130000**	**90000**	**72000**	**120000**	**110000**	**120000**	**150000**	**96000**
Chromium	mg/kg	**19**	**20**	**9.5**	**15**	**17**	**20**	**13**	**19**	**8.3**	**16**
Cobalt	mg/kg	**7.8**	**8.3**	**3.5**	**6.7**	**8.8**	**10**	**7.2**	**11**	**4.3**	**7.6**
Copper	mg/kg	**29**	**39**	**7.6**	**29**	**28**	**34**	**24**	**37**	**14**	**34**
Iron	mg/kg	**21000**	**19000**	**10000**	**18000**	**20000**	**25000**	**18000**	**24000**	**9300**	**20000**
Lead	mg/kg	**41**	**94**	**7.2**	**36**	**38**	**40**	**21**	**37**	**15**	**48**
Magnesium	mg/kg	**20000**	**24000**	**29000**	**20000**	**25000**	**23000**	**26000**	**32000**	**19000**	**22000**
Manganese	mg/kg	**640**	**520**	**430**	**660**	**620**	**730**	**790**	**1000**	**520**	**640**
Mercury	mg/kg	**0.089 J**	**0.10 J**	0.034 U	**0.081 J**	**0.072 J**	0.063 U	0.056 U	**0.10 J**	**0.061 J**	**0.10 J**
Methyl mercury	µg/kg	**0.27 J**	**0.24**	0.14 U	0.21 U	0.14 U	**0.33 J**	0.20 U	0.16 U	0.20 U	0.22 U
Nickel	mg/kg	**21**	**20**	**8.1**	**18**	**20**	**25**	**18**	**26**	**11**	**20**
Potassium	mg/kg	**1900**	**1400**	**620**	**1400**	**1200**	**2000 J**	**1600**	**1900**	**940**	**1500**
Selenium	mg/kg	**1.2 J**	**1.1 J**	**0.31 J**	**0.95 J**	**0.73 J**	**1.6 J**	**0.76 J**	**1.0 J**	**0.73 J**	**1.1 J**
Silver	mg/kg	**0.12 J**	**0.10 J**	**0.35 J**	**0.11 J**	**0.079 J**	**0.12 J**	**0.071 J**	**0.11 J**	0.055 U	**0.10 J**
Sodium	mg/kg	**300 J**	**150 J**	**140 J**	**170 J**	**130 J**	**250 J**	**170 J**	**180 J**	**180 J**	**170 J**
Thallium	mg/kg	**0.47 J**	**0.34**	**0.15 J**	**0.35 J**	**0.33 J**	**0.55 J**	**0.39 J**	**0.50**	**0.27 J**	**0.34 J**
Vanadium	mg/kg	**25**	**22**	**9.0**	**21**	**24**	**29**	**21**	**26**	**13**	**24**
Zinc	mg/kg	**150**	**390**	**28**	**100**	**96**	**160**	**89**	**130**	**54**	**140**
SEM Metals											
Cadmium	umol/g	**0.0050**	**0.0067**	**0.0011 J**	**0.0038**	**0.0032**	**0.0049**	**0.0034**	**0.0047**	**0.00094 J**	**0.0045**
Copper	umol/g	**0.34 J**	**0.46**	**0.15**	**0.45**	**0.34**	**0.42**	**0.38**	**0.43**	**0.18**	**0.46**
Lead	umol/g	**0.21**	**0.35**	**0.030**	**0.17**	**0.16**	**0.17**	**0.11**	**0.16**	**0.078**	**0.22**
Mercury	umol/g	0.000030 U	0.000016 U	0.000018 U	0.000026 U	0.000017 U	0.000034 U	0.000024 U	0.000019 U	0.000025 U	0.000026 U
Nickel	umol/g	**0.25**	**0.25**	**0.11**	**0.25**	**0.23**	**0.33**	**0.26**	**0.33**	**0.13**	**0.27**
Simultaneously extracted metals (SEM)/Acid-volatile sulfide ratio (AVS)	none	**0.13**	**0.17**	**0.059**	**0.078**	**0.077**	**0.022**	**0.047**	**0.067**	**0.024**	**0.050**
Zinc	umol/g	**2.0 J**	**4.2**	**0.39**	**1.3**	**0.95**	**2.7 J**	**1.1**	**1.4**	**0.72**	**1.7**
PCBs											
Aroclor-1016 (PCB-1016)	µg/kg	79 U	43 U	41 U	69 U	42 U	88 U	63 U	50 U	62 U	70 U
Aroclor-1221 (PCB-1221)	µg/kg	86 U	46 U	45 U	76 U	46 U	96 U	68 U	55 U	68 U	77 U
Aroclor-1232 (PCB-1232)	µg/kg	83 U	44 U	43 U	72 U	44 U	92 U	65 U	52 U	65 U	74 U
Aroclor-1242 (PCB-1242)	µg/kg	68 U	**88 J**	**43 J**	**60 NJ**	37 U	76 U	**61 J**	**83 J**	54 U	**88 J**
Aroclor-1248 (PCB-1248)	µg/kg	86 U	46 U	45 U	76 U	46 U	96 U	68 U	55 U	68 U	77 U
Aroclor-1254 (PCB-1254)	µg/kg	83 U	**69 J**	43 U	72 U	44 U	92 U	65 U	52 U	65 U	74 U
Aroclor-1260 (PCB-1260)	µg/kg	79 U	43 U	41 U	69 U	42 U	88 U	63 U	50 U	62 U	70 U
Herbicides											
2,4,5-T	µg/kg	47 UJ	24 U	25 U	40 U	24 U	51 U	36 U	29 U	36 UJ	41 U
2,4,5-TP (Silvex)	µg/kg	50 U	26 U	26 U	43 U	26 U	55 U	39 U	32 U	39 U	44 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/kg	180 U	92 U	93 U	150 U	92 U	190 U	140 U	110 U	140 U	160 U

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-06**	**SD-06**	**SD-07**	**SD-08**	**SD-08**	**SD-10**	**SD-11**	**SD-11**	**SD-12**	**SD-13**
Sample ID:		**SED-092118-38443-JPF-008**	**SED-092518-38443-JPF-018**	**SED-092518-38443-JPF-017**	**SED-092518-38443-JPF-015**	**SED-092518-38443-JPF-014**	**SED-092518-38443-JPF-016**	**SED-092518-38443-JPF-019**	**SED-092518-38443-JPF-020**	**SED-092618-38443-JPF-030**	**SED-092518-38443-JPF-022**
Sample Date:		**9/21/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/25/2018**	**9/26/2018**	**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.4 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**
Parameters	**Units**										
Pesticides											
4,4'-DDD	µg/kg	27 U	2.9 U	2.8 U	4.7 U	2.9 U	5.9 U	4.2 U	3.4 U	420 U	4.7 U
4,4'-DDE	µg/kg	28 U	2.9 U	2.8 U	4.8 U	2.9 U	6.1 U	4.3 U	3.4 U	4.3 U	4.8 U
4,4'-DDT	µg/kg	21 U	2.2 U	2.1 U	3.6 U	2.2 U	230 U	3.2 U	2.6 U	320 U	3.6 U
Aldrin	µg/kg	14 U	1.5 U	1.4 U	2.4 U	1.5 U	3.1 U	2.2 U	1.7 U	2.2 U	2.5 U
alpha-BHC	µg/kg	17 U	1.8 U	1.7 U	2.9 U	1.8 U	3.7 U	2.6 U	2.1 U	260 U	2.9 U
alpha-Chlordane	µg/kg	28 U	2.9 U	2.8 U	4.7 U	2.9 U	6.0 U	4.3 U	3.4 U	4.2 U	4.8 U
beta-BHC	µg/kg	32 U	3.3 U	3.2 U	5.4 U	3.3 U	6.9 U	4.9 U	3.9 U	4.9 U	5.5 U
delta-BHC	µg/kg	320 UJ	160 UJ	160 UJ	270 UJ	160 UJ	340 UJ	250 UJ	200 UJ	480 U	280 UJ
Dieldrin	µg/kg	20 U	2.1 U	2.1 U	3.5 U	2.1 U	4.4 U	3.1 U	2.5 U	3.1 U	3.5 U
Endosulfan I	µg/kg	22 U	2.3 U	2.2 U	3.8 U	2.3 U	4.8 U	3.4 U	2.7 U	3.4 U	3.8 U
Endosulfan II	µg/kg	27 U	2.9 U	2.8 U	4.7 U	2.9 U	5.9 U	4.2 U	3.4 U	4.2 U	4.7 U
Endosulfan sulfate	µg/kg	23 U	120 U	120 U	200 U	120 U	260 U	180 U	150 U	360 U	200 U
Endrin	µg/kg	35 U	3.7 U	3.5 U	6.0 U	3.7 U	7.6 U	5.4 U	4.3 U	5.4 U	6.1 U
Endrin aldehyde	µg/kg	240 U	130 U	120 U	210 U	130 U	260 U	190 U	150 U	370 U	210 U
Endrin ketone	µg/kg	16 U	1.7 U	1.7 U	2.8 U	1.7 U	180 U	2.5 U	2.0 U	2.5 U	2.8 U
gamma-BHC (lindane)	µg/kg	33 U	3.5 U	3.3 U	5.6 U	3.4 U	7.2 U	5.1 U	4.1 U	510 U	5.7 U
gamma-Chlordane	µg/kg	23 U	**3.5 J**	2.3 U	3.9 U	2.4 U	4.9 U	3.5 U	2.8 U	3.5 U	3.9 U
Heptachlor	µg/kg	29 U	3.1 U	2.9 U	5.0 U	3.0 U	6.3 U	4.5 U	3.6 U	4.5 U	5.1 U
Heptachlor epoxide	µg/kg	26 U	2.8 U	2.7 U	4.5 U	2.8 U	5.8 U	4.1 U	3.3 U	4.1 U	4.6 U
Methoxychlor	µg/kg	120 UJ	13 U	12 U	21 U	13 U	1300 U	19 U	15 U	19 U	21 U
Toxaphene	µg/kg	460 U	48 U	47 U	79 U	48 U	100 U	71 U	57 U	71 U	80 U
General Chemistry											
Cyanide (total)	mg/kg	**1.4 J**	0.32 U	0.33 U	0.52 U	0.37 U	**2.4**	0.47 U	0.49 U	0.50 U	0.53 U
Soot carbon	mg/kg	**7200**	**11000**	**11000**	**12000**	**10000**	**6700**	**12000**	**20000**	**9500**	**9300**
Sulfide	umol/g	**23 J**	**31**	**11**	**28**	**22**	**160**	**40**	**35**	**46 J**	**52**
Total organic carbon (TOC)	mg/kg	**26000**	**16000**	**16000**	**29000**	**15000**	**34000**	**24000**	**15000**	**25000**	**36000**

Notes:

J - Estimated concentration.
NJ - Tentatively identified compound, estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
- - Not applicable.

Criteria Notes:
AL - Aquatic life.
WB - Wildlife based.

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**
Sample ID:		**SED-092518-38443-JPF-023**
Sample Date:		**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**
		Duplicate
Parameters	**Units**	
Volatile Organic Compounds		
1,1,1-Trichloroethane	µg/kg	4.4 U
1,1,2,2-Tetrachloroethane	µg/kg	7.7 U
1,1,2-Trichloroethane	µg/kg	6.1 U
1,1-Dichloroethane	µg/kg	3.7 U
1,1-Dichloroethene	µg/kg	4.9 U
1,2,4-Trichlorobenzene	µg/kg	3.1 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/kg	19 U
1,2-Dibromoethane (Ethylene dibromide)	µg/kg	4.2 U
1,2-Dichlorobenzene	µg/kg	6.0 U
1,2-Dichloroethane	µg/kg	4.2 U
1,2-Dichloropropane	µg/kg	4.6 U
1,3-Dichlorobenzene	µg/kg	4.4 U
1,4-Dichlorobenzene	µg/kg	4.8 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/kg	**31 J**
2-Hexanone	µg/kg	22 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/kg	20 U
Acetone	µg/kg	110 U
Benzene	µg/kg	3.8 U
Bromodichloromethane	µg/kg	3.7 U
Bromoform	µg/kg	13 U
Bromomethane (Methyl bromide)	µg/kg	5.3 U
Carbon disulfide	µg/kg	6.3 U
Carbon tetrachloride	µg/kg	18 U
Chlorobenzene	µg/kg	4.9 U
Chloroethane	µg/kg	6.6 U
Chloroform (Trichloromethane)	µg/kg	4.3 U
Chloromethane (Methyl chloride)	µg/kg	5.6 U
cis-1,2-Dichloroethene	µg/kg	3.5 U
cis-1,3-Dichloropropene	µg/kg	7.8 U
Cyclohexane	µg/kg	7.4 U
Dibromochloromethane	µg/kg	15 U
Dichlorodifluoromethane (CFC-12)	µg/kg	5.1 U
Ethylbenzene	µg/kg	5.7 U
Isopropyl benzene	µg/kg	4.5 U
Methyl acetate	µg/kg	18 U
Methyl cyclohexane	µg/kg	6.6 U
Methyl tert butyl ether (MTBE)	µg/kg	4.4 U
Methylene chloride	µg/kg	65 U
Styrene	µg/kg	6.3 U
Tetrachloroethene	µg/kg	3.9 U
Toluene	µg/kg	4.2 U
trans-1,2-Dichloroethene	µg/kg	2.5 U
trans-1,3-Dichloropropene	µg/kg	5.6 U
Trichloroethene	µg/kg	3.4 U
Trichlorofluoromethane (CFC-11)	µg/kg	5.8 U
Trifluorotrichloroethane (CFC-113)	µg/kg	6.9 U
Vinyl chloride	µg/kg	4.5 U
Xylenes (total)	µg/kg	8.6 U

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**
Sample ID:		**SED-092518-38443-JPF-023**
Sample Date:		**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**
		Duplicate
Parameters	**Units**	
Semivolatile Organic Compounds		
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	33 U
2,4,5-Trichlorophenol	µg/kg	230 U
2,4,6-Trichlorophenol	µg/kg	210 U
2,4-Dichlorophenol	µg/kg	140 U
2,4-Dimethylphenol	µg/kg	130 U
2,4-Dinitrophenol	µg/kg	460 U
2,4-Dinitrotoluene	µg/kg	200 U
2,6-Dinitrotoluene	µg/kg	180 U
2-Chloronaphthalene	µg/kg	46 U
2-Chlorophenol	µg/kg	33 U
2-Methylphenol	µg/kg	100 U
2-Nitroaniline	µg/kg	130 U
2-Nitrophenol	µg/kg	42 U
3&4-Methylphenol	µg/kg	95 U
3,3'-Dichlorobenzidine	µg/kg	140 U
3-Nitroaniline	µg/kg	160 U
4,6-Dinitro-2-methylphenol	µg/kg	260 U
4-Bromophenyl phenyl ether	µg/kg	46 U
4-Chloro-3-methylphenol	µg/kg	150 U
4-Chloroaniline	µg/kg	98 U
4-Chlorophenyl phenyl ether	µg/kg	46 U
4-Nitroaniline	µg/kg	200 U
4-Nitrophenol	µg/kg	310 U
Acetophenone	µg/kg	36 U
Atrazine	µg/kg	120 U
Benzaldehyde	µg/kg	75 U
Biphenyl (1,1-Biphenyl)	µg/kg	56 U
bis(2-Chloroethoxy)methane	µg/kg	39 U
bis(2-Chloroethyl)ether	µg/kg	39 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	170 U
Butyl benzylphthalate (BBP)	µg/kg	72 U
Caprolactam	µg/kg	250 U
Carbazole	µg/kg	62 U
Dibenzofuran	µg/kg	42 U
Diethyl phthalate	µg/kg	100 U
Dimethyl phthalate	µg/kg	46 U
Di-n-butylphthalate (DBP)	µg/kg	72 U
Di-n-octyl phthalate (DnOP)	µg/kg	91 U
Hexachlorobenzene	µg/kg	9.3 U
Hexachlorobutadiene	µg/kg	39 U
Hexachlorocyclopentadiene	µg/kg	200 U
Hexachloroethane	µg/kg	29 U
Isophorone	µg/kg	39 U
Nitrobenzene	µg/kg	42 U
N-Nitrosodi-n-propylamine	µg/kg	36 U
N-Nitrosodiphenylamine	µg/kg	39 U
Pentachlorophenol	µg/kg	190 U
Phenol	µg/kg	26 U
LMW-PAHs		
2-Methylnaphthalene	µg/kg	6.4 U
Acenaphthene	µg/kg	**36 J**
Acenaphthylene	µg/kg	13 U
Anthracene	µg/kg	**86**
Fluorene	µg/kg	**37 J**
Naphthalene	µg/kg	**12 J**
Phenanthrene	µg/kg	**400**
Total LMW-PAHs	µg/kg	**571**

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**
Sample ID:		**SED-092518-38443-JPF-023**
Sample Date:		**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**
		Duplicate
Parameters	**Units**	
HMW-PAHs		
Benzo(a)anthracene	µg/kg	**450**
Benzo(a)pyrene	µg/kg	**530**
Benzo(b)fluoranthene	µg/kg	**750**
Benzo(g,h,i)perylene	µg/kg	**180**
Benzo(k)fluoranthene	µg/kg	**230**
Chrysene	µg/kg	**550**
Dibenz(a,h)anthracene	µg/kg	**71**
Fluoranthene	µg/kg	**980**
Indeno(1,2,3-cd)pyrene	µg/kg	**200**
Pyrene	µg/kg	**800**
Total HMW-PAHs	µg/kg	**4741**
Total PAHs	µg/kg	**5312**
Metals		
Aluminum	mg/kg	**9900**
Antimony	mg/kg	**0.58 J**
Arsenic	mg/kg	**15**
Barium	mg/kg	**200**
Beryllium	mg/kg	**0.66**
Cadmium	mg/kg	**0.58 J**
Calcium	mg/kg	**98000**
Chromium	mg/kg	**17**
Cobalt	mg/kg	**7.6**
Copper	mg/kg	**34**
Iron	mg/kg	**21000**
Lead	mg/kg	**48**
Magnesium	mg/kg	**23000**
Manganese	mg/kg	**660**
Mercury	mg/kg	**0.11 J**
Methyl mercury	µg/kg	0.23 U
Nickel	mg/kg	**21**
Potassium	mg/kg	**1600**
Selenium	mg/kg	**1.1 J**
Silver	mg/kg	**0.11 J**
Sodium	mg/kg	**180 J**
Thallium	mg/kg	**0.35 J**
Vanadium	mg/kg	**25**
Zinc	mg/kg	**150**
SEM Metals		
Cadmium	umol/g	**0.0047**
Copper	umol/g	**0.47**
Lead	umol/g	**0.22**
Mercury	umol/g	0.000026 U
Nickel	umol/g	**0.29**
Simultaneously extracted metals (SEM)/Acid-volatile sulfide ratio (AVS)	none	**0.052**
Zinc	umol/g	**1.7**
PCBs		
Aroclor-1016 (PCB-1016)	µg/kg	72 U
Aroclor-1221 (PCB-1221)	µg/kg	78 U
Aroclor-1232 (PCB-1232)	µg/kg	75 U
Aroclor-1242 (PCB-1242)	µg/kg	**130 J**
Aroclor-1248 (PCB-1248)	µg/kg	78 U
Aroclor-1254 (PCB-1254)	µg/kg	75 U
Aroclor-1260 (PCB-1260)	µg/kg	72 U
Herbicides		
2,4,5-T	µg/kg	41 U
2,4,5-TP (Silvex)	µg/kg	45 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/kg	160 U

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**
Sample ID:		**SED-092518-38443-JPF-023**
Sample Date:		**9/25/2018**
Sample Depth:		**0-0.5 ft BSS**
		Duplicate
Parameters	**Units**	
Pesticides		
4,4'-DDD	µg/kg	4.8 U
4,4'-DDE	µg/kg	4.9 U
4,4'-DDT	µg/kg	3.7 U
Aldrin	µg/kg	2.5 U
alpha-BHC	µg/kg	3.0 U
alpha-Chlordane	µg/kg	4.9 U
beta-BHC	µg/kg	5.7 U
delta-BHC	µg/kg	280 UJ
Dieldrin	µg/kg	3.6 U
Endosulfan I	µg/kg	3.9 U
Endosulfan II	µg/kg	4.8 U
Endosulfan sulfate	µg/kg	210 U
Endrin	µg/kg	6.2 U
Endrin aldehyde	µg/kg	210 U
Endrin ketone	µg/kg	2.9 U
gamma-BHC (lindane)	µg/kg	5.8 U
gamma-Chlordane	µg/kg	4.0 U
Heptachlor	µg/kg	5.2 U
Heptachlor epoxide	µg/kg	4.7 U
Methoxychlor	µg/kg	21 U
Toxaphene	µg/kg	82 U
General Chemistry		
Cyanide (total)	mg/kg	0.54 U
Soot carbon	mg/kg	**15000**
Sulfide	umol/g	**51**
Total organic carbon (TOC)	mg/kg	**33000**

Notes:

J - Estimated concentration.
NJ - Tentatively identified compound, estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
- - Not applicable.

Criteria Notes:
AL - Aquatic life.
WB - Wildlife based.

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**	**SD-14**	**SD-14**	**SD-14**	**SD-15**	**SD-16**	**SD-17**	**SD-17A**	**SD-17A**	**SD-17B**
Sample ID:		**SED-092518-38443-JPF-024**	**SED-092618-38443-JPF-026**	**SED-092618-38443-JPF-027**	**SED-092618-38443-JPF-028**	**SED-092618-38443-JPF-029**	**SED-092618-38443-JPF-025**	**SED-092118-38443-JPF-009**	**SED-38443-100319-JPF-001**	**SED-38443-100319-JPF-002**	**SED-38443-100319-JPF-003**
Sample Date:		**9/25/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/21/2018**	**10/3/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.3 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/kg	1.9 U	5.1 U	4.5 U	3.3 U	3.6 U	1.0 U	1.6 U	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	3.4 U	8.8 U	7.8 U	5.8 U	6.3 U	1.8 U	2.8 U	-	-	-
1,1,2-Trichloroethane	µg/kg	2.7 U	7.0 U	6.2 U	4.6 U	5.0 U	1.4 U	2.2 U	-	-	-
1,1-Dichloroethane	µg/kg	1.6 U	4.3 U	3.8 U	2.8 U	3.0 U	0.87 U	1.4 U	-	-	-
1,1-Dichloroethene	µg/kg	2.1 U	5.6 U	4.9 U	3.7 U	4.0 U	1.1 U	1.8 U	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1.3 U	3.5 U	3.1 U	2.3 U	2.5 U	0.72 U	1.1 U	-	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/kg	8.5 U	22 U	20 U	15 U	16 U	4.5 U	7.0 U	-	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/kg	1.8 U	4.8 U	4.2 U	3.1 U	3.4 U	0.97 U	1.5 U	-	-	-
1,2-Dichlorobenzene	µg/kg	2.6 U	6.9 U	6.1 U	4.5 U	4.9 U	1.4 U	2.2 U	-	-	-
1,2-Dichloroethane	µg/kg	1.8 U	4.8 U	4.2 U	3.1 U	3.4 U	0.97 U	1.5 U	-	-	-
1,2-Dichloropropane	µg/kg	2.0 U	5.3 U	4.6 U	3.4 U	3.7 U	1.1 U	1.7 U	-	-	-
1,3-Dichlorobenzene	µg/kg	1.9 U	5.0 U	4.4 U	3.3 U	3.6 U	1.0 U	1.6 U	-	-	-
1,4-Dichlorobenzene	µg/kg	2.1 U	5.5 U	4.8 U	3.6 U	3.9 U	1.1 U	1.7 U	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/kg	**21 J**	**41 J**	**49 J**	**34 J**	**39 J**	**12 J**	6.9 U	-	-	-
2-Hexanone	µg/kg	9.6 U	25 U	22 U	17 U	18 U	5.1 U	8.0 U	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/kg	8.8 U	23 U	20 U	15 U	16 U	4.7 U	7.2 U	-	-	-
Acetone	µg/kg	**65**	130 U	**110 J**	85 U	**150**	26 U	41 U	-	-	-
Benzene	µg/kg	1.6 U	4.3 U	3.8 U	2.8 U	3.1 U	0.88 U	1.4 U	-	-	-
Bromodichloromethane	µg/kg	1.6 U	4.2 U	3.7 U	2.8 U	3.0 U	0.86 U	1.3 U	-	-	-
Bromoform	µg/kg	5.7 U	15 U	13 U	9.7 U	11 U	3.0 U	4.7 U	-	-	-
Bromomethane (Methyl bromide)	µg/kg	2.3 U	6.1 U	5.4 U	4.0 U	4.3 U	1.2 U	1.9 UJ	-	-	-
Carbon disulfide	µg/kg	2.7 U	7.2 U	6.3 U	4.7 U	5.1 U	1.5 U	2.3 U	-	-	-
Carbon tetrachloride	µg/kg	7.7 U	20 U	18 U	13 U	14 U	4.1 U	6.3 U	-	-	-
Chlorobenzene	µg/kg	2.2 U	5.7 U	5.0 U	3.7 U	4.0 U	1.2 U	1.8 U	-	-	-
Chloroethane	µg/kg	2.9 U	7.5 U	6.6 U	4.9 U	5.4 U	1.5 U	2.4 U	-	-	-
Chloroform (Trichloromethane)	µg/kg	1.9 U	4.9 U	4.3 U	3.2 U	3.5 U	0.99 U	1.5 U	-	-	-
Chloromethane (Methyl chloride)	µg/kg	2.5 U	6.4 U	5.7 U	4.2 U	4.6 U	1.3 U	2.0 U	-	-	-
cis-1,2-Dichloroethene	µg/kg	1.5 U	4.0 U	3.5 U	2.6 U	2.9 U	0.82 U	1.3 U	-	-	-
cis-1,3-Dichloropropene	µg/kg	3.4 U	8.9 U	7.8 U	5.8 U	6.3 U	1.8 U	2.8 U	-	-	-
Cyclohexane	µg/kg	3.2 U	8.5 U	7.5 U	5.6 U	6.0 U	1.7 U	2.7 U	-	-	-
Dibromochloromethane	µg/kg	6.6 U	17 U	15 U	11 U	12 U	3.5 U	5.4 U	-	-	-
Dichlorodifluoromethane (CFC-12)	µg/kg	2.2 U	5.8 U	5.1 U	3.8 U	4.1 U	1.2 U	1.8 U	-	-	-
Ethylbenzene	µg/kg	2.5 U	6.5 U	5.7 U	4.2 U	4.6 U	1.3 U	2.0 U	-	-	-
Isopropyl benzene	µg/kg	2.0 U	5.1 U	4.5 U	3.4 U	3.7 U	1.0 U	1.6 U	-	-	-
Methyl acetate	µg/kg	8.0 U	21 U	19 U	14 U	15 U	4.3 U	6.6 U	-	-	-
Methyl cyclohexane	µg/kg	2.9 U	7.6 U	6.7 U	5.0 U	5.4 U	1.5 U	2.4 U	-	-	-
Methyl tert butyl ether (MTBE)	µg/kg	1.9 U	5.1 U	4.5 U	3.3 U	3.6 U	1.0 U	1.6 U	-	-	-
Methylene chloride	µg/kg	28 U	74 U	65 U	49 U	53 U	15 U	23 U	-	-	-
Styrene	µg/kg	2.7 U	7.2 U	6.3 U	4.7 U	5.1 U	1.5 U	2.3 U	-	-	-
Tetrachloroethene	µg/kg	1.7 U	4.5 U	4.0 U	3.0 U	3.2 U	0.92 U	1.4 U	-	-	-
Toluene	µg/kg	1.8 U	4.8 U	4.2 U	3.1 U	3.4 U	**1.5 J**	**3.6 J**	-	-	-
trans-1,2-Dichloroethene	µg/kg	1.1 U	2.9 U	2.5 U	1.9 U	2.0 U	0.59 U	0.91 U	-	-	-
trans-1,3-Dichloropropene	µg/kg	2.4 U	6.4 U	5.6 U	4.2 U	4.5 U	1.3 U	2.0 U	-	-	-
Trichloroethene	µg/kg	1.5 U	3.9 U	3.4 U	2.6 U	2.8 U	0.80 U	1.2 U	-	-	-
Trichlorofluoromethane (CFC-11)	µg/kg	2.5 U	6.7 U	5.9 U	4.4 U	4.7 U	1.4 U	2.1 U	-	-	-
Trifluorotrichloroethane (CFC-113)	µg/kg	3.0 U	7.9 U	7.0 U	5.2 U	5.6 U	1.6 U	2.5 U	-	-	-
Vinyl chloride	µg/kg	2.0 U	5.2 U	4.6 U	3.4 U	3.7 U	1.1 U	1.6 U	-	-	-
Xylenes (total)	µg/kg	3.7 U	9.8 U	8.6 U	6.4 U	7.0 U	2.0 U	3.1 U	-	-	-

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**	**SD-14**	**SD-14**	**SD-14**	**SD-15**	**SD-16**	**SD-17**	**SD-17A**	**SD-17A**	**SD-17B**
Sample ID:		**SED-092518-38443-JPF-024**	**SED-092618-38443-JPF-026**	**SED-092618-38443-JPF-027**	**SED-092618-38443-JPF-028**	**SED-092618-38443-JPF-029**	**SED-092618-38443-JPF-025**	**SED-092118-38443-JPF-009**	**SED-38443-100319-JPF-001**	**SED-38443-100319-JPF-002**	**SED-38443-100319-JPF-003**
Sample Date:		**9/25/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/21/2018**	**10/3/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.3 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
Semivolatile Organic Compounds											
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	16 U	37 U	36 U	25 U	32 U	12 U	650 U	29 U	42 U	26 U
2,4,5-Trichlorophenol	µg/kg	110 U	260 U	250 U	170 U	220 U	86 U	4500 U	200 U	290 U	180 U
2,4,6-Trichlorophenol	µg/kg	100 U	240 U	230 U	160 U	210 U	79 U	4100 U	190 U	270 U	170 U
2,4-Dichlorophenol	µg/kg	69 U	160 U	160 U	110 U	140 U	55 U	2900 U	130 U	190 U	110 U
2,4-Dimethylphenol	µg/kg	63 U	150 U	140 U	99 U	130 U	50 U	2600 U	120 U	170 U	100 U
2,4-Dinitrophenol	µg/kg	220 U	530 U	510 U	350 U	460 U	180 U	9200 U	420 U	600 U	370 U
2,4-Dinitrotoluene	µg/kg	97 U	230 U	220 U	150 U	200 U	77 U	4000 U	180 U	260 U	160 U
2,6-Dinitrotoluene	µg/kg	88 U	210 U	200 U	140 U	180 U	69 U	3600 U	160 U	240 U	150 U
2-Chloronaphthalene	µg/kg	22 U	52 U	50 U	35 U	45 U	17 U	910 U	41 U	59 U	36 U
2-Chlorophenol	µg/kg	16 U	37 U	36 U	25 U	32 U	12 U	650 U	29 U	42 U	26 U
2-Methylphenol	µg/kg	49 U	110 U	110 U	77 U	100 U	38 U	2000 U	91 U	130 U	80 U
2-Nitroaniline	µg/kg	63 U	150 U	140 U	99 U	130 U	50 U	2600 U	120 U	170 U	100 U
2-Nitrophenol	µg/kg	20 U	48 U	46 U	32 U	42 U	16 U	840 U	38 U	55 U	34 U
3&4-Methylphenol	µg/kg	46 U	110 U	100 U	72 U	94 U	36 U	1900 U	85 U	120 U	75 U
3,3'-Dichlorobenzidine	µg/kg	68 U	160 U	150 U	110 U	140 U	53 U	2800 U	130 U	180 U	110 U
3-Nitroaniline	µg/kg	77 U	180 U	170 U	120 U	160 U	61 U	3200 U	140 U	210 U	130 U
4,6-Dinitro-2-methylphenol	µg/kg	130 U	300 U	290 U	200 U	260 U	99 U	5200 U	230 U	340 U	210 U
4-Bromophenyl phenyl ether	µg/kg	22 U	52 U	50 U	35 U	45 U	17 U	910 U	41 U	59 U	36 U
4-Chloro-3-methylphenol	µg/kg	71 U	170 U	160 U	110 U	150 U	56 U	2900 U	130 U	190 U	120 U
4-Chloroaniline	µg/kg	47 U	110 U	110 U	75 U	97 U	37 U	1900 U	88 U	130 U	78 U
4-Chlorophenyl phenyl ether	µg/kg	22 U	52 U	50 U	35 U	45 U	17 U	910 U	41 U	59 U	36 U
4-Nitroaniline	µg/kg	94 U	220 U	210 U	150 U	190 U	74 U	3900 U	180 U	250 U	160 U
4-Nitrophenol	µg/kg	150 U	350 U	340 U	230 U	300 U	120 U	6100 U	280 U	400 U	240 U
Acetophenone	µg/kg	17 U	41 U	39 U	27 U	36 U	14 U	710 U	32 U	47 U	29 U
Atrazine	µg/kg	57 U	130 U	130 U	89 U	120 U	45 U	2300 U	110 U	150 U	93 U
Benzaldehyde	µg/kg	36 U	85 U	82 U	57 U	74 U	28 U	1500 U	67 U	97 U	60 U
Biphenyl (1,1-Biphenyl)	µg/kg	27 U	63 U	61 U	42 U	55 U	21 U	1100 U	50 U	72 U	44 U
bis(2-Chloroethoxy)methane	µg/kg	19 U	44 U	43 U	30 U	39 U	15 U	780 U	35 U	51 U	31 U
bis(2-Chloroethyl)ether	µg/kg	19 U	44 U	43 U	30 U	39 U	15 U	780 U	35 U	51 U	31 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	80 U	190 U	180 U	130 U	160 U	63 U	3300 U	**160 J**	220 U	130 U
Butyl benzylphthalate (BBP)	µg/kg	35 U	81 U	79 U	55 U	71 U	27 U	1400 U	64 U	93 U	57 U
Caprolactam	µg/kg	120 U	280 U	270 U	190 U	240 U	93 U	4900 U	220 U	320 U	190 U
Carbazole	µg/kg	**35 J**	70 U	68 U	47 U	61 U	24 U	**5400**	**130 J**	**200 J**	**130**
Dibenzofuran	µg/kg	**22 J**	48 U	46 U	32 U	42 U	16 U	**1600 J**	**48 J**	**56 J**	34 U
Diethyl phthalate	µg/kg	49 U	110 U	110 U	77 U	100 U	38 U	2000 U	91 U	130 U	80 U
Dimethyl phthalate	µg/kg	22 U	52 U	50 U	35 U	45 U	17 U	910 U	41 U	59 U	36 U
Di-n-butylphthalate (DBP)	µg/kg	35 U	81 U	79 U	55 U	71 U	27 U	1400 U	64 U	93 U	57 U
Di-n-octyl phthalate (DnOP)	µg/kg	44 U	100 U	100 U	70 U	91 U	35 U	1800 U	82 U	120 U	73 U
Hexachlorobenzene	µg/kg	4.5 U	11 U	10 U	7.1 U	9.2 U	3.5 U	180 U	8.3 U	12 U	7.4 U
Hexachlorobutadiene	µg/kg	19 U	44 U	43 U	30 U	39 U	15 U	780 U	35 U	51 U	31 U
Hexachlorocyclopentadiene	µg/kg	97 U	230 U	220 U	150 U	200 U	77 U	4000 U	180 U	260 U	160 U
Hexachloroethane	µg/kg	14 U	33 U	32 U	22 U	29 U	11 U	580 U	26 U	38 U	23 U
Isophorone	µg/kg	19 U	44 U	43 U	30 U	39 U	15 U	780 U	35 U	51 U	31 U
Nitrobenzene	µg/kg	20 U	48 U	46 U	32 U	42 U	16 U	840 U	38 U	55 U	34 U
N-Nitrosodi-n-propylamine	µg/kg	17 U	41 U	39 U	27 U	36 U	14 U	710 U	32 U	47 U	29 U
N-Nitrosodiphenylamine	µg/kg	19 U	44 U	43 U	30 U	39 U	15 U	780 U	35 U	51 U	31 U
Pentachlorophenol	µg/kg	91 U	210 U	210 U	140 U	190 U	72 U	3800 U	170 U	250 U	150 U
Phenol	µg/kg	13 U	30 U	29 U	20 U	26 U	9.9 U	520 U	23 U	34 U	21 U
LMW-PAHs											
2-Methylnaphthalene	µg/kg	**22 J**	7.3 U	7.0 U	**9.6 J**	6.3 U	2.4 U	**260 J**	**36 J**	**37 J**	**11 J**
Acenaphthene	µg/kg	**31**	11 U	10 U	**19 J**	9.2 U	3.5 U	**2900**	**57**	**110**	**57**
Acenaphthylene	µg/kg	**12 J**	15 U	14 U	**13 J**	13 U	5.0 U	260 U	**46**	**43 J**	10 U
Anthracene	µg/kg	**64**	**13 J**	8.6 U	**39**	**17 J**	**11 J**	**7800**	**220**	**350**	**150**
Fluorene	µg/kg	**35**	10 U	9.8 U	**23 J**	**11 J**	**5.1 J**	**3000**	**76**	**100**	**61**
Naphthalene	µg/kg	**20 J**	8.9 U	8.6 U	6.0 U	7.8 U	3.0 U	**300 J**	**41 J**	**46 J**	**13 J**
Phenanthrene	µg/kg	**270**	**67**	**66**	**240**	**79**	**51**	**37000**	**910**	**1400**	**720**
Total LMW-PAHs	µg/kg	**454**	**80**	**66**	**343.6**	**107**	**67.1**	**51260**	**1386**	**2086**	**1012**

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		SD-13	SD-14	SD-14	SD-14	SD-15	SD-16	SD-17	SD-17A	SD-17A	SD-17B
Sample ID:		SED-092518-38443-JPF-024	SED-092618-38443-JPF-026	SED-092618-38443-JPF-027	SED-092618-38443-JPF-028	SED-092618-38443-JPF-029	SED-092618-38443-JPF-025	SED-092118-38443-JPF-009	SED-38443-100319-JPF-001	SED-38443-100319-JPF-002	SED-38443-100319-JPF-003
Sample Date:		9/25/2018	9/26/2018	9/26/2018	9/26/2018	9/26/2018	9/26/2018	9/21/2018	10/3/2019	10/3/2019	10/3/2019
Sample Depth:		0.5-1.5 ft BSS	0-0.5 ft BSS	0-0.5 ft BSS	0.5-1.5 ft BSS	0-0.5 ft BSS	0-0.5 ft BSS	0-0.5 ft BSS	0-0.5 ft BSS	0.5-1.3 ft BSS	0-0.5 ft BSS
				Duplicate							
Parameters	**Units**										
HMW-PAHs											
Benzo(a)anthracene	µg/kg	**250**	**78**	**91**	**190**	**110**	**44**	**26000**	**910**	**1400**	**750**
Benzo(a)pyrene	µg/kg	**280**	**100**	**110**	**190**	**120**	**49**	**22000**	**1000**	**1400**	**710**
Benzo(b)fluoranthene	µg/kg	**390**	**150**	**180**	**310**	**160**	**67**	**33000**	**1300**	**1800**	**980**
Benzo(g,h,i)perylene	µg/kg	**150**	**41 J**	**39 J**	**150**	**110**	**30**	**11000**	**380**	**780**	**410**
Benzo(k)fluoranthene	µg/kg	**150**	**64**	**59**	**100**	**87**	**27**	**9300**	**610**	**730**	**280**
Chrysene	µg/kg	**290**	**97**	**110**	**230**	**140**	**54**	**29000**	**970**	**1700**	**770**
Dibenz(a,h)anthracene	µg/kg	**42**	26 U	25 U	**38**	22 U	8.6 U	**3700**	**100**	**240**	**150**
Fluoranthene	µg/kg	**610**	**170**	**190**	**450**	**220**	**100**	**59000**	**1600**	**2900**	**1300**
Indeno(1,2,3-cd)pyrene	µg/kg	**130**	**42 J**	**45 J**	**130**	**88**	**29**	**11000**	**390**	**710**	**370**
Pyrene	µg/kg	**470**	**140**	**160**	**360**	**200**	**76**	**41000**	**1500**	**2400**	**1200**
Total HMW-PAHs	µg/kg	**2762**	**882**	**984**	**2148**	**1235**	**476**	**245000**	**8760**	**14060**	**6920**
Total PAHs	µg/kg	**3216**	**962**	**1050**	**2491.6**	**1342**	**543.1**	**296260**	**10146**	**16146**	**7932**
Metals											
Aluminum	mg/kg	**8000**	**7600**	**7400**	**8500**	**7400**	**1500**	**4500**	-	-	-
Antimony	mg/kg	**0.33 J**	**0.63 J**	**0.59 J**	**0.71 J**	**0.53 J**	**0.12 J**	**0.24 J**	-	-	-
Arsenic	mg/kg	**11**	**12**	**12**	**12**	**13**	**6.4**	**7.9**	-	-	-
Barium	mg/kg	**120**	**180**	**180**	**160**	**140**	**19**	**53**	-	-	-
Beryllium	mg/kg	**0.50**	0.47 U	0.44 U	0.46 U	0.21 U	0.15 U	**0.38**	-	-	-
Cadmium	mg/kg	**0.50**	**0.50 J**	**0.50 J**	**0.64**	**0.34 J**	**0.059 J**	**0.37**	-	-	-
Calcium	mg/kg	**64000**	**110000**	**97000**	**94000**	**210000**	**150000**	**84000**	-	-	-
Chromium	mg/kg	**15**	**14**	**13**	**19**	**12**	**3.7**	**12**	-	-	-
Cobalt	mg/kg	**7.2**	**5.8**	**5.6**	**7.1**	**7.8**	**2.4**	**4.1**	-	-	-
Copper	mg/kg	**31**	**24**	**24**	**30**	**19**	**2.9**	**19**	-	-	-
Iron	mg/kg	**16000**	**15000**	**14000**	**16000**	**15000**	**5800**	**12000**	-	-	-
Lead	mg/kg	**49**	**25**	**25**	**37**	**20**	**3.2**	**35**	-	-	-
Magnesium	mg/kg	**19000**	**17000**	**16000**	**20000**	**33000**	**63000**	**33000**	-	-	-
Manganese	mg/kg	**460**	**390**	**380**	**460**	**570**	**320**	**320**	-	-	-
Mercury	mg/kg	**0.092 J**	**0.098 J**	**0.10 J**	**0.11 J**	**0.070 J**	0.021 U	**0.068 J**	-	-	-
Methyl mercury	µg/kg	**0.46**	**0.69**	**0.64**	**0.51**	**0.55**	0.087 U	**0.61**	-	-	-
Nickel	mg/kg	**19**	**17**	**17**	**19**	**16**	**4.1**	**11**	-	-	-
Potassium	mg/kg	**1200**	**1400**	**1300**	**1400**	**1500**	**320**	**770**	-	-	-
Selenium	mg/kg	**0.71 J**	**1.1 J**	**1.2 J**	**1.2 J**	**0.82 J**	0.12 U	**0.28 J**	-	-	-
Silver	mg/kg	**0.078 J**	**0.13 J**	**0.13 J**	**0.22 J**	**0.068 J**	0.022 U	**0.055 J**	-	-	-
Sodium	mg/kg	**120 J**	**200 J**	**190 J**	**160 J**	**240 J**	**170 J**	**140 J**	-	-	-
Thallium	mg/kg	**0.28 J**	**0.32 J**	**0.32 J**	**0.38 J**	**0.32 J**	**0.079 J**	**0.23 J**	-	-	-
Vanadium	mg/kg	**20**	**20**	**19**	**22**	**20**	**6.1**	**15**	-	-	-
Zinc	mg/kg	**120**	**90**	**87**	**110**	**77**	**13**	**62**	-	-	-
SEM Metals											
Cadmium	umol/g	**0.0083**	**0.0021 J**	**0.0019 J**	**0.0033**	**0.00095 J**	**0.00018 J**	**0.0029**	-	-	-
Copper	umol/g	**0.70**	**0.27**	**0.25**	**0.30**	**0.12**	**0.030**	**0.20**	-	-	-
Lead	umol/g	**0.47**	**0.15**	**0.13**	**0.20**	**0.11**	**0.014**	**0.13**	-	-	-
Mercury	umol/g	0.000014 U	0.000029 U	0.000029 U	0.000021 U	0.000027 U	0.0000098 U	0.000013 U	-	-	-
Nickel	umol/g	**0.22**	**0.21**	**0.20**	**0.23**	**0.18**	**0.020 J**	**0.090**	-	-	-
Simultaneously extracted metals (SEM)/Acid-volatile sulfide ratio (AVS)	none	**0.34**	**0.024**	**0.025**	**0.029**	**0.015**	**0.12**	**0.34**	-	-	-
Zinc	umol/g	**2.4**	**1.2**	**1.2**	**1.3**	**1.0**	**0.14 J**	**0.58**	-	-	-
PCBs											
Aroclor-1016 (PCB-1016)	µg/kg	34 U	80 U	77 U	53 U	71 U	26 U	35 U	-	-	-
Aroclor-1221 (PCB-1221)	µg/kg	37 U	88 U	84 U	58 U	77 U	29 U	38 U	-	-	-
Aroclor-1232 (PCB-1232)	µg/kg	36 U	84 U	81 U	55 U	74 U	28 U	37 U	-	-	-
Aroclor-1242 (PCB-1242)	µg/kg	**71 J**	69 U	67 U	46 U	61 U	23 U	30 U	-	-	-
Aroclor-1248 (PCB-1248)	µg/kg	37 U	88 U	84 U	58 U	77 U	29 U	38 U	-	-	-
Aroclor-1254 (PCB-1254)	µg/kg	36 U	84 U	81 U	**78 J**	74 U	28 U	**420**	-	-	-
Aroclor-1260 (PCB-1260)	µg/kg	34 U	80 U	77 U	53 U	71 U	26 U	35 U	-	-	-
Herbicides											
2,4,5-T	µg/kg	20 U	47 UJ	45 UJ	32 UJ	41 UJ	16 UJ	21 UJ	-	-	-
2,4,5-TP (Silvex)	µg/kg	21 U	51 U	48 U	34 U	44 U	17 U	23 U	-	-	-
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/kg	75 U	180 U	170 U	120 U	160 U	59 U	79 U	-	-	-

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-13**	**SD-14**	**SD-14**	**SD-14**	**SD-15**	**SD-16**	**SD-17**	**SD-17A**	**SD-17A**	**SD-17B**
Sample ID:		**SED-092518-38443-JPF-024**	**SED-092618-38443-JPF-026**	**SED-092618-38443-JPF-027**	**SED-092618-38443-JPF-028**	**SED-092618-38443-JPF-029**	**SED-092618-38443-JPF-025**	**SED-092118-38443-JPF-009**	**SED-38443-100319-JPF-001**	**SED-38443-100319-JPF-002**	**SED-38443-100319-JPF-003**
Sample Date:		**9/25/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/26/2018**	**9/21/2018**	**10/3/2019**	**10/3/2019**	**10/3/2019**
Sample Depth:		**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.3 ft BSS**	**0-0.5 ft BSS**
				Duplicate							
Parameters	**Units**										
Pesticides											
4,4'-DDD	µg/kg	2.3 U	540 U	520 U	360 U	470 U	35 U	48 U	-	-	-
4,4'-DDE	µg/kg	2.3 U	5.5 U	5.3 U	3.6 U	4.8 U	1.8 U	49 U	-	-	-
4,4'-DDT	µg/kg	1.8 U	410 U	400 U	270 U	360 U	27 U	36 U	-	-	-
Aldrin	µg/kg	1.2 U	2.8 U	2.7 U	1.9 U	2.5 U	0.92 U	25 U	-	-	-
alpha-BHC	µg/kg	1.4 U	330 U	320 U	220 U	290 U	22 U	29 U	-	-	-
alpha-Chlordane	µg/kg	2.3 U	5.5 U	5.3 U	3.6 U	4.8 U	1.8 U	48 U	-	-	-
beta-BHC	µg/kg	2.7 U	6.3 U	6.1 U	4.2 U	5.5 U	2.1 U	56 U	-	-	-
delta-BHC	µg/kg	140 UJ	620 U	590 U	410 U	540 U	40 U	55 UJ	-	-	-
Dieldrin	µg/kg	1.7 U	4.0 U	3.9 U	2.6 U	3.5 U	1.3 U	35 U	-	-	-
Endosulfan I	µg/kg	1.9 U	4.4 U	4.2 U	2.9 U	3.8 U	1.4 U	39 U	-	-	-
Endosulfan II	µg/kg	2.3 U	5.4 U	5.2 U	3.6 U	4.7 U	1.8 U	48 U	-	-	-
Endosulfan sulfate	µg/kg	99 U	470 U	450 U	310 U	410 U	31 U	41 U	-	-	-
Endrin	µg/kg	2.9 U	6.9 U	6.7 U	4.6 U	6.1 U	2.3 U	61 U	-	-	-
Endrin aldehyde	µg/kg	100 U	480 U	460 U	310 U	420 U	1.6 U	42 U	-	-	-
Endrin ketone	µg/kg	1.4 U	3.2 U	3.1 U	2.1 U	2.9 U	1.1 U	29 U	-	-	-
gamma-BHC (lindane)	µg/kg	2.8 U	650 U	630 U	430 U	570 U	43 U	58 U	-	-	-
gamma-Chlordane	µg/kg	**2.3 J**	**12 J**	**12 NJ**	3.0 U	**4.5 NJ**	1.5 U	40 U	-	-	-
Heptachlor	µg/kg	2.4 U	5.8 U	5.5 U	3.8 U	5.1 U	1.9 U	51 U	-	-	-
Heptachlor epoxide	µg/kg	2.2 U	5.3 U	5.0 U	3.5 U	4.6 U	1.7 U	46 U	-	-	-
Methoxychlor	µg/kg	10 U	24 U	23 U	16 U	21 U	7.9 U	210 UJ	-	-	-
Toxaphene	µg/kg	39 U	91 U	88 U	60 U	80 U	30 U	800 U	-	-	-
General Chemistry											
Cyanide (total)	mg/kg	0.31 U	0.61 U	**0.77 J**	**0.58 J**	**2.6**	0.27 U	0.29 U	-	-	-
Soot carbon	mg/kg	**7700**	**15000**	**14000**	**9200**	**11000**	**15000**	**18000**	-	-	-
Sulfide	umol/g	**11**	**77 J**	**72 J**	**69 J**	**94 J**	**1.7 J**	**2.9 J**	-	-	-
Total organic carbon (TOC)	mg/kg	**16000**	**51000**	**40000**	**35000**	**30000**	**1900**	**14000**	-	-	-

Notes:

J - Estimated concentration.
NJ - Tentatively identified compound, estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
- - Not applicable.

Criteria Notes:
AL - Aquatic life.
WB - Wildlife based.

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-17B**	**SD-17C**	**SD-17C**	**SD-17D**	**SD-17D**	**SD-17E**	**SD-18**	**SD-19**	**SD-19**	**SD-20**
Sample ID:		**SED-38443-100319-JPF-004**	**SED-38443-100419-JPF-005**	**SED-38443-100419-JPF-006**	**SED-38443-100419-JPF-007**	**SED-38443-100419-JPF-008**	**SED-38443-100419-JPF-009**	**SED-092418-38443-JPF-013**	**SED-092418-38443-JPF-011**	**SED-092418-38443-JPF-012**	**SED-092118-38443-JPF-010**
Sample Date:		**10/3/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**9/24/2018**	**9/24/2018**	**9/24/2018**	**9/21/2018**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-0.83 ft BSS**	**0-0.5 ft BSS**	**0.5-0.92 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**
		Duplicate									
Parameters	**Units**										
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/kg	-	-	-	-	-	-	3.1 U	4.4 U	2.2 U	2.7 U
1,1,2,2-Tetrachloroethane	µg/kg	-	-	-	-	-	-	5.4 U	7.7 U	3.8 U	4.7 U
1,1,2-Trichloroethane	µg/kg	-	-	-	-	-	-	4.2 U	6.1 U	3.0 U	3.7 U
1,1-Dichloroethane	µg/kg	-	-	-	-	-	-	2.6 U	3.7 U	1.9 U	2.3 U
1,1-Dichloroethene	µg/kg	-	-	-	-	-	-	3.4 U	4.8 U	2.4 U	3.0 U
1,2,4-Trichlorobenzene	µg/kg	-	-	-	-	-	-	2.1 U	3.1 U	1.5 U	1.9 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/kg	-	-	-	-	-	-	13 U	19 U	9.7 U	12 U
1,2-Dibromoethane (Ethylene dibromide)	µg/kg	-	-	-	-	-	-	2.9 U	4.1 U	2.1 U	2.5 U
1,2-Dichlorobenzene	µg/kg	-	-	-	-	-	-	4.2 U	6.0 U	3.0 U	3.7 U
1,2-Dichloroethane	µg/kg	-	-	-	-	-	-	2.9 U	4.1 U	2.1 U	2.6 U
1,2-Dichloropropane	µg/kg	-	-	-	-	-	-	3.2 U	4.6 U	2.3 U	2.8 U
1,3-Dichlorobenzene	µg/kg	-	-	-	-	-	-	3.1 U	4.4 U	2.2 U	2.7 U
1,4-Dichlorobenzene	µg/kg	-	-	-	-	-	-	3.3 U	4.7 U	2.4 U	2.9 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/kg	-	-	-	-	-	-	13 U	**73 J**	**16 J**	**20 J**
2-Hexanone	µg/kg	-	-	-	-	-	-	15 U	22 U	11 U	14 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/kg	-	-	-	-	-	-	14 U	20 U	10 U	12 U
Acetone	µg/kg	-	-	-	-	-	-	79 U	**210**	56 U	70 U
Benzene	µg/kg	-	-	-	-	-	-	2.6 U	3.7 U	1.9 U	**6.4 J**
Bromodichloromethane	µg/kg	-	-	-	-	-	-	2.5 U	3.6 U	1.8 U	2.2 U
Bromoform	µg/kg	-	-	-	-	-	-	9.0 U	13 U	6.5 U	7.9 U
Bromomethane (Methyl bromide)	µg/kg	-	-	-	-	-	-	3.7 U	5.3 UJ	2.7 UJ	3.3 UJ
Carbon disulfide	µg/kg	-	-	-	-	-	-	4.4 U	6.2 U	3.1 U	3.9 U
Carbon tetrachloride	µg/kg	-	-	-	-	-	-	12 U	17 U	8.7 U	11 U
Chlorobenzene	µg/kg	-	-	-	-	-	-	3.4 U	4.9 U	2.5 U	3.0 U
Chloroethane	µg/kg	-	-	-	-	-	-	4.6 U	6.5 U	3.3 U	4.0 U
Chloroform (Trichloromethane)	µg/kg	-	-	-	-	-	-	2.9 U	4.2 U	2.1 U	2.6 U
Chloromethane (Methyl chloride)	µg/kg	-	-	-	-	-	-	3.9 U	5.6 U	2.8 U	3.5 U
cis-1,2-Dichloroethene	µg/kg	-	-	-	-	-	-	2.4 U	3.5 U	1.8 U	2.2 U
cis-1,3-Dichloropropene	µg/kg	-	-	-	-	-	-	5.4 U	7.7 U	3.9 U	4.8 U
Cyclohexane	µg/kg	-	-	-	-	-	-	5.1 U	7.4 U	3.7 U	4.6 U
Dibromochloromethane	µg/kg	-	-	-	-	-	-	10 U	15 U	7.5 U	9.2 U
Dichlorodifluoromethane (CFC-12)	µg/kg	-	-	-	-	-	-	3.5 U	5.0 U	2.5 U	3.1 U
Ethylbenzene	µg/kg	-	-	-	-	-	-	3.9 U	5.6 U	2.8 U	3.5 U
Isopropyl benzene	µg/kg	-	-	-	-	-	-	3.1 U	4.5 U	2.2 U	2.8 U
Methyl acetate	µg/kg	-	-	-	-	-	-	13 U	18 U	9.1 U	11 U
Methyl cyclohexane	µg/kg	-	-	-	-	-	-	4.6 U	6.6 U	3.3 U	4.1 U
Methyl tert butyl ether (MTBE)	µg/kg	-	-	-	-	-	-	3.1 U	4.4 U	2.2 U	2.7 U
Methylene chloride	µg/kg	-	-	-	-	-	-	45 U	64 U	32 U	40 U
Styrene	µg/kg	-	-	-	-	-	-	4.3 U	6.2 U	3.1 U	3.8 U
Tetrachloroethene	µg/kg	-	-	-	-	-	-	2.7 U	3.9 U	2.0 U	2.4 U
Toluene	µg/kg	-	-	-	-	-	-	2.9 U	4.1 U	2.1 U	2.6 U
trans-1,2-Dichloroethene	µg/kg	-	-	-	-	-	-	1.7 U	2.5 U	1.3 U	1.5 U
trans-1,3-Dichloropropene	µg/kg	-	-	-	-	-	-	3.9 U	5.5 U	2.8 U	3.4 U
Trichloroethene	µg/kg	-	-	-	-	-	-	2.4 U	3.4 U	1.7 U	2.1 U
Trichlorofluoromethane (CFC-11)	µg/kg	-	-	-	-	-	-	4.0 U	5.8 U	2.9 U	3.6 U
Trifluorotrichloroethane (CFC-113)	µg/kg	-	-	-	-	-	-	4.8 U	6.9 U	3.4 U	4.2 U
Vinyl chloride	µg/kg	-	-	-	-	-	-	3.1 U	4.5 U	2.3 U	2.8 U
Xylenes (total)	µg/kg	-	-	-	-	-	-	5.9 U	8.5 U	4.3 U	5.3 U

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-17B**	**SD-17C**	**SD-17C**	**SD-17D**	**SD-17D**	**SD-17E**	**SD-18**	**SD-19**	**SD-19**	**SD-20**
Sample ID:		**SED-38443-100319-JPF-004**	**SED-38443-100419-JPF-005**	**SED-38443-100419-JPF-006**	**SED-38443-100419-JPF-007**	**SED-38443-100419-JPF-008**	**SED-38443-100419-JPF-009**	**SED-092418-38443-JPF-013**	**SED-092418-38443-JPF-011**	**SED-092418-38443-JPF-012**	**SED-092118-38443-JPF-010**
Sample Date:		**10/3/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**9/24/2018**	**9/24/2018**	**9/24/2018**	**9/21/2018**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-0.83 ft BSS**	**0-0.5 ft BSS**	**0.5-0.92 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**
		Duplicate									
Parameters	**Units**										
Semivolatile Organic Compounds											
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/kg	24 U	23 U	41 U	26 U	39 U	68 U	29 U	32 U	22 U	23 U
2,4,5-Trichlorophenol	µg/kg	170 U	160 U	280 U	180 U	270 U	470 U	200 U	220 U	150 U	160 U
2,4,6-Trichlorophenol	µg/kg	160 U	150 U	260 U	170 U	250 U	440 U	180 U	200 U	140 U	150 U
2,4-Dichlorophenol	µg/kg	110 U	100 U	180 U	110 U	170 U	300 U	130 U	140 U	99 U	100 U
2,4-Dimethylphenol	µg/kg	98 U	94 U	160 U	100 U	160 U	270 U	120 U	130 U	90 U	91 U
2,4-Dinitrophenol	µg/kg	350 U	330 U	580 U	370 U	550 U	R	410 U	450 U	320 U	320 U
2,4-Dinitrotoluene	µg/kg	150 U	150 U	250 U	160 U	240 U	420 U	180 U	200 U	140 U	140 U
2,6-Dinitrotoluene	µg/kg	140 U	130 U	230 U	150 U	220 U	380 U	160 U	180 U	130 U	130 U
2-Chloronaphthalene	µg/kg	34 U	33 U	57 U	36 U	54 U	95 U	40 U	44 U	31 U	32 U
2-Chlorophenol	µg/kg	24 U	23 U	41 U	26 U	39 U	68 U	29 U	32 U	22 U	23 U
2-Methylphenol	µg/kg	76 U	73 U	130 U	81 U	120 U	210 U	89 U	98 U	70 U	71 U
2-Nitroaniline	µg/kg	98 U	94 U	160 U	100 U	160 U	270 U	120 U	130 U	90 U	91 U
2-Nitrophenol	µg/kg	32 U	30 U	53 U	34 U	51 U	88 U	37 U	41 U	29 U	30 U
3&4-Methylphenol	µg/kg	71 U	68 U	120 U	76 U	110 U	200 U	83 U	92 U	65 U	66 U
3,3'-Dichlorobenzidine	µg/kg	110 U	100 U	180 U	110 U	170 U	290 U	120 U	140 U	96 U	98 U
3-Nitroaniline	µg/kg	120 U	110 U	200 U	130 U	190 U	330 U	140 U	160 U	110 U	110 U
4,6-Dinitro-2-methylphenol	µg/kg	200 U	190 U	330 U	210 U	310 U	540 U	230 U	250 U	180 U	180 U
4-Bromophenyl phenyl ether	µg/kg	34 U	33 U	57 U	36 U	54 U	95 U	40 U	44 U	31 U	32 U
4-Chloro-3-methylphenol	µg/kg	110 U	110 U	180 U	120 U	170 U	310 U	130 U	140 U	100 U	100 U
4-Chloroaniline	µg/kg	73 U	70 U	120 U	78 U	120 U	200 U	86 U	95 U	67 U	69 U
4-Chlorophenyl phenyl ether	µg/kg	34 U	33 U	57 U	36 U	54 U	95 U	40 U	44 U	31 U	32 U
4-Nitroaniline	µg/kg	150 U	140 U	240 U	160 U	230 U	410 U	170 U	190 U	130 U	140 U
4-Nitrophenol	µg/kg	230 U	220 U	380 U	240 U	370 U	640 U	270 U	300 U	210 U	210 U
Acetophenone	µg/kg	27 U	26 U	45 U	29 U	43 U	75 U	32 U	35 U	25 U	25 U
Atrazine	µg/kg	88 U	84 U	150 U	94 U	140 U	240 U	100 U	110 U	81 U	82 U
Benzaldehyde	µg/kg	56 U	54 U	94 U	60 U	89 U	160 U	66 U	73 U	52 U	53 U
Biphenyl (1,1-Biphenyl)	µg/kg	42 U	40 U	69 U	44 U	66 U	120 U	49 U	54 U	38 U	39 U
bis(2-Chloroethoxy)methane	µg/kg	29 U	28 U	49 U	31 U	47 U	82 U	35 U	38 U	27 U	27 U
bis(2-Chloroethyl)ether	µg/kg	29 U	28 U	49 U	31 U	47 U	82 U	35 U	38 U	27 U	27 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/kg	120 U	120 U	210 U	130 U	200 U	350 U	**200**	160 U	**120 J**	**230**
Butyl benzylphthalate (BBP)	µg/kg	54 U	51 U	90 U	57 U	86 U	150 U	63 U	70 U	49 U	50 U
Caprolactam	µg/kg	180 U	180 U	310 U	200 U	290 U	510 U	220 U	240 U	170 U	170 U
Carbazole	µg/kg	**90 J**	**63 J**	**250**	**240**	**220**	**560**	55 U	60 U	43 U	43 U
Dibenzofuran	µg/kg	32 U	30 U	**97 J**	**50 J**	**95 J**	**150 J**	37 U	41 U	29 U	30 U
Diethyl phthalate	µg/kg	76 U	73 U	130 U	81 U	120 U	210 U	89 U	98 U	70 U	71 U
Dimethyl phthalate	µg/kg	34 U	33 U	57 U	36 U	54 U	95 U	40 U	44 U	31 U	32 U
Di-n-butylphthalate (DBP)	µg/kg	54 U	51 U	90 U	57 U	**2900**	150 U	63 U	70 U	49 U	50 U
Di-n-octyl phthalate (DnOP)	µg/kg	69 U	65 U	110 U	73 U	110 U	190 U	81 U	89 U	63 U	64 U
Hexachlorobenzene	µg/kg	7.0 U	6.7 U	12 U	7.4 U	11 U	19 U	8.2 U	9.0 U	6.4 U	6.5 U
Hexachlorobutadiene	µg/kg	29 U	28 U	49 U	31 U	47 U	82 U	35 U	38 U	27 U	27 U
Hexachlorocyclopentadiene	µg/kg	150 U	150 U	250 U	160 U	240 U	R	180 U	200 U	140 U	140 U
Hexachloroethane	µg/kg	22 U	21 U	37 U	23 U	35 U	61 U	26 U	29 U	20 U	21 U
Isophorone	µg/kg	29 U	28 U	49 U	31 U	47 U	82 U	35 U	38 U	27 U	27 U
Nitrobenzene	µg/kg	32 U	30 U	53 U	34 U	51 U	88 U	37 U	41 U	29 U	30 U
N-Nitrosodi-n-propylamine	µg/kg	27 U	26 U	45 U	29 U	43 U	75 U	32 U	35 U	25 U	25 U
N-Nitrosodiphenylamine	µg/kg	29 U	28 U	49 U	31 U	47 U	82 U	35 U	38 U	27 U	27 U
Pentachlorophenol	µg/kg	140 U	140 U	240 U	150 U	230 U	390 U	170 U	180 U	130 U	130 U
Phenol	µg/kg	20 U	19 U	33 U	21 U	31 U	54 U	23 U	25 U	18 U	18 U
LMW-PAHs											
2-Methylnaphthalene	µg/kg	4.8 U	**11 J**	**61**	**12 J**	**44 J**	**34 J**	5.6 U	6.2 U	**8.8 J**	4.5 U
Acenaphthene	µg/kg	**54**	**27 J**	**110**	**100**	**75**	**320**	8.2 U	9.1 U	**13 J**	**10 J**
Acenaphthylene	µg/kg	9.8 U	**16 J**	**42 J**	10 U	**62**	27 U	12 U	13 U	**11 J**	9.2 U
Anthracene	µg/kg	**120**	**97**	**370**	**280**	**370**	**770**	**21 J**	7.6 U	**26 J**	**20 J**
Fluorene	µg/kg	**45**	**36**	**160**	**110**	**130**	**310**	**10 J**	8.7 U	**16 J**	**9.6 J**
Naphthalene	µg/kg	5.9 U	**13 J**	**62**	**17 J**	**47 J**	**39 J**	6.9 U	7.6 U	5.4 U	5.5 U
Phenanthrene	µg/kg	**550**	**390**	**1600**	**1400**	**1700**	**3800 J**	**120**	**43 J**	**150**	**110**
Total LMW-PAHs	µg/kg	**769**	**590**	**2405**	**1919**	**2428**	**5273**	**151**	**43**	**224.8**	**149.6**

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		SD-17B	SD-17C	SD-17C	SD-17D	SD-17D	SD-17E	SD-18	SD-19	SD-19	SD-20
Sample ID:		SED-38443-100319-JPF-004	SED-38443-100419-JPF-005	SED-38443-100419-JPF-006	SED-38443-100419-JPF-007	SED-38443-100419-JPF-008	SED-38443-100419-JPF-009	SED-092418-38443-JPF-013	SED-092418-38443-JPF-011	SED-092418-38443-JPF-012	SED-092118-38443-JPF-010
Sample Date:		10/3/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	9/24/2018	9/24/2018	9/24/2018	9/21/2018
Sample Depth:		0-0.5 ft BSS	0-0.5 ft BSS	0.5-0.83 ft BSS	0-0.5 ft BSS	0.5-0.92 ft BSS	0-0.5 ft BSS	0-0.5 ft BSS	0-0.5 ft BSS	0.5-1.5 ft BSS	0-0.5 ft BSS
		Duplicate									
Parameters	**Units**										
HMW-PAHs											
Benzo(a)anthracene	µg/kg	490	290	1400	1200	1200	3200 J	120	57	120	130
Benzo(a)pyrene	µg/kg	500	290	1400	1200	1400	2800 J	130	61	130	150
Benzo(b)fluoranthene	µg/kg	750	400	1700	1600	2000	3200 J	200	86	200	210
Benzo(g,h,i)perylene	µg/kg	340	190	690	790	510	1600	100	50	99	88
Benzo(k)fluoranthene	µg/kg	160	160	790	730	810	1500	70	40 J	70	74
Chrysene	µg/kg	510	310	1300	1200	1200	3000 J	150	62	150	170
Dibenz(a,h)anthracene	µg/kg	97	16 U	240	230	160	510	20 U	22 U	26 J	23 J
Fluoranthene	µg/kg	980	600	2500	2500	2200	5800	270	110	270	290
Indeno(1,2,3-cd)pyrene	µg/kg	290	170	630	720	530	1400	86	46 J	87	83
Pyrene	µg/kg	810	500	2000	2000	1800	5300	230	100	240	240
Total HMW-PAHs	µg/kg	4927	2910	12650	12170	11810	28310	1356	612	1392	1458
Total PAHs	µg/kg	5696	3500	15055	14089	14238	33583	1507	655	1616.8	1607.6
Metals											
Aluminum	mg/kg	-	-	-	-	-	-	7400	10000	9900	12000
Antimony	mg/kg	-	-	-	-	-	-	0.43 J	0.44 J	0.45 J	0.37 J
Arsenic	mg/kg	-	-	-	-	-	-	9.2	15	14	10
Barium	mg/kg	-	-	-	-	-	-	170	200	160	140
Beryllium	mg/kg	-	-	-	-	-	-	0.44 J	0.60	0.63	0.62
Cadmium	mg/kg	-	-	-	-	-	-	0.41 J	0.45 J	0.51	0.26 J
Calcium	mg/kg	-	-	-	-	-	-	140000	110000	100000	49000
Chromium	mg/kg	-	-	-	-	-	-	15	16	19	16
Cobalt	mg/kg	-	-	-	-	-	-	6.0	7.6	8.6	6.6
Copper	mg/kg	-	-	-	-	-	-	24	27	32	18
Iron	mg/kg	-	-	-	-	-	-	14000	20000	19000	18000
Lead	mg/kg	-	-	-	-	-	-	26	27	37	17
Magnesium	mg/kg	-	-	-	-	-	-	26000	21000	20000	14000
Manganese	mg/kg	-	-	-	-	-	-	420	550	540	340
Mercury	mg/kg	-	-	-	-	-	-	0.046 U	0.062 J	0.10 J	0.049 J
Methyl mercury	µg/kg	-	-	-	-	-	-	0.20 U	0.23 U	0.26	0.48
Nickel	mg/kg	-	-	-	-	-	-	17	20	21	18
Potassium	mg/kg	-	-	-	-	-	-	1300	1800	1600	1700
Selenium	mg/kg	-	-	-	-	-	-	0.97 J	1.1 J	1.1 J	0.62 J
Silver	mg/kg	-	-	-	-	-	-	0.13 J	0.084 J	0.099 J	0.061 J
Sodium	mg/kg	-	-	-	-	-	-	190 J	180 J	160 J	140 J
Thallium	mg/kg	-	-	-	-	-	-	0.28 J	0.39 J	0.39	0.26 J
Vanadium	mg/kg	-	-	-	-	-	-	20	25	24	27
Zinc	mg/kg	-	-	-	-	-	-	84	100	120	69
SEM Metals											
Cadmium	umol/g	-	-	-	-	-	-	0.0014	0.0038 J	0.0046	0.0020 J
Copper	umol/g	-	-	-	-	-	-	0.14	0.33	0.37	0.10
Lead	umol/g	-	-	-	-	-	-	0.048	0.14	0.21	0.079
Mercury	umol/g	-	-	-	-	-	-	0.000011 U	0.000028 U	0.000020 U	0.000018 U
Nickel	umol/g	-	-	-	-	-	-	0.096	0.28	0.27	0.17
Simultaneously extracted metals (SEM)/Acid-volatile sulfide ratio (AVS)	none	-	-	-	-	-	-	0.058	0.033	0.054	0.082
Zinc	umol/g	-	-	-	-	-	-	0.39	1.2	1.3	0.48
PCBs											
Aroclor-1016 (PCB-1016)	µg/kg	-	-	-	-	-	-	64 U	69 U	49 U	49 U
Aroclor-1221 (PCB-1221)	µg/kg	-	-	-	-	-	-	70 U	76 U	53 U	54 U
Aroclor-1232 (PCB-1232)	µg/kg	-	-	-	-	-	-	67 U	73 U	51 U	52 U
Aroclor-1242 (PCB-1242)	µg/kg	-	-	-	-	-	-	55 J	60 J	77 J	43 U
Aroclor-1248 (PCB-1248)	µg/kg	-	-	-	-	-	-	70 U	76 U	53 U	54 U
Aroclor-1254 (PCB-1254)	µg/kg	-	-	-	-	-	-	67 U	73 U	51 U	52 U
Aroclor-1260 (PCB-1260)	µg/kg	-	-	-	-	-	-	64 U	69 U	49 U	49 U
Herbicides											
2,4,5-T	µg/kg	-	-	-	-	-	-	38 UJ	41 UJ	29 UJ	29 UJ
2,4,5-TP (Silvex)	µg/kg	-	-	-	-	-	-	41 U	44 U	32 U	32 U
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/kg	-	-	-	-	-	-	140 U	160 U	110 U	110 U

Table A.3

Summary of Analytical Results
Sediment Samples
South Dayton Dump and Landfill Site
Moraine, Ohio

Sample Location:		**SD-17B**	**SD-17C**	**SD-17C**	**SD-17D**	**SD-17D**	**SD-17E**	**SD-18**	**SD-19**	**SD-19**	**SD-20**
Sample ID:		**SED-38443-100319-JPF-004**	**SED-38443-100419-JPF-005**	**SED-38443-100419-JPF-006**	**SED-38443-100419-JPF-007**	**SED-38443-100419-JPF-008**	**SED-38443-100419-JPF-009**	**SED-092418-38443-JPF-013**	**SED-092418-38443-JPF-011**	**SED-092418-38443-JPF-012**	**SED-092118-38443-JPF-010**
Sample Date:		**10/3/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**10/4/2019**	**9/24/2018**	**9/24/2018**	**9/24/2018**	**9/21/2018**
Sample Depth:		**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-0.83 ft BSS**	**0-0.5 ft BSS**	**0.5-0.92 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0-0.5 ft BSS**	**0.5-1.5 ft BSS**	**0-0.5 ft BSS**
		Duplicate									
Parameters	**Units**										
Pesticides											
4,4'-DDD	µg/kg	-	-	-	-	-	-	4.3 U	4.7 U	3.3 U	16 U
4,4'-DDE	µg/kg	-	-	-	-	-	-	4.4 U	4.8 U	3.4 U	17 U
4,4'-DDT	µg/kg	-	-	-	-	-	-	3.3 U	3.6 U	2.5 U	13 U
Aldrin	µg/kg	-	-	-	-	-	-	2.2 U	2.4 U	1.7 U	8.5 U
alpha-BHC	µg/kg	-	-	-	-	-	-	2.6 U	2.9 U	2.0 U	10 U
alpha-Chlordane	µg/kg	-	-	-	-	-	-	4.4 U	4.7 U	3.3 U	17 U
beta-BHC	µg/kg	-	-	-	-	-	-	5.0 U	5.5 U	3.8 U	19 U
delta-BHC	µg/kg	-	-	-	-	-	-	240 UJ	280 UJ	200 UJ	190 UJ
Dieldrin	µg/kg	-	-	-	-	-	-	3.2 U	3.5 U	2.4 U	12 U
Endosulfan I	µg/kg	-	-	-	-	-	-	3.5 U	3.8 U	2.7 U	13 U
Endosulfan II	µg/kg	-	-	-	-	-	-	4.3 U	4.7 U	3.3 U	16 U
Endosulfan sulfate	µg/kg	-	-	-	-	-	-	190 U	200 U	140 U	14 U
Endrin	µg/kg	-	-	-	-	-	-	5.5 U	6.0 U	4.2 U	21 U
Endrin aldehyde	µg/kg	-	-	-	-	-	-	190 U	210 U	150 U	150 U
Endrin ketone	µg/kg	-	-	-	-	-	-	2.6 U	2.8 U	2.0 U	9.9 U
gamma-BHC (lindane)	µg/kg	-	-	-	-	-	-	5.2 U	5.6 U	4.0 U	20 U
gamma-Chlordane	µg/kg	-	-	-	-	-	-	3.6 U	3.9 U	2.7 U	14 U
Heptachlor	µg/kg	-	-	-	-	-	-	4.6 U	5.0 U	3.5 U	18 U
Heptachlor epoxide	µg/kg	-	-	-	-	-	-	4.2 U	4.5 U	3.2 U	16 U
Methoxychlor	µg/kg	-	-	-	-	-	-	19 U	21 U	15 U	73 UJ
Toxaphene	µg/kg	-	-	-	-	-	-	73 U	79 U	56 U	280 U
General Chemistry											
Cyanide (total)	mg/kg	-	-	-	-	-	-	0.55 U	**0.70 J**	0.41 U	0.39 U
Soot carbon	mg/kg	-	-	-	-	-	-	**7400**	**8100**	**4100**	**9500**
Sulfide	umol/g	-	-	-	-	-	-	**12 J**	**58**	**40**	**10 J**
Total organic carbon (TOC)	mg/kg	-	-	-	-	-	-	**31000**	**28000**	**21000**	**24000**

Notes:

J - Estimated concentration.
NJ - Tentatively identified compound, estimated concentration.
R - Rejected.
U - Not detected at the associated reporting limit.
UJ - Not detected; associated reporting limit is estimated.
- - Not applicable.

Criteria Notes:
AL - Aquatic life.
WB - Wildlife based.

Attachment B

Table B.1

Summary of ProUCL Input Data for Quarry Pond Surface Water Bioaccumulating to Fish
South Dayton Dump Site
Moraine, Ohio

			0	1	2	3
EU:	**Sample Location:**	**Sample Date:**	Manganese	D_Manganese	Thallium	D_Thallium
Quarry Pond	SW-1	9/18/2018	7.4	1	0.2	0
Quarry Pond	SW-1	9/18/2018	2000	1	0.2	0
Quarry Pond	SW-2	9/19/2018	5.2	1	0.2	0
Quarry Pond	SW-2	9/19/2018	1800	1	0.2	0
Quarry Pond	SW-3	9/20/2018	4.9	1	0.2	0
Quarry Pond	SW-3	9/20/2018	17	1	0.2	0
Quarry Pond	SW-4	9/19/2018	7.6	1	0.2	0
Quarry Pond	SW-5	9/19/2018	7.4	1	0.2	0
Quarry Pond	SW-6	9/19/2018	7.7	1	0.2	0
Quarry Pond	SW-7	9/20/2018	5.2	1	0.2	0
Quarry Pond	SW-7	9/20/2018	18	1	0.2	0
Quarry Pond	SW-8	9/19/2018	4.4	1	0.2	0
Quarry Pond	SW-8	9/19/2018	16	1	0.2	0
Quarry Pond	SW-9	9/19/2018	5.5	1	0.2	0
Quarry Pond	SW-10	9/18/2018	7.6	1	0.2	0
Quarry Pond	SW-1	10/2/2019	4.1	1	0.55	1
Quarry Pond	SW-1	10/2/2019	50	1	0.23	1
Quarry Pond	SW-2	10/2/2019	3.6	1	0.2	0
Quarry Pond	SW-2	10/2/2019	3000	1	0.2	0
Quarry Pond	SW-3	10/2/2019	4.4	1	0.2	0
Quarry Pond	SW-3	10/2/2019	20	1	0.2	0
Quarry Pond	SW-4	10/3/2019	4.9	1	0.2	0
Quarry Pond	SW-5	10/3/2019	5.8	1	0.2	0
Quarry Pond	SW-6	10/3/2019	3.7	1	0.82	0
Quarry Pond	SW-7	10/3/2019	6.8	1	0.2	0
Quarry Pond	SW-7	10/3/2019	36	1	0.2	0
Quarry Pond	SW-8	10/3/2019	3.7	1	0.82	0
Quarry Pond	SW-8	10/3/2019	7.8	1	0.2	0
Quarry Pond	SW-9	10/2/2019	3.9	1	0.2	0
Quarry Pond	SW-10	10/2/2019	5.3	1	0.2	0
Quarry Pond	SW-11	10/3/2019	5	1	0.2	0
Quarry Pond	SW-12	10/3/2019	5.4	1	0.2	0

Table B.2

Summary of ProUCL Output for Quarry Pond Surface Water Bioaccumulating to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.112/16/2019 11:28:04 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Manganese

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
		Number of Missing Observations	0
Minimum	3.6	Mean	221.4
Maximum	3000	Median	6.3
SD	688.1	Std. Error of Mean	121.6
Coefficient of Variation	3.108	Skewness	3.246

Normal GOF Test

Shapiro Wilk Test Statistic	0.36	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.505	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	427.6	95% Adjusted-CLT UCL (Chen-1995)	496
		95% Modified-t UCL (Johnson-1978)	439.3

Gamma GOF Test

A-D Test Statistic	7.859	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.881	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.415	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.171	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.247	k star (bias corrected MLE)	0.245
Theta hat (MLE)	895.5	Theta star (bias corrected MLE)	904
nu hat (MLE)	15.82	nu star (bias corrected)	15.67
MLE Mean (bias corrected)	221.4	MLE Sd (bias corrected)	447.4
		Approximate Chi Square Value (0.05)	7.732
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	7.433

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	448.8	95% Adjusted Gamma UCL (use when n<50)	466.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.626	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.32	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.281	Mean of logged Data	2.522
Maximum of Logged Data	8.006	SD of logged Data	1.814

Assuming Lognormal Distribution

95% H-UCL	205.2	90% Chebyshev (MVUE) UCL	130.6
95% Chebyshev (MVUE) UCL	163.8	97.5% Chebyshev (MVUE) UCL	209.9
99% Chebyshev (MVUE) UCL	300.5		

Table B.2

Summary of ProUCL Output for Quarry Pond Surface Water Bioaccumulating to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.112/16/2019 11:28:04 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Manganese (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	421.5	95% Jackknife UCL	427.6
95% Standard Bootstrap UCL	420.8	95% Bootstrap-t UCL	563.2
95% Hall's Bootstrap UCL	364.9	95% Percentile Bootstrap UCL	431.6
95% BCA Bootstrap UCL	518		
90% Chebyshev(Mean, Sd) UCL	586.3	95% Chebyshev(Mean, Sd) UCL	751.6
97.5% Chebyshev(Mean, Sd) UCL	981	99% Chebyshev(Mean, Sd) UCL	1432

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	751.6

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

Table B.2

Summary of ProUCL Output for Quarry Pond Surface Water Bioaccumulating to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.112/16/2019 11:28:04 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Thallium

General Statistics

Total Number of Observations	32	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	30
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.23	Minimum Non-Detect	0.2
Maximum Detect	0.55	Maximum Non-Detect	0.82
Variance Detects	0.0512	Percent Non-Detects	93.75%
Mean Detects	0.39	SD Detects	0.226
Median Detects	0.39	CV Detects	0.58
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.034	SD of Logged Detects	0.616

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

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

KM Mean	0.213	KM Standard Error of Mean	0.0162
KM SD	0.0629	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.24	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.239	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.261	95% KM Chebyshev UCL	0.283
97.5% KM Chebyshev UCL	0.314	99% KM Chebyshev UCL	0.374

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	5.587	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0698	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	22.35	nu star (bias corrected)	N/A
Mean (detects)	0.39		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.213	SD (KM)	0.0629
Variance (KM)	0.00395	SE of Mean (KM)	0.0162
k hat (KM)	11.44	k star (KM)	10.39
nu hat (KM)	732.3	nu star (KM)	664.9
theta hat (KM)	0.0186	theta star (KM)	0.0205
80% gamma percentile (KM)	0.265	90% gamma percentile (KM)	0.3
95% gamma percentile (KM)	0.332	99% gamma percentile (KM)	0.395

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0416
Approximate Chi Square Value (664.94, α)	606.1	Adjusted Chi Square Value (664.94, β)	603.1
95% Gamma Approximate KM-UCL (use when n>=50)	0.233	95% Gamma Adjusted KM-UCL (use when n<50)	0.234

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0319	Mean in Log Scale	-6.255
SD in Original Scale	0.103	SD in Log Scale	2.583
95% t UCL (assumes normality of ROS data)	0.063	95% Percentile Bootstrap UCL	0.0636
95% BCA Bootstrap UCL	0.0838	95% Bootstrap t UCL	0.231
95% H-UCL (Log ROS)	0.487		

Table B.2

Summary of ProUCL Output for Quarry Pond Surface Water Bioaccumulating to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.112/16/2019 11:28:04 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Thallium (cont.'d)

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.571	KM Geo Mean	0.208
KM SD (logged)	0.182	95% Critical H Value (KM-Log)	1.736
KM Standard Error of Mean (logged)	0.0471	95% H-UCL (KM -Log)	0.224
KM SD (logged)	0.182	95% Critical H Value (KM-Log)	1.736
KM Standard Error of Mean (logged)	0.0471		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.138	Mean in Log Scale	-2.135
SD in Original Scale	0.109	SD in Log Scale	0.464
95% t UCL (Assumes normality)	0.17	95% H-Stat UCL	0.154

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

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.283

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

Table B.3

Summary of ProUCL Input Data for Quarry Pond Sediment Bioaccumalation to Fish
South Dayton Dump Site
Moraine, Ohio

				0	1	2	3	4	5	6	7	8	9	10	11
OU Designation:	**Sample Location:**	**Sample Date:**	**Sample Depth:**	**Acenaphthene**	**D_Acenaphthene**	**Acenaphthylene**	**D_Acenaphthylene**	**Anthracene**	**D_Anthracene**	**Benzo(a)anthracene**	**D_Benzo(a)anthracene**	**Benzo(a)pyrene**	**D_Benzo(a)pyrene**	**Benzo(b)fluoranthene**	**D_Benzo(b)fluoranthene**
Quarry Pond	SD-01	9/25/2018	0-0.5 ft BGS	7.8	0	11	0	24	1	150	1	160	1	220	1
Quarry Pond	SD-02	9/21/2018	0-0.5 ft BGS	4.8	1	5.5	0	6.5	1	41	1	44	1	79	1
Quarry Pond	SD-03	9/21/2018	0-0.5 ft BGS	16	0	23	0	28	1	180	1	230	1	290	1
Quarry Pond	SD-04	9/21/2018	0-0.5 ft BGS	15	1	17	1	49	1	310	1	360	1	490	1
Quarry Pond	SD-04	9/21/2018	0.5-1.5 ft BGS	80	1	88	1	290	1	1200	1	1200	1	1700	1
Quarry Pond	SD-05	9/20/2018	0-0.5 ft BGS	13	1	20	1	46	1	300	1	310	1	450	1
Quarry Pond	SD-05	9/21/2018	0.5-1.5 ft BGS	160	1	120	1	390	1	1800	1	1700	1	2400	1
Quarry Pond	SD-06	9/21/2018	0-0.5 ft BGS	11	0	15	0	13	1	77	1	97	1	130	1
Quarry Pond	SD-06	9/25/2018	0.5-1.5 ft BGS	9.7	1	11	1	22	1	110	1	140	1	160	1
Quarry Pond	SD-07	9/25/2018	0-0.5 ft BGS	5.5	0	7.7	0	7	1	52	1	68	1	99	1
Quarry Pond	SD-08	9/25/2018	0-0.5 ft BGS	14	1	13	0	35	1	180	1	220	1	310	1
Quarry Pond	SD-08	9/25/2018	0.5-1.5 ft BGS	14	1	14	1	31	1	170	1	200	1	290	1
Quarry Pond	SD-10	9/25/2018	0-0.5 ft BGS	12	0	16	0	15	1	79	1	110	1	170	1
Quarry Pond	SD-11	9/25/2018	0-0.5 ft BGS	8.1	0	11	0	12	1	76	1	99	1	150	1
Quarry Pond	SD-11	9/25/2018	0.5-1.5 ft BGS	6.5	0	9.2	0	5.5	0	31	1	38	1	50	1
Quarry Pond	SD-12	9/26/2018	0-0.5 ft BGS	8.2	0	11	0	13	1	72	1	89	1	110	1
Quarry Pond	SD-13	9/25/2018	0-0.5 ft BGS	36	1	13	0	86	1	450	1	530	1	750	1
Quarry Pond	SD-13	9/25/2018	0.5-1.5 ft BGS	31	1	12	1	64	1	250	1	280	1	390	1
Quarry Pond	SD-14	9/26/2018	0-0.5 ft BGS	10	0	14	0	13	1	91	1	110	1	180	1
Quarry Pond	SD-14	9/26/2018	0.5-1.5 ft BGS	19	1	13	1	39	1	190	1	190	1	310	1
Quarry Pond	SD-15	9/26/2018	0-0.5 ft BGS	9.2	0	13	0	17	1	110	1	120	1	160	1
Quarry Pond	SD-16	9/26/2018	0-0.5 ft BGS	3.5	0	5	0	11	1	44	1	49	1	67	1
Quarry Pond	SD-17	9/21/2018	0-0.5 ft BGS	2900	1	260	0	7800	1	26000	1	22000	1	33000	1
Quarry Pond	SD-18	9/24/2018	0-0.5 ft BGS	8.2	0	12	0	21	1	120	1	130	1	200	1
Quarry Pond	SD-19	9/24/2018	0-0.5 ft BGS	9.1	0	13	0	7.6	0	57	1	61	1	86	1
Quarry Pond	SD-19	9/24/2018	0.5-1.5 ft BGS	13	1	11	1	26	1	120	1	130	1	200	1
Quarry Pond	SD-20	9/21/2018	0-0.5 ft BGS	10	1	9.2	0	20	1	130	1	150	1	210	1
Quarry Pond	SD-05A	10/4/2019	0-0.5 ft BSS	5.7	0	8	0	16	1	74	1	96	1	130	1
Quarry Pond	SD-05B	10/4/2019	0-0.5 ft BSS	5.8	0	8.1	0	6.8	1	46	1	54	1	67	1
Quarry Pond	SD-17A	10/3/2019	0-0.5 ft BSS	57	1	46	1	220	1	910	1	1000	1	1300	1
Quarry Pond	SD-17A	10/3/2019	0.5-1.3 ft BSS	110	1	43	1	350	1	1400	1	1400	1	1800	1
Quarry Pond	SD-17B	10/3/2019	0-0.5 ft BSS	55.5	1	9.9	0	135	1	620	1	605	1	865	1
Quarry Pond	SD-17C	10/4/2019	0-0.5 ft BSS	27	1	16	1	97	1	290	1	290	1	400	1
Quarry Pond	SD-17C	10/4/2019	0.5-0.85 ft BSS	110	1	42	1	370	1	1400	1	1400	1	1700	1
Quarry Pond	SD-17D	10/4/2019	0-0.5 ft BSS	100	1	10	0	280	1	1200	1	1200	1	1600	1
Quarry Pond	SD-17D	10/4/2019	0.5-0.92 ft BSS	75	1	62	1	370	1	1200	1	1400	1	2000	1
Quarry Pond	SD-17E	10/4/2019	0-0.5 ft BSS	320	1	27	0	770	1	3200	1	2800	1	3200	1

Table B.3

Summary of ProUCL Input Data for Quarry Pond Sediment Bioaccumalation to Fish
South Dayton Dump Site
Moraine, Ohio

			12	13	14	15	16	17	18	19	20	21	22	23
Sample Location:	**Sample Date:**	**Sample Depth:**	**Benzo(g,h,i)perylene**	**D_Benzo(g,h,i)perylene**	**Benzo(k)fluoranthene**	**D_Benzo(k)fluoranthene**	**Chrysene**	**D_Chrysene**	**Dibenz(a,h)anthracene**	**D_Dibenz(a,h)anthracene**	**Fluoranthene**	**D_Fluoranthene**	**Fluorene**	**D_Fluorene**
SD-01	9/25/2018	0-0.5 ft BGS	95	1	98	1	160	1	25	1	300	1	7.4	0
SD-02	9/21/2018	0-0.5 ft BGS	36	1	19	1	54	1	9.4	0	92	1	5.1	1
SD-03	9/21/2018	0-0.5 ft BGS	140	1	100	1	220	1	40	0	380	1	16	0
SD-04	9/21/2018	0-0.5 ft BGS	220	1	180	1	370	1	52	1	610	1	19	1
SD-04	9/21/2018	0.5-1.5 ft BGS	730	1	470	1	1300	1	220	1	2900	1	99	1
SD-05	9/20/2018	0-0.5 ft BGS	180	1	140	1	330	1	42	1	570	1	16	1
SD-05	9/21/2018	0.5-1.5 ft BGS	1100	1	950	1	1800	1	260	1	4600	1	220	1
SD-06	9/21/2018	0-0.5 ft BGS	83	1	48	1	94	1	26	0	160	1	10	0
SD-06	9/25/2018	0.5-1.5 ft BGS	85	1	69	1	130	1	20	1	280	1	11	1
SD-07	9/25/2018	0-0.5 ft BGS	42	1	36	1	68	1	13	0	110	1	5.2	0
SD-08	9/25/2018	0-0.5 ft BGS	100	1	120	1	210	1	29	1	420	1	15	1
SD-08	9/25/2018	0.5-1.5 ft BGS	80	1	98	1	190	1	24	1	380	1	15	1
SD-10	9/25/2018	0-0.5 ft BGS	76	1	66	1	100	1	28	0	210	1	11	0
SD-11	9/25/2018	0-0.5 ft BGS	67	1	50	1	93	1	20	0	170	1	7.7	0
SD-11	9/25/2018	0.5-1.5 ft BGS	20	1	23	1	38	1	16	0	78	1	6.3	0
SD-12	9/26/2018	0-0.5 ft BGS	59	1	42	1	82	1	20	0	150	1	7.8	0
SD-13	9/25/2018	0-0.5 ft BGS	180	1	230	1	550	1	71	1	980	1	37	1
SD-13	9/25/2018	0.5-1.5 ft BGS	150	1	150	1	290	1	42	1	610	1	35	1
SD-14	9/26/2018	0-0.5 ft BGS	41	1	64	1	110	1	25	0	190	1	9.8	0
SD-14	9/26/2018	0.5-1.5 ft BGS	150	1	100	1	230	1	38	1	450	1	23	1
SD-15	9/26/2018	0-0.5 ft BGS	110	1	87	1	140	1	22	0	220	1	11	1
SD-16	9/26/2018	0-0.5 ft BGS	30	1	27	1	54	1	8.6	0	100	1	5.1	1
SD-17	9/21/2018	0-0.5 ft BGS	11000	1	9300	1	29000	1	3700	1	59000	1	3000	1
SD-18	9/24/2018	0-0.5 ft BGS	100	1	70	1	150	1	20	0	270	1	10	1
SD-19	9/24/2018	0-0.5 ft BGS	50	1	40	1	62	1	22	0	110	1	8.7	0
SD-19	9/24/2018	0.5-1.5 ft BGS	99	1	70	1	150	1	26	1	270	1	16	1
SD-20	9/21/2018	0-0.5 ft BGS	88	1	74	1	170	1	23	1	290	1	9.6	1
SD-05A	10/4/2019	0-0.5 ft BSS	58	1	46	1	85	1	14	0	160	1	6.8	1
SD-05B	10/4/2019	0-0.5 ft BSS	41	1	26	1	47	1	14	0	68	1	5.5	0
SD-17A	10/3/2019	0-0.5 ft BSS	380	1	610	1	970	1	100	1	1600	1	76	1
SD-17A	10/3/2019	0.5-1.3 ft BSS	780	1	730	1	1700	1	240	1	2900	1	100	1
SD-17B	10/3/2019	0-0.5 ft BSS	375	1	220	1	640	1	123.5	1	1140	1	53	1
SD-17C	10/4/2019	0-0.5 ft BSS	190	1	160	1	310	1	16	0	600	1	36	1
SD-17C	10/4/2019	0.5-0.85 ft BSS	690	1	790	1	1300	1	240	1	2500	1	160	1
SD-17D	10/4/2019	0-0.5 ft BSS	790	1	730	1	1200	1	230	1	2500	1	110	1
SD-17D	10/4/2019	0.5-0.92 ft BSS	510	1	810	1	1200	1	160	1	2200	1	130	1
SD-17E	10/4/2019	0-0.5 ft BSS	1600	1	1500	1	3000	1	510	1	5800	1	310	1

Table B.3

Summary of ProUCL Input Data for Quarry Pond Sediment Bioaccumalation to Fish
South Dayton Dump Site
Moraine, Ohio

			24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Sample Location:	**Sample Date:**	**Sample Depth:**	**Indeno(1,2,3-cd)pyrene**	**D_Indeno(1,2,3-cd)pyrene**	**Phenanthrene**	**D_Phenanthrene**	**Pyrene**	**D_Pyrene**	**Arsenic**	**D_Arsenic**	**Cadmium**	**D_Cadmium**	**Chromium**	**D_Chromium**	**Copper**	**D_Copper**	**Lead**	**D_Lead**
SD-01	9/25/2018	0-0.5 ft BGS	79	1	110	1	240	1	8.7	1	0.35	1	16	1	23	1	140	1
SD-02	9/21/2018	0-0.5 ft BGS	31	1	48	1	76	1	3.1	1	0.12	1	6	1	5.5	1	8.6	1
SD-03	9/21/2018	0-0.5 ft BGS	140	1	120	1	330	1	11	1	0.36	1	13	1	23	1	25	1
SD-04	9/21/2018	0-0.5 ft BGS	220	1	200	1	540	1	11	1	0.26	1	11	1	17	1	18	1
SD-04	9/21/2018	0.5-1.5 ft BGS	650	1	1100	1	2100	1	11	1	0.49	1	14	1	26	1	65	1
SD-05	9/20/2018	0-0.5 ft BGS	170	1	180	1	500	1	8.4	1	0.21	1	10	1	12	1	16	1
SD-05	9/21/2018	0.5-1.5 ft BGS	910	1	1800	1	3400	1	7.9	1	0.46	1	11	1	20	1	52	1
SD-06	9/21/2018	0-0.5 ft BGS	66	1	53	1	150	1	20	1	0.52	1	19	1	29	1	41	1
SD-06	9/25/2018	0.5-1.5 ft BGS	76	1	110	1	210	1	13	1	0.86	1	20	1	39	1	94	1
SD-07	9/25/2018	0-0.5 ft BGS	32	1	38	1	96	1	7.6	1	0.13	1	9.5	1	7.6	1	7.2	1
SD-08	9/25/2018	0-0.5 ft BGS	95	1	160	1	330	1	14	1	0.45	1	15	1	29	1	36	1
SD-08	9/25/2018	0.5-1.5 ft BGS	76	1	110	1	320	1	12	1	0.43	1	17	1	28	1	38	1
SD-10	9/25/2018	0-0.5 ft BGS	73	1	71	1	170	1	24	1	0.61	1	20	1	34	1	40	1
SD-11	9/25/2018	0-0.5 ft BGS	59	1	57	1	130	1	14	1	0.38	1	13	1	24	1	21	1
SD-11	9/25/2018	0.5-1.5 ft BGS	20	1	27	1	57	1	23	1	0.54	1	19	1	37	1	37	1
SD-12	9/26/2018	0-0.5 ft BGS	47	1	58	1	130	1	6.8	1	0.24	1	8.3	1	14	1	15	1
SD-13	9/25/2018	0-0.5 ft BGS	200	1	400	1	800	1	15	1	0.58	1	17	1	34	1	48	1
SD-13	9/25/2018	0.5-1.5 ft BGS	130	1	270	1	470	1	11	1	0.5	1	15	1	31	1	49	1
SD-14	9/26/2018	0-0.5 ft BGS	45	1	67	1	160	1	12	1	0.5	1	14	1	24	1	25	1
SD-14	9/26/2018	0.5-1.5 ft BGS	130	1	240	1	360	1	12	1	0.64	1	19	1	30	1	37	1
SD-15	9/26/2018	0-0.5 ft BGS	88	1	79	1	200	1	13	1	0.34	1	12	1	19	1	20	1
SD-16	9/26/2018	0-0.5 ft BGS	29	1	51	1	76	1	6.4	1	0.059	1	3.7	1	2.9	1	3.2	1
SD-17	9/21/2018	0-0.5 ft BGS	11000	1	37000	1	41000	1	7.9	1	0.37	1	12	1	19	1	35	1
SD-18	9/24/2018	0-0.5 ft BGS	86	1	120	1	230	1	9.2	1	0.41	1	15	1	24	1	26	1
SD-19	9/24/2018	0-0.5 ft BGS	46	1	43	1	100	1	15	1	0.45	1	16	1	27	1	27	1
SD-19	9/24/2018	0.5-1.5 ft BGS	87	1	150	1	240	1	14	1	0.51	1	19	1	32	1	37	1
SD-20	9/21/2018	0-0.5 ft BGS	83	1	110	1	240	1	10	1	0.26	1	16	1	18	1	17	1
SD-05A	10/4/2019	0-0.5 ft BSS	58	1	63	1	130	1										
SD-05B	10/4/2019	0-0.5 ft BSS	15	0	35	1	73	1										
SD-17A	10/3/2019	0-0.5 ft BSS	390	1	910	1	1500	1										
SD-17A	10/3/2019	0.5-1.3 ft BSS	710	1	1400	1	2400	1										
SD-17B	10/3/2019	0-0.5 ft BSS	330	1	635	1	1005	1										
SD-17C	10/4/2019	0-0.5 ft BSS	170	1	390	1	500	1										
SD-17C	10/4/2019	0.5-0.85 ft BSS	630	1	1600	1	2000	1										
SD-17D	10/4/2019	0-0.5 ft BSS	720	1	1400	1	2000	1										
SD-17D	10/4/2019	0.5-0.92 ft BSS	530	1	1700	1	1800	1										
SD-17E	10/4/2019	0-0.5 ft BSS	1400	1	3800	1	5300	1										

Table B.3

Summary of ProUCL Input Data for Quarry Pond Sediment Bioaccumalation to Fish
South Dayton Dump Site
Moraine, Ohio

			40	41	42	43	44	45	46	47	48	49	50	51	52	53
Sample Location:	**Sample Date:**	**Sample Depth:**	**Mercury**	**D_Mercury**	**Methyl mercury**	**D_Methyl mercury**	**Nickel**	**D_Nickel**	**Selenium**	**D_Selenium**	**Silver**	**D_Silver**	**Zinc**	**D_Zinc**	**Aroclor-1242 (PCB-1242)**	**D_Aroclor-1242 (PCB-1242)**
SD-01	9/25/2018	0-0.5 ft BGS	0.051	1	0.00065	1	14	1	0.89	1	0.08	1	76	1	49	0
SD-02	9/21/2018	0-0.5 ft BGS	0.023	0	0.000097	0	6	1	0.14	1	0.025	0	29	1	26	0
SD-03	9/21/2018	0-0.5 ft BGS	0.1	0	0.00042	0	15	1	1.8	1	0.12	0	86	1	100	0
SD-04	9/21/2018	0-0.5 ft BGS	0.059	1	0.00026	1	14	1	0.61	1	0.049	1	65	1	51	0
SD-04	9/21/2018	0.5-1.5 ft BGS	0.17	1	0.00014	1	17	1	0.77	1	0.086	1	110	1	36	0
SD-05	9/20/2018	0-0.5 ft BGS	0.057	1	0.00026	1	12	1	0.4	1	0.054	0	52	1	52	0
SD-05	9/21/2018	0.5-1.5 ft BGS	0.097	1	0.00031	1	13	1	0.47	1	0.061	1	71	1	29	0
SD-06	9/21/2018	0-0.5 ft BGS	0.089	1	0.00027	1	21	1	1.2	1	0.12	1	150	1	68	0
SD-06	9/25/2018	0.5-1.5 ft BGS	0.1	1	0.00024	1	20	1	1.1	1	0.1	1	390	1	88	1
SD-07	9/25/2018	0-0.5 ft BGS	0.034	0	0.00014	0	8.1	1	0.31	1	0.35	1	28	1	43	1
SD-08	9/25/2018	0-0.5 ft BGS	0.081	1	0.00021	0	18	1	0.95	1	0.11	1	100	1	60	1
SD-08	9/25/2018	0.5-1.5 ft BGS	0.072	1	0.00014	0	20	1	0.73	1	0.079	1	96	1	37	0
SD-10	9/25/2018	0-0.5 ft BGS	0.063	0	0.00033	1	25	1	1.6	1	0.12	1	160	1	76	0
SD-11	9/25/2018	0-0.5 ft BGS	0.056	0	0.0002	0	18	1	0.76	1	0.071	1	89	1	61	1
SD-11	9/25/2018	0.5-1.5 ft BGS	0.1	1	0.00016	0	26	1	1	1	0.11	1	130	1	83	1
SD-12	9/26/2018	0-0.5 ft BGS	0.061	1	0.0002	0	11	1	0.73	1	0.055	0	54	1	54	0
SD-13	9/25/2018	0-0.5 ft BGS	0.11	1	0.00022	0	21	1	1.1	1	0.11	1	150	1	130	1
SD-13	9/25/2018	0.5-1.5 ft BGS	0.092	1	0.00046	1	19	1	0.71	1	0.078	1	120	1	71	1
SD-14	9/26/2018	0-0.5 ft BGS	0.1	1	0.00069	1	17	1	1.2	1	0.13	1	90	1	67	0
SD-14	9/26/2018	0.5-1.5 ft BGS	0.11	1	0.00051	1	19	1	1.2	1	0.22	1	110	1	46	0
SD-15	9/26/2018	0-0.5 ft BGS	0.07	1	0.00055	1	16	1	0.82	1	0.068	1	77	1	61	0
SD-16	9/26/2018	0-0.5 ft BGS	0.021	0	0.000087	0	4.1	1	0.12	0	0.022	0	13	1	23	0
SD-17	9/21/2018	0-0.5 ft BGS	0.068	1	0.00061	1	11	1	0.28	1	0.055	1	62	1	30	0
SD-18	9/24/2018	0-0.5 ft BGS	0.046	0	0.0002	0	17	1	0.97	1	0.13	1	84	1	55	1
SD-19	9/24/2018	0-0.5 ft BGS	0.062	1	0.00023	0	20	1	1.1	1	0.084	1	100	1	60	1
SD-19	9/24/2018	0.5-1.5 ft BGS	0.1	1	0.00026	1	21	1	1.1	1	0.099	1	120	1	77	1
SD-20	9/21/2018	0-0.5 ft BGS	0.049	1	0.00048	1	18	1	0.62	1	0.061	1	69	1	43	0
SD-05A	10/4/2019	0-0.5 ft BSS														
SD-05B	10/4/2019	0-0.5 ft BSS														
SD-17A	10/3/2019	0-0.5 ft BSS														
SD-17A	10/3/2019	0.5-1.3 ft BSS														
SD-17B	10/3/2019	0-0.5 ft BSS														
SD-17C	10/4/2019	0-0.5 ft BSS														
SD-17C	10/4/2019	0.5-0.85 ft BSS														
SD-17D	10/4/2019	0-0.5 ft BSS														
SD-17D	10/4/2019	0.5-0.92 ft BSS														
SD-17E	10/4/2019	0-0.5 ft BSS														

Table B.3

Summary of ProUCL Input Data for Quarry Pond Sediment Bioaccumalation to Fish
South Dayton Dump Site
Moraine, Ohio

			54	55	56	57	58	59
Sample Location:	**Sample Date:**	**Sample Depth:**	**Aroclor-1254 (PCB-1254)**	**D_Aroclor-1254 (PCB-1254)**	**alpha-Chlordane**	**D_alpha-Chlordane**	**gamma-Chlordane**	**D_gamma-Chlordane**
SD-01	9/25/2018	0-0.5 ft BGS	60	0	3.9	0	3.2	0
SD-02	9/21/2018	0-0.5 ft BGS	31	0	2	0	1.7	0
SD-03	9/21/2018	0-0.5 ft BGS	130	0	8.7	0	7.2	0
SD-04	9/21/2018	0-0.5 ft BGS	61	0	3.9	0	3.2	0
SD-04	9/21/2018	0.5-1.5 ft BGS	43	0	2.9	0	2.4	0
SD-05	9/20/2018	0-0.5 ft BGS	63	0	4.1	0	3.4	0
SD-05	9/21/2018	0.5-1.5 ft BGS	75	1	5.5	1	4.7	1
SD-06	9/21/2018	0-0.5 ft BGS	83	0	28	0	23	0
SD-06	9/25/2018	0.5-1.5 ft BGS	69	1	2.9	0	3.5	1
SD-07	9/25/2018	0-0.5 ft BGS	43	0	2.8	0	2.3	0
SD-08	9/25/2018	0-0.5 ft BGS	72	0	4.7	0	3.9	0
SD-08	9/25/2018	0.5-1.5 ft BGS	44	0	2.9	0	2.4	0
SD-10	9/25/2018	0-0.5 ft BGS	92	0	6	0	4.9	0
SD-11	9/25/2018	0-0.5 ft BGS	65	0	4.3	0	3.5	0
SD-11	9/25/2018	0.5-1.5 ft BGS	52	0	3.4	0	2.8	0
SD-12	9/26/2018	0-0.5 ft BGS	65	0	4.2	0	3.5	0
SD-13	9/25/2018	0-0.5 ft BGS	74	0	4.8	0	3.9	0
SD-13	9/25/2018	0.5-1.5 ft BGS	36	0	2.3	0	2.3	1
SD-14	9/26/2018	0-0.5 ft BGS	81	0	5.3	0	12	1
SD-14	9/26/2018	0.5-1.5 ft BGS	78	1	3.6	0	3	0
SD-15	9/26/2018	0-0.5 ft BGS	74	0	4.8	0	4.5	1
SD-16	9/26/2018	0-0.5 ft BGS	28	0	1.8	0	1.5	0
SD-17	9/21/2018	0-0.5 ft BGS	420	1	48	0	40	0
SD-18	9/24/2018	0-0.5 ft BGS	67	0	4.4	0	3.6	0
SD-19	9/24/2018	0-0.5 ft BGS	73	0	4.7	0	3.9	0
SD-19	9/24/2018	0.5-1.5 ft BGS	51	0	3.3	0	2.7	0
SD-20	9/21/2018	0-0.5 ft BGS	52	0	17	0	14	0
SD-05A	10/4/2019	0-0.5 ft BSS						
SD-05B	10/4/2019	0-0.5 ft BSS						
SD-17A	10/3/2019	0-0.5 ft BSS						
SD-17A	10/3/2019	0.5-1.3 ft BSS						
SD-17B	10/3/2019	0-0.5 ft BSS						
SD-17C	10/4/2019	0-0.5 ft BSS						
SD-17C	10/4/2019	0.5-0.85 ft BSS						
SD-17D	10/4/2019	0-0.5 ft BSS						
SD-17D	10/4/2019	0.5-0.92 ft BSS						
SD-17E	10/4/2019	0-0.5 ft BSS						

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	32
Number of Detects	22	Number of Non-Detects	15
Number of Distinct Detects	19	Number of Distinct Non-Detects	14
Minimum Detect	4.8	Minimum Non-Detect	3.5
Maximum Detect	2900	Maximum Non-Detect	16
Variance Detects	371579	Percent Non-Detects	40.54%
Mean Detects	189.7	SD Detects	609.6
Median Detects	33.5	CV Detects	3.213
Skewness Detects	4.588	Kurtosis Detects	21.3
Mean of Logged Detects	3.732	SD of Logged Detects	1.438

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.301	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.429	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	114.6	KM Standard Error of Mean	78.78
KM SD	468.2	95% KM (BCA) UCL	269.7
95% KM (t) UCL	247.6	95% KM (Percentile Bootstrap) UCL	264
95% KM (z) UCL	244.2	95% KM Bootstrap t UCL	1246
90% KM Chebyshev UCL	350.9	95% KM Chebyshev UCL	458
97.5% KM Chebyshev UCL	606.6	99% KM Chebyshev UCL	898.4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.509	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.819	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.286	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.198	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.43	k star (bias corrected MLE)	0.401
Theta hat (MLE)	441.5	Theta star (bias corrected MLE)	472.6
nu hat (MLE)	18.91	nu star (bias corrected)	17.66
Mean (detects)	189.7		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	112.8
Maximum	2900	Median	13
SD	475	CV	4.211
k hat (MLE)	0.172	k star (bias corrected MLE)	0.176
Theta hat (MLE)	655.3	Theta star (bias corrected MLE)	640.2
nu hat (MLE)	12.74	nu star (bias corrected)	13.04
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (13.04, α)	5.92	Adjusted Chi Square Value (13.04, β)	5.712
95% Gamma Approximate UCL (use when n>=50)	248.5	95% Gamma Adjusted UCL (use when n<50)	257.6

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthene (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	114.6	SD (KM)	468.2
Variance (KM)	219174	SE of Mean (KM)	78.78
k hat (KM)	0.0599	k star (KM)	0.0731
nu hat (KM)	4.435	nu star (KM)	5.408
theta hat (KM)	1912	theta star (KM)	1568
80% gamma percentile (KM)	45.24	90% gamma percentile (KM)	255.5
95% gamma percentile (KM)	662.3	99% gamma percentile (KM)	2117

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.41, α)	1.345	Adjusted Chi Square Value (5.41, β)	1.261
95% Gamma Approximate KM-UCL (use when n>=50)	460.7	95% Gamma Adjusted KM-UCL (use when n<50)	491.7

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	113.6	Mean in Log Scale	2.448
SD in Original Scale	474.9	SD in Log Scale	1.937
95% t UCL (assumes normality of ROS data)	245.4	95% Percentile Bootstrap UCL	267.6
95% BCA Bootstrap UCL	357.6	95% Bootstrap t UCL	1227
95% H-UCL (Log ROS)	244.6		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.805	KM Geo Mean	16.52
KM SD (logged)	1.569	95% Critical H Value (KM-Log)	3.113
KM Standard Error of Mean (logged)	0.269	95% H-UCL (KM -Log)	127.7
KM SD (logged)	1.569	95% Critical H Value (KM-Log)	3.113
KM Standard Error of Mean (logged)	0.269		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	114.5	Mean in Log Scale	2.778
SD in Original Scale	474.6	SD in Log Scale	1.623
95% t UCL (Assumes normality)	246.3	95% H-Stat UCL	142

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	127.7

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthylene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	25
Number of Detects	14	Number of Non-Detects	23
Number of Distinct Detects	13	Number of Distinct Non-Detects	17
Minimum Detect	11	Minimum Non-Detect	5
Maximum Detect	120	Maximum Non-Detect	260
Variance Detects	1113	Percent Non-Detects	62.16%
Mean Detects	36.79	SD Detects	33.36
Median Detects	18.5	CV Detects	0.907
Skewness Detects	1.526	Kurtosis Detects	1.841
Mean of Logged Detects	3.272	SD of Logged Detects	0.823

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.785	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	17.84	KM Standard Error of Mean	4.367
KM SD	25.17	95% KM (BCA) UCL	27.03
95% KM (t) UCL	25.21	95% KM (Percentile Bootstrap) UCL	25.07
95% KM (z) UCL	25.02	95% KM Bootstrap t UCL	30.08
90% KM Chebyshev UCL	30.94	95% KM Chebyshev UCL	36.88
97.5% KM Chebyshev UCL	45.11	99% KM Chebyshev UCL	61.29

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.818	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.749	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.232	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.647	k star (bias corrected MLE)	1.342
Theta hat (MLE)	22.33	Theta star (bias corrected MLE)	27.41
nu hat (MLE)	46.12	nu star (bias corrected)	37.57
Mean (detects)	36.79		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	13.93
Maximum	120	Median	0.01
SD	27	CV	1.939
k hat (MLE)	0.176	k star (bias corrected MLE)	0.18
Theta hat (MLE)	79.02	Theta star (bias corrected MLE)	77.38
nu hat (MLE)	13.04	nu star (bias corrected)	13.32
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (13.32, α)	6.106	Adjusted Chi Square Value (13.32, β)	5.894
95% Gamma Approximate UCL (use when n>=50)	30.37	95% Gamma Adjusted UCL (use when n<50)	31.46

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthylene (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	17.84	SD (KM)	25.17
Variance (KM)	633.7	SE of Mean (KM)	4.367
k hat (KM)	0.502	k star (KM)	0.48
nu hat (KM)	37.17	nu star (KM)	35.49
theta hat (KM)	35.52	theta star (KM)	37.2
80% gamma percentile (KM)	29.24	90% gamma percentile (KM)	48.68
95% gamma percentile (KM)	69.56	99% gamma percentile (KM)	121.1

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (35.49, α)	22.86	Adjusted Chi Square Value (35.49, β)	22.42
95% Gamma Approximate KM-UCL (use when n>=50)	27.7	95% Gamma Adjusted KM-UCL (use when n<50)	28.24

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	16.06	Mean in Log Scale	1.949
SD in Original Scale	25.92	SD in Log Scale	1.211
95% t UCL (assumes normality of ROS data)	23.26	95% Percentile Bootstrap UCL	23.3
95% BCA Bootstrap UCL	25.2	95% Bootstrap t UCL	28.44
95% H-UCL (Log ROS)	24.89		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.315	KM Geo Mean	10.12
KM SD (logged)	0.936	95% Critical H Value (KM-Log)	2.317
KM Standard Error of Mean (logged)	0.167	95% H-UCL (KM -Log)	22.5
KM SD (logged)	0.936	95% Critical H Value (KM-Log)	2.317
KM Standard Error of Mean (logged)	0.167		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	21.01	Mean in Log Scale	2.391
SD in Original Scale	31.14	SD in Log Scale	1.041
95% t UCL (Assumes normality)	29.65	95% H-Stat UCL	28.68

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	22.5

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Anthracene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	34
Number of Detects	35	Number of Non-Detects	2
Number of Distinct Detects	32	Number of Distinct Non-Detects	2
Minimum Detect	6.5	Minimum Non-Detect	5.5
Maximum Detect	7800	Maximum Non-Detect	7.6
Variance Detects	1715821	Percent Non-Detects	5.405%
Mean Detects	334.1	SD Detects	1310
Median Detects	31	CV Detects	3.921
Skewness Detects	5.767	Kurtosis Detects	33.75
Mean of Logged Detects	3.941	SD of Logged Detects	1.615

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.252	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.934	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.426	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	316.4	KM Standard Error of Mean	209.8
KM SD	1258	95% KM (BCA) UCL	743.6
95% KM (t) UCL	670.6	95% KM (Percentile Bootstrap) UCL	731.2
95% KM (z) UCL	661.5	95% KM Bootstrap t UCL	2864
90% KM Chebyshev UCL	945.8	95% KM Chebyshev UCL	1231
97.5% KM Chebyshev UCL	1627	99% KM Chebyshev UCL	2404

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.836	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.844	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.243	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.16	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.358	k star (bias corrected MLE)	0.347
Theta hat (MLE)	932.6	Theta star (bias corrected MLE)	964
nu hat (MLE)	25.08	nu star (bias corrected)	24.26
Mean (detects)	334.1		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	316
Maximum	7800	Median	28
SD	1275	CV	4.035
k hat (MLE)	0.303	k star (bias corrected MLE)	0.296
Theta hat (MLE)	1045	Theta star (bias corrected MLE)	1068
nu hat (MLE)	22.39	nu star (bias corrected)	21.9
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (21.90, α)	12.27	Adjusted Chi Square Value (21.90, β)	11.95
95% Gamma Approximate UCL (use when n>=50)	564.3	95% Gamma Adjusted UCL (use when n<50)	579.2

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Anthracene (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	316.4	SD (KM)	1258
Variance (KM)	1582206	SE of Mean (KM)	209.8
k hat (KM)	0.0633	k star (KM)	0.0761
nu hat (KM)	4.681	nu star (KM)	5.635
theta hat (KM)	5001	theta star (KM)	4155
80% gamma percentile (KM)	136.3	90% gamma percentile (KM)	726.2
95% gamma percentile (KM)	1834	99% gamma percentile (KM)	5735

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.63, α)	1.456	Adjusted Chi Square Value (5.63, β)	1.367
95% Gamma Approximate KM-UCL (use when n>=50)	1224	95% Gamma Adjusted KM-UCL (use when n<50)	1304

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.934	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	316.1	Mean in Log Scale	3.757
SD in Original Scale	1275	SD in Log Scale	1.759
95% t UCL (assumes normality of ROS data)	670.1	95% Percentile Bootstrap UCL	728.5
95% BCA Bootstrap UCL	981.4	95% Bootstrap t UCL	2915
95% H-UCL (Log ROS)	541.9		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.825	KM Geo Mean	45.82
KM SD (logged)	1.624	95% Critical H Value (KM-Log)	3.188
KM Standard Error of Mean (logged)	0.271	95% H-UCL (KM -Log)	405.6
KM SD (logged)	1.624	95% Critical H Value (KM-Log)	3.188
KM Standard Error of Mean (logged)	0.271		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	316.2	Mean in Log Scale	3.792
SD in Original Scale	1275	SD in Log Scale	1.693
95% t UCL (Assumes normality)	670.2	95% H-Stat UCL	470.2

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1231

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)anthracene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	31
		Number of Missing Observations	0
Minimum	31	Mean	1155
Maximum	26000	Median	170
SD	4250	Std. Error of Mean	698.8
Coefficient of Variation	3.68	Skewness	5.857

Normal GOF Test

Shapiro Wilk Test Statistic	0.264	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.396	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2335	95% Adjusted-CLT UCL (Chen-1995)	3023
		95% Modified-t UCL (Johnson-1978)	2447

Gamma GOF Test

A-D Test Statistic	3.829	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.832	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.155	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.411	k star (bias corrected MLE)	0.396
Theta hat (MLE)	2808	Theta star (bias corrected MLE)	2916
nu hat (MLE)	30.44	nu star (bias corrected)	29.3
MLE Mean (bias corrected)	1155	MLE Sd (bias corrected)	1835
		Approximate Chi Square Value (0.05)	17.95
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	17.56

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1886	95% Adjusted Gamma UCL (use when n<50)	1927

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.152	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.434	Mean of logged Data	5.459
Maximum of Logged Data	10.17	SD of logged Data	1.472

Assuming Lognormal Distribution

95% H-UCL	1441	90% Chebyshev (MVUE) UCL	1267
95% Chebyshev (MVUE) UCL	1544	97.5% Chebyshev (MVUE) UCL	1928
99% Chebyshev (MVUE) UCL	2683		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)anthracene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2304	95% Jackknife UCL	2335
95% Standard Bootstrap UCL	2292	95% Bootstrap-t UCL	8321
95% Hall's Bootstrap UCL	6537	95% Percentile Bootstrap UCL	2543
95% BCA Bootstrap UCL	3264		
90% Chebyshev(Mean, Sd) UCL	3251	95% Chebyshev(Mean, Sd) UCL	4201
97.5% Chebyshev(Mean, Sd) UCL	5519	99% Chebyshev(Mean, Sd) UCL	8108

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	4201

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)pyrene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	32
		Number of Missing Observations	0
Minimum	38	Mean	1056
Maximum	22000	Median	190
SD	3593	Std. Error of Mean	590.6
Coefficient of Variation	3.403	Skewness	5.809

Normal GOF Test

Shapiro Wilk Test Statistic	0.278	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.388	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2053	95% Adjusted-CLT UCL (Chen-1995)	2630
		95% Modified-t UCL (Johnson-1978)	2147

Gamma GOF Test

A-D Test Statistic	3.522	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.821	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.461	k star (bias corrected MLE)	0.442
Theta hat (MLE)	2289	Theta star (bias corrected MLE)	2389
nu hat (MLE)	34.13	nu star (bias corrected)	32.69
MLE Mean (bias corrected)	1056	MLE Sd (bias corrected)	1588
		Approximate Chi Square Value (0.05)	20.62
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	20.21

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1674	95% Adjusted Gamma UCL (use when n<50)	1708

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.638	Mean of logged Data	5.567
Maximum of Logged Data	9.999	SD of logged Data	1.389

Assuming Lognormal Distribution

95% H-UCL	1334	90% Chebyshev (MVUE) UCL	1221
95% Chebyshev (MVUE) UCL	1478	97.5% Chebyshev (MVUE) UCL	1834
99% Chebyshev (MVUE) UCL	2534		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)pyrene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2027	95% Jackknife UCL	2053
95% Standard Bootstrap UCL	2006	95% Bootstrap-t UCL	6444
95% Hall's Bootstrap UCL	5595	95% Percentile Bootstrap UCL	2167
95% BCA Bootstrap UCL	2930		
90% Chebyshev(Mean, Sd) UCL	2828	95% Chebyshev(Mean, Sd) UCL	3630
97.5% Chebyshev(Mean, Sd) UCL	4744	99% Chebyshev(Mean, Sd) UCL	6932

Suggested UCL to Use

95% H-UCL	1334

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

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	30
		Number of Missing Observations	0
Minimum	50	Mean	1506
Maximum	33000	Median	290
SD	5378	Std. Error of Mean	884.1
Coefficient of Variation	3.572	Skewness	5.888

Normal GOF Test

Shapiro Wilk Test Statistic	0.262	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2998	95% Adjusted-CLT UCL (Chen-1995)	3874
		95% Modified-t UCL (Johnson-1978)	3141

Gamma GOF Test

A-D Test Statistic	3.679	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.823	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.25	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.454	k star (bias corrected MLE)	0.436
Theta hat (MLE)	3313	Theta star (bias corrected MLE)	3456
nu hat (MLE)	33.63	nu star (bias corrected)	32.24
MLE Mean (bias corrected)	1506	MLE Sd (bias corrected)	2281
		Approximate Chi Square Value (0.05)	20.26
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	19.85

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2396	95% Adjusted Gamma UCL (use when n<50)	2446

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.912	Mean of logged Data	5.898
Maximum of Logged Data	10.4	SD of logged Data	1.374

Assuming Lognormal Distribution

95% H-UCL	1801	90% Chebyshev (MVUE) UCL	1659
95% Chebyshev (MVUE) UCL	2005	97.5% Chebyshev (MVUE) UCL	2485
99% Chebyshev (MVUE) UCL	3429		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(b)fluoranthene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2960	95% Jackknife UCL	2998
95% Standard Bootstrap UCL	2972	95% Bootstrap-t UCL	10205
95% Hall's Bootstrap UCL	8268	95% Percentile Bootstrap UCL	3261
95% BCA Bootstrap UCL	4252		
90% Chebyshev(Mean, Sd) UCL	4158	95% Chebyshev(Mean, Sd) UCL	5360
97.5% Chebyshev(Mean, Sd) UCL	7027	99% Chebyshev(Mean, Sd) UCL	10303

Suggested UCL to Use

95% H-UCL	1801

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

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(g,h,i)perylene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	20	Mean	554.7
Maximum	11000	Median	100
SD	1799	Std. Error of Mean	295.7
Coefficient of Variation	3.243	Skewness	5.742

Normal GOF Test

Shapiro Wilk Test Statistic	0.29	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.383	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1054	95% Adjusted-CLT UCL (Chen-1995)	1339
		95% Modified-t UCL (Johnson-1978)	1101

Gamma GOF Test

A-D Test Statistic	3.582	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.813	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.153	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.5	k star (bias corrected MLE)	0.477
Theta hat (MLE)	1110	Theta star (bias corrected MLE)	1162
nu hat (MLE)	36.98	nu star (bias corrected)	35.31
MLE Mean (bias corrected)	554.7	MLE Sd (bias corrected)	803
		Approximate Chi Square Value (0.05)	22.72
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	22.28

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	862.3	95% Adjusted Gamma UCL (use when n<50)	879.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.996	Mean of logged Data	5.047
Maximum of Logged Data	9.306	SD of logged Data	1.309

Assuming Lognormal Distribution

95% H-UCL	669.9	90% Chebyshev (MVUE) UCL	634.3
95% Chebyshev (MVUE) UCL	762.2	97.5% Chebyshev (MVUE) UCL	939.8
99% Chebyshev (MVUE) UCL	1289		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(g,h,i)perylene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	1041	95% Jackknife UCL	1054
95% Standard Bootstrap UCL	1029	95% Bootstrap-t UCL	2986
95% Hall's Bootstrap UCL	2751	95% Percentile Bootstrap UCL	1130
95% BCA Bootstrap UCL	1675		
90% Chebyshev(Mean, Sd) UCL	1442	95% Chebyshev(Mean, Sd) UCL	1844
97.5% Chebyshev(Mean, Sd) UCL	2402	99% Chebyshev(Mean, Sd) UCL	3497

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	1844

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	19	Mean	495.8
Maximum	9300	Median	98
SD	1526	Std. Error of Mean	250.8
Coefficient of Variation	3.077	Skewness	5.637

Normal GOF Test

Shapiro Wilk Test Statistic	0.31	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	919.2	95% Adjusted-CLT UCL (Chen-1995)	1157
		95% Modified-t UCL (Johnson-1978)	957.9

Gamma GOF Test

A-D Test Statistic	3.31	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.814	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.25	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.153	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.492	k star (bias corrected MLE)	0.47
Theta hat (MLE)	1007	Theta star (bias corrected MLE)	1054
nu hat (MLE)	36.42	nu star (bias corrected)	34.8
MLE Mean (bias corrected)	495.8	MLE Sd (bias corrected)	722.9
		Approximate Chi Square Value (0.05)	22.3
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	21.87

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	773.5	95% Adjusted Gamma UCL (use when n<50)	788.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.944	Mean of logged Data	4.912
Maximum of Logged Data	9.138	SD of logged Data	1.369

Assuming Lognormal Distribution

95% H-UCL	663.5	90% Chebyshev (MVUE) UCL	612.8
95% Chebyshev (MVUE) UCL	740.2	97.5% Chebyshev (MVUE) UCL	917.2
99% Chebyshev (MVUE) UCL	1265		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(k)fluoranthene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	908.3	95% Jackknife UCL	919.2
95% Standard Bootstrap UCL	893	95% Bootstrap-t UCL	2267
95% Hall's Bootstrap UCL	2374	95% Percentile Bootstrap UCL	975.9
95% BCA Bootstrap UCL	1309		
90% Chebyshev(Mean, Sd) UCL	1248	95% Chebyshev(Mean, Sd) UCL	1589
97.5% Chebyshev(Mean, Sd) UCL	2062	99% Chebyshev(Mean, Sd) UCL	2991

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	1589

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chrysene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	38	Mean	1259
Maximum	29000	Median	190
SD	4732	Std. Error of Mean	778
Coefficient of Variation	3.758	Skewness	5.907

Normal GOF Test

Shapiro Wilk Test Statistic	0.254	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2573	95% Adjusted-CLT UCL (Chen-1995)	3346
		95% Modified-t UCL (Johnson-1978)	2699

Gamma GOF Test

A-D Test Statistic	3.926	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.83	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.155	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.423	k star (bias corrected MLE)	0.406
Theta hat (MLE)	2980	Theta star (bias corrected MLE)	3099
nu hat (MLE)	31.27	nu star (bias corrected)	30.07
MLE Mean (bias corrected)	1259	MLE Sd (bias corrected)	1976
		Approximate Chi Square Value (0.05)	18.55
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	18.15

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2042	95% Adjusted Gamma UCL (use when n<50)	2086

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.638	Mean of logged Data	5.595
Maximum of Logged Data	10.28	SD of logged Data	1.419

Assuming Lognormal Distribution

95% H-UCL	1464	90% Chebyshev (MVUE) UCL	1321
95% Chebyshev (MVUE) UCL	1603	97.5% Chebyshev (MVUE) UCL	1994
99% Chebyshev (MVUE) UCL	2762		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chrysene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2539	95% Jackknife UCL	2573
95% Standard Bootstrap UCL	2496	95% Bootstrap-t UCL	9516
95% Hall's Bootstrap UCL	7259	95% Percentile Bootstrap UCL	2764
95% BCA Bootstrap UCL	3651		
90% Chebyshev(Mean, Sd) UCL	3593	95% Chebyshev(Mean, Sd) UCL	4650
97.5% Chebyshev(Mean, Sd) UCL	6118	99% Chebyshev(Mean, Sd) UCL	9000

Suggested UCL to Use

95% H-UCL	1464

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

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dibenz(a,h)anthracene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	27
Number of Detects	21	Number of Non-Detects	16
Number of Distinct Detects	19	Number of Distinct Non-Detects	11
Minimum Detect	20	Minimum Non-Detect	8.6
Maximum Detect	3700	Maximum Non-Detect	40
Variance Detects	624269	Percent Non-Detects	43.24%
Mean Detects	294.1	SD Detects	790.1
Median Detects	71	CV Detects	2.687
Skewness Detects	4.405	Kurtosis Detects	19.82
Mean of Logged Detects	4.513	SD of Logged Detects	1.315

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.343	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.422	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.188	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	171.1	KM Standard Error of Mean	100.7
KM SD	597.7	95% KM (BCA) UCL	381
95% KM (t) UCL	341.1	95% KM (Percentile Bootstrap) UCL	369.5
95% KM (z) UCL	336.8	95% KM Bootstrap t UCL	1063
90% KM Chebyshev UCL	473.2	95% KM Chebyshev UCL	610.1
97.5% KM Chebyshev UCL	800	99% KM Chebyshev UCL	1173

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.972	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.802	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.2	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.537	k star (bias corrected MLE)	0.492
Theta hat (MLE)	547.8	Theta star (bias corrected MLE)	597.9
nu hat (MLE)	22.55	nu star (bias corrected)	20.66
Mean (detects)	294.1		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	166.9
Maximum	3700	Median	24
SD	607.1	CV	3.638
k hat (MLE)	0.166	k star (bias corrected MLE)	0.171
Theta hat (MLE)	1003	Theta star (bias corrected MLE)	976.3
nu hat (MLE)	12.32	nu star (bias corrected)	12.65
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (12.65, α)	5.659	Adjusted Chi Square Value (12.65, β)	5.456
95% Gamma Approximate UCL (use when n>=50)	373.1	95% Gamma Adjusted UCL (use when n<50)	387

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dibenz(a,h)anthracene (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	171.1	SD (KM)	597.7
Variance (KM)	357283	SE of Mean (KM)	100.7
k hat (KM)	0.082	k star (KM)	0.0934
nu hat (KM)	6.067	nu star (KM)	6.908
theta hat (KM)	2088	theta star (KM)	1833
80% gamma percentile (KM)	107	90% gamma percentile (KM)	441.8
95% gamma percentile (KM)	996.4	99% gamma percentile (KM)	2813

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.91, α)	2.12	Adjusted Chi Square Value (6.91, β)	2.007
95% Gamma Approximate KM-UCL (use when n>=50)	557.6	95% Gamma Adjusted KM-UCL (use when n<50)	589.1

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.188	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	168.9	Mean in Log Scale	3.172
SD in Original Scale	606.6	SD in Log Scale	1.871
95% t UCL (assumes normality of ROS data)	337.3	95% Percentile Bootstrap UCL	364.7
95% BCA Bootstrap UCL	464.4	95% Bootstrap t UCL	1069
95% H-UCL (Log ROS)	414.4		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.527	KM Geo Mean	34.03
KM SD (logged)	1.498	95% Critical H Value (KM-Log)	3.016
KM Standard Error of Mean (logged)	0.254	95% H-UCL (KM -Log)	221.8
KM SD (logged)	1.498	95% Critical H Value (KM-Log)	3.016
KM Standard Error of Mean (logged)	0.254		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	171.1	Mean in Log Scale	3.517
SD in Original Scale	606	SD in Log Scale	1.538
95% t UCL (Assumes normality)	339.3	95% H-Stat UCL	241.7

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	221.8

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluoranthene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	30
		Number of Missing Observations	0
Minimum	68	Mean	2523
Maximum	59000	Median	380
SD	9635	Std. Error of Mean	1584
Coefficient of Variation	3.818	Skewness	5.906

Normal GOF Test

Shapiro Wilk Test Statistic	0.253	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.403	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5198	95% Adjusted-CLT UCL (Chen-1995)	6772
		95% Modified-t UCL (Johnson-1978)	5454

Gamma GOF Test

A-D Test Statistic	3.967	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.834	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.275	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.155	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.405	k star (bias corrected MLE)	0.39
Theta hat (MLE)	6228	Theta star (bias corrected MLE)	6465
nu hat (MLE)	29.98	nu star (bias corrected)	28.89
MLE Mean (bias corrected)	2523	MLE Sd (bias corrected)	4039
		Approximate Chi Square Value (0.05)	17.62
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	17.24

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4137	95% Adjusted Gamma UCL (use when n<50)	4229

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.22	Mean of logged Data	6.213
Maximum of Logged Data	10.99	SD of logged Data	1.46

Assuming Lognormal Distribution

95% H-UCL	2981	90% Chebyshev (MVUE) UCL	2637
95% Chebyshev (MVUE) UCL	3210	97.5% Chebyshev (MVUE) UCL	4005
99% Chebyshev (MVUE) UCL	5568		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluoranthene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5129	95% Jackknife UCL	5198
95% Standard Bootstrap UCL	5119	95% Bootstrap-t UCL	19734
95% Hall's Bootstrap UCL	14343	95% Percentile Bootstrap UCL	5486
95% BCA Bootstrap UCL	8554		
90% Chebyshev(Mean, Sd) UCL	7275	95% Chebyshev(Mean, Sd) UCL	9428
97.5% Chebyshev(Mean, Sd) UCL	12415	99% Chebyshev(Mean, Sd) UCL	18284

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 9428

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluorene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	30
Number of Detects	26	Number of Non-Detects	11
Number of Distinct Detects	22	Number of Distinct Non-Detects	11
Minimum Detect	5.1	Minimum Non-Detect	5.2
Maximum Detect	3000	Maximum Non-Detect	16
Variance Detects	337799	Percent Non-Detects	29.73%
Mean Detects	174.2	SD Detects	581.2
Median Detects	29	CV Detects	3.337
Skewness Detects	4.966	Kurtosis Detects	25.03
Mean of Logged Detects	3.6	SD of Logged Detects	1.489

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.291	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.394	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	124.1	KM Standard Error of Mean	81.13
KM SD	483.9	95% KM (BCA) UCL	292.4
95% KM (t) UCL	261	95% KM (Percentile Bootstrap) UCL	281.8
95% KM (z) UCL	257.5	95% KM Bootstrap t UCL	1063
90% KM Chebyshev UCL	367.5	95% KM Chebyshev UCL	477.7
97.5% KM Chebyshev UCL	630.7	99% KM Chebyshev UCL	931.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.609	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.826	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.216	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.183	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.419	k star (bias corrected MLE)	0.396
Theta hat (MLE)	415.9	Theta star (bias corrected MLE)	439.7
nu hat (MLE)	21.78	nu star (bias corrected)	20.6
Mean (detects)	174.2		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	122.4
Maximum	3000	Median	15
SD	491	CV	4.012
k hat (MLE)	0.202	k star (bias corrected MLE)	0.203
Theta hat (MLE)	607.2	Theta star (bias corrected MLE)	602.2
nu hat (MLE)	14.92	nu star (bias corrected)	15.04
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (15.04, α)	7.29	Adjusted Chi Square Value (15.04, β)	7.055
95% Gamma Approximate UCL (use when n>=50)	252.5	95% Gamma Adjusted UCL (use when n<50)	260.9

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Fluorene (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	124.1	SD (KM)	483.9
Variance (KM)	234178	SE of Mean (KM)	81.13
k hat (KM)	0.0657	k star (KM)	0.0784
nu hat (KM)	4.864	nu star (KM)	5.803
theta hat (KM)	1887	theta star (KM)	1582
80% gamma percentile (KM)	56.77	90% gamma percentile (KM)	290.4
95% gamma percentile (KM)	720.7	99% gamma percentile (KM)	2218

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.80, α)	1.54	Adjusted Chi Square Value (5.80, β)	1.448
95% Gamma Approximate KM-UCL (use when n>=50)	467.5	95% Gamma Adjusted KM-UCL (use when n<50)	497.4

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	123.3	Mean in Log Scale	2.863
SD in Original Scale	490.8	SD in Log Scale	1.696
95% t UCL (assumes normality of ROS data)	259.5	95% Percentile Bootstrap UCL	280.9
95% BCA Bootstrap UCL	375.3	95% Bootstrap t UCL	1071
95% H-UCL (Log ROS)	187		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.037	KM Geo Mean	20.84
KM SD (logged)	1.503	95% Critical H Value (KM-Log)	3.023
KM Standard Error of Mean (logged)	0.253	95% H-UCL (KM -Log)	137.5
KM SD (logged)	1.503	95% Critical H Value (KM-Log)	3.023
KM Standard Error of Mean (logged)	0.253		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	123.7	Mean in Log Scale	2.951
SD in Original Scale	490.7	SD in Log Scale	1.61
95% t UCL (Assumes normality)	259.9	95% H-Stat UCL	163.8

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	137.5

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	34
Number of Detects	36	Number of Non-Detects	1
Number of Distinct Detects	33	Number of Distinct Non-Detects	1
Minimum Detect	20	Minimum Non-Detect	15
Maximum Detect	11000	Maximum Non-Detect	15
Variance Detects	3307896	Percent Non-Detects	2.703%
Mean Detects	544.6	SD Detects	1819
Median Detects	91.5	CV Detects	3.34
Skewness Detects	5.738	Kurtosis Detects	33.77
Mean of Logged Detects	4.997	SD of Logged Detects	1.318

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.28	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.387	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.145	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	530.3	KM Standard Error of Mean	295.3
KM SD	1771	95% KM (BCA) UCL	1137
95% KM (t) UCL	1029	95% KM (Percentile Bootstrap) UCL	1091
95% KM (z) UCL	1016	95% KM Bootstrap t UCL	3190
90% KM Chebyshev UCL	1416	95% KM Chebyshev UCL	1817
97.5% KM Chebyshev UCL	2374	99% KM Chebyshev UCL	3468

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.55	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.815	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.243	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.155	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.489	k star (bias corrected MLE)	0.467
Theta hat (MLE)	1114	Theta star (bias corrected MLE)	1167
nu hat (MLE)	35.21	nu star (bias corrected)	33.61
Mean (detects)	544.6		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	529.9
Maximum	11000	Median	88
SD	1796	CV	3.389
k hat (MLE)	0.424	k star (bias corrected MLE)	0.408
Theta hat (MLE)	1248	Theta star (bias corrected MLE)	1299
nu hat (MLE)	31.41	nu star (bias corrected)	30.2
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (30.20, α)	18.65	Adjusted Chi Square Value (30.20, β)	18.25
95% Gamma Approximate UCL (use when n>=50)	858.1	95% Gamma Adjusted UCL (use when n<50)	876.6

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Indeno(1,2,3-cd)pyrene (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	530.3	SD (KM)	1771
Variance (KM)	3136467	SE of Mean (KM)	295.3
k hat (KM)	0.0897	k star (KM)	0.1
nu hat (KM)	6.635	nu star (KM)	7.43
theta hat (KM)	5915	theta star (KM)	5281
80% gamma percentile (KM)	370.1	90% gamma percentile (KM)	1414
95% gamma percentile (KM)	3077	99% gamma percentile (KM)	8406

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.43, α)	2.41	Adjusted Chi Square Value (7.43, β)	2.287
95% Gamma Approximate KM-UCL (use when n>=50)	1635	95% Gamma Adjusted KM-UCL (use when n<50)	1723

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.935	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.145	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	530	Mean in Log Scale	4.909
SD in Original Scale	1796	SD in Log Scale	1.405
95% t UCL (assumes normality of ROS data)	1028	95% Percentile Bootstrap UCL	1101
95% BCA Bootstrap UCL	1465	95% Bootstrap t UCL	3202
95% H-UCL (Log ROS)	715.5		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.935	KM Geo Mean	139
KM SD (logged)	1.334	95% Critical H Value (KM-Log)	2.798
KM Standard Error of Mean (logged)	0.222	95% H-UCL (KM -Log)	630.9
KM SD (logged)	1.334	95% Critical H Value (KM-Log)	2.798
KM Standard Error of Mean (logged)	0.222		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	530.1	Mean in Log Scale	4.916
SD in Original Scale	1795	SD in Log Scale	1.389
95% t UCL (Assumes normality)	1028	95% H-Stat UCL	695.3

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

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1817

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Phenanthrene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	32
		Number of Missing Observations	0
Minimum	27	Mean	1479
Maximum	37000	Median	120
SD	6051	Std. Error of Mean	994.8
Coefficient of Variation	4.093	Skewness	5.932

Normal GOF Test

Shapiro Wilk Test Statistic	0.242	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.425	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3158	95% Adjusted-CLT UCL (Chen-1995)	4152
		95% Modified-t UCL (Johnson-1978)	3320

Gamma GOF Test

A-D Test Statistic	4.355	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.846	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.254	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.156	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.35	k star (bias corrected MLE)	0.339
Theta hat (MLE)	4226	Theta star (bias corrected MLE)	4355
nu hat (MLE)	25.89	nu star (bias corrected)	25.12
MLE Mean (bias corrected)	1479	MLE Sd (bias corrected)	2538
		Approximate Chi Square Value (0.05)	14.7
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	14.36

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2526	95% Adjusted Gamma UCL (use when n<50)	2587

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.296	Mean of logged Data	5.376
Maximum of Logged Data	10.52	SD of logged Data	1.599

Assuming Lognormal Distribution

95% H-UCL	1802	90% Chebyshev (MVUE) UCL	1473
95% Chebyshev (MVUE) UCL	1812	97.5% Chebyshev (MVUE) UCL	2284
99% Chebyshev (MVUE) UCL	3210		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Phenanthrene (cont.'d0

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	3115	95% Jackknife UCL	3158
95% Standard Bootstrap UCL	3057	95% Bootstrap-t UCL	14061
95% Hall's Bootstrap UCL	9366	95% Percentile Bootstrap UCL	3381
95% BCA Bootstrap UCL	4660		
90% Chebyshev(Mean, Sd) UCL	4463	95% Chebyshev(Mean, Sd) UCL	5815
97.5% Chebyshev(Mean, Sd) UCL	7691	99% Chebyshev(Mean, Sd) UCL	11377

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	5815

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pyrene

General Statistics

Total Number of Observations	37	Number of Distinct Observations	29
		Number of Missing Observations	0
Minimum	57	Mean	1875
Maximum	41000	Median	320
SD	6704	Std. Error of Mean	1102
Coefficient of Variation	3.576	Skewness	5.83

Normal GOF Test

Shapiro Wilk Test Statistic	0.27	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3735	95% Adjusted-CLT UCL (Chen-1995)	4816
		95% Modified-t UCL (Johnson-1978)	3911

Gamma GOF Test

A-D Test Statistic	3.685	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.828	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.155	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.431	k star (bias corrected MLE)	0.414
Theta hat (MLE)	4350	Theta star (bias corrected MLE)	4528
nu hat (MLE)	31.89	nu star (bias corrected)	30.64
MLE Mean (bias corrected)	1875	MLE Sd (bias corrected)	2914
		Approximate Chi Square Value (0.05)	18.99
Adjusted Level of Significance	0.0431	Adjusted Chi Square Value	18.59

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3024	95% Adjusted Gamma UCL (use when n<50)	3089

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.144	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.043	Mean of logged Data	6.027
Maximum of Logged Data	10.62	SD of logged Data	1.433

Assuming Lognormal Distribution

95% H-UCL	2330	90% Chebyshev (MVUE) UCL	2089
95% Chebyshev (MVUE) UCL	2537	97.5% Chebyshev (MVUE) UCL	3160
99% Chebyshev (MVUE) UCL	4382		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pyrene (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3687	95% Jackknife UCL	3735
95% Standard Bootstrap UCL	3633	95% Bootstrap-t UCL	12982
95% Hall's Bootstrap UCL	10184	95% Percentile Bootstrap UCL	4013
95% BCA Bootstrap UCL	5547		
90% Chebyshev(Mean, Sd) UCL	5181	95% Chebyshev(Mean, Sd) UCL	6679
97.5% Chebyshev(Mean, Sd) UCL	8757	99% Chebyshev(Mean, Sd) UCL	12840

Suggested UCL to Use

95% H-UCL 2330

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

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	27	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	3.1	Mean	11.89
Maximum	24	Median	11
SD	4.767	Std. Error of Mean	0.917
Coefficient of Variation	0.401	Skewness	0.953

Normal GOF Test

Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	13.45	95% Adjusted-CLT UCL (Chen-1995)	13.58
		95% Modified-t UCL (Johnson-1978)	13.48

Gamma GOF Test

A-D Test Statistic	0.383	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.168	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.462	k star (bias corrected MLE)	5.769
Theta hat (MLE)	1.84	Theta star (bias corrected MLE)	2.061
nu hat (MLE)	349	nu star (bias corrected)	311.5
MLE Mean (bias corrected)	11.89	MLE Sd (bias corrected)	4.95
		Approximate Chi Square Value (0.05)	271.6
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	269.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	13.63	95% Adjusted Gamma UCL (use when n<50)	13.76

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.131	Mean of logged Data	2.396
Maximum of Logged Data	3.178	SD of logged Data	0.421

Assuming Lognormal Distribution

95% H-UCL	14.05	90% Chebyshev (MVUE) UCL	14.95
95% Chebyshev (MVUE) UCL	16.31	97.5% Chebyshev (MVUE) UCL	18.19
99% Chebyshev (MVUE) UCL	21.89		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	13.4	95% Jackknife UCL	13.45
95% Standard Bootstrap UCL	13.36	95% Bootstrap-t UCL	13.89
95% Hall's Bootstrap UCL	13.8	95% Percentile Bootstrap UCL	13.37
95% BCA Bootstrap UCL	13.56		
90% Chebyshev(Mean, Sd) UCL	14.64	95% Chebyshev(Mean, Sd) UCL	15.89
97.5% Chebyshev(Mean, Sd) UCL	17.62	99% Chebyshev(Mean, Sd) UCL	21.02

Suggested UCL to Use

95% Student's-t UCL	13.45

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium

General Statistics

Total Number of Observations	27	Number of Distinct Observations	24
		Number of Missing Observations	0
Minimum	0.059	Mean	0.408
Maximum	0.86	Median	0.43
SD	0.176	Std. Error of Mean	0.0339
Coefficient of Variation	0.431	Skewness	0.127

Normal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.0893	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.466	95% Adjusted-CLT UCL (Chen-1995)	0.465
		95% Modified-t UCL (Johnson-1978)	0.466

Gamma GOF Test

A-D Test Statistic	0.795	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.164	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.169	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.13	k star (bias corrected MLE)	3.696
Theta hat (MLE)	0.0989	Theta star (bias corrected MLE)	0.111
nu hat (MLE)	223	nu star (bias corrected)	199.6
MLE Mean (bias corrected)	0.408	MLE Sd (bias corrected)	0.212
		Approximate Chi Square Value (0.05)	167.9
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	166

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.486	95% Adjusted Gamma UCL (use when n<50)	0.491

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.201	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.83	Mean of logged Data	-1.021
Maximum of Logged Data	-0.151	SD of logged Data	0.579

Assuming Lognormal Distribution

95% H-UCL	0.537	90% Chebyshev (MVUE) UCL	0.572
95% Chebyshev (MVUE) UCL	0.64	97.5% Chebyshev (MVUE) UCL	0.734
99% Chebyshev (MVUE) UCL	0.918		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.464	95% Jackknife UCL	0.466
95% Standard Bootstrap UCL	0.466	95% Bootstrap-t UCL	0.465
95% Hall's Bootstrap UCL	0.466	95% Percentile Bootstrap UCL	0.461
95% BCA Bootstrap UCL	0.466		
90% Chebyshev(Mean, Sd) UCL	0.51	95% Chebyshev(Mean, Sd) UCL	0.556
97.5% Chebyshev(Mean, Sd) UCL	0.62	99% Chebyshev(Mean, Sd) UCL	0.745

Suggested UCL to Use

95% Student's-t UCL	0.466

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium

General Statistics

Total Number of Observations	27	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	3.7	Mean	14.09
Maximum	20	Median	15
SD	4.259	Std. Error of Mean	0.82
Coefficient of Variation	0.302	Skewness	-0.61

Normal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.103	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.49	95% Adjusted-CLT UCL (Chen-1995)	15.34
		95% Modified-t UCL (Johnson-1978)	15.47

Gamma GOF Test

A-D Test Statistic	0.756	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.136	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.168	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.542	k star (bias corrected MLE)	7.618
Theta hat (MLE)	1.65	Theta star (bias corrected MLE)	1.85
nu hat (MLE)	461.3	nu star (bias corrected)	411.4
MLE Mean (bias corrected)	14.09	MLE Sd (bias corrected)	5.106
		Approximate Chi Square Value (0.05)	365.4
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	362.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	15.87	95% Adjusted Gamma UCL (use when n<50)	15.99

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.848	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.308	Mean of logged Data	2.586
Maximum of Logged Data	2.996	SD of logged Data	0.387

Assuming Lognormal Distribution

95% H-UCL	16.5	90% Chebyshev (MVUE) UCL	17.54
95% Chebyshev (MVUE) UCL	19.02	97.5% Chebyshev (MVUE) UCL	21.08
99% Chebyshev (MVUE) UCL	25.12		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	15.44	95% Jackknife UCL	15.49
95% Standard Bootstrap UCL	15.41	95% Bootstrap-t UCL	15.37
95% Hall's Bootstrap UCL	15.33	95% Percentile Bootstrap UCL	15.37
95% BCA Bootstrap UCL	15.31		
90% Chebyshev(Mean, Sd) UCL	16.55	95% Chebyshev(Mean, Sd) UCL	17.67
97.5% Chebyshev(Mean, Sd) UCL	19.21	99% Chebyshev(Mean, Sd) UCL	22.25

Suggested UCL to Use

95% Student's-t UCL	15.49

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

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper

General Statistics

Total Number of Observations	27	Number of Distinct Observations	21
		Number of Missing Observations	0
Minimum	2.9	Mean	23.3
Maximum	39	Median	24
SD	9.327	Std. Error of Mean	1.795
Coefficient of Variation	0.4	Skewness	-0.51

Normal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.117	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	26.36	95% Adjusted-CLT UCL (Chen-1995)	26.06
		95% Modified-t UCL (Johnson-1978)	26.33

Gamma GOF Test

A-D Test Statistic	1.112	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.185	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.169	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.106	k star (bias corrected MLE)	3.675
Theta hat (MLE)	5.673	Theta star (bias corrected MLE)	6.339
nu hat (MLE)	221.7	nu star (bias corrected)	198.4
MLE Mean (bias corrected)	23.3	MLE Sd (bias corrected)	12.15
		Approximate Chi Square Value (0.05)	166.8
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	165

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	27.71	95% Adjusted Gamma UCL (use when n<50)	28.02

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.065	Mean of logged Data	3.022
Maximum of Logged Data	3.664	SD of logged Data	0.601

Assuming Lognormal Distribution

95% H-UCL	31.36	90% Chebyshev (MVUE) UCL	33.37
95% Chebyshev (MVUE) UCL	37.44	97.5% Chebyshev (MVUE) UCL	43.08
99% Chebyshev (MVUE) UCL	54.16		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	26.25	95% Jackknife UCL	26.36
95% Standard Bootstrap UCL	26.2	95% Bootstrap-t UCL	26.2
95% Hall's Bootstrap UCL	26.13	95% Percentile Bootstrap UCL	26.08
95% BCA Bootstrap UCL	26.03		
90% Chebyshev(Mean, Sd) UCL	28.68	95% Chebyshev(Mean, Sd) UCL	31.12
97.5% Chebyshev(Mean, Sd) UCL	34.51	99% Chebyshev(Mean, Sd) UCL	41.16

Suggested UCL to Use

95% Student's-t UCL	26.36

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

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	27	Number of Distinct Observations	24
		Number of Missing Observations	0
Minimum	3.2	Mean	36.22
Maximum	140	Median	35
SD	28.23	Std. Error of Mean	5.433
Coefficient of Variation	0.779	Skewness	2.247

Normal GOF Test

Shapiro Wilk Test Statistic	0.792	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	45.49	95% Adjusted-CLT UCL (Chen-1995)	47.67
		95% Modified-t UCL (Johnson-1978)	45.88

Gamma GOF Test

A-D Test Statistic	0.402	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.17	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.077	k star (bias corrected MLE)	1.871
Theta hat (MLE)	17.44	Theta star (bias corrected MLE)	19.36
nu hat (MLE)	112.2	nu star (bias corrected)	101
MLE Mean (bias corrected)	36.22	MLE Sd (bias corrected)	26.48
		Approximate Chi Square Value (0.05)	78.83
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	77.58

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	46.42	95% Adjusted Gamma UCL (use when n<50)	47.17

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.163	Mean of logged Data	3.33
Maximum of Logged Data	4.942	SD of logged Data	0.779

Assuming Lognormal Distribution

95% H-UCL	53.37	90% Chebyshev (MVUE) UCL	55.68
95% Chebyshev (MVUE) UCL	64	97.5% Chebyshev (MVUE) UCL	75.54
99% Chebyshev (MVUE) UCL	98.22		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	45.16	95% Jackknife UCL	45.49
95% Standard Bootstrap UCL	45.29	95% Bootstrap-t UCL	49.49
95% Hall's Bootstrap UCL	93.73	95% Percentile Bootstrap UCL	45.48
95% BCA Bootstrap UCL	47.9		
90% Chebyshev(Mean, Sd) UCL	52.52	95% Chebyshev(Mean, Sd) UCL	59.91
97.5% Chebyshev(Mean, Sd) UCL	70.15	99% Chebyshev(Mean, Sd) UCL	90.28

Suggested UCL to Use

95% Adjusted Gamma UCL	47.17

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Methyl mercury

General Statistics

Total Number of Observations	27	Number of Distinct Observations	21
Number of Detects	15	Number of Non-Detects	12
Number of Distinct Detects	13	Number of Distinct Non-Detects	9
Minimum Detect	1.4000E-4	Minimum Non-Detect	8.7000E-5
Maximum Detect	6.9000E-4	Maximum Non-Detect	4.2000E-4
Variance Detects	2.9798E-8	Percent Non-Detects	44.44%
Mean Detects	4.0133E-4	SD Detects	1.7262E-4
Median Detects	3.3000E-4	CV Detects	0.43
Skewness Detects	0.318	Kurtosis Detects	-1.26
Mean of Logged Detects	-7.915	SD of Logged Detects	0.461

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	2.67E-04	KM Standard Error of Mean	3.9415E-5
KM SD	1.9628E-4	95% KM (BCA) UCL	3.4333E-4
95% KM (t) UCL	3.3443E-4	95% KM (Percentile Bootstrap) UCL	3.3567E-4
95% KM (z) UCL	3.3203E-4	95% KM Bootstrap t UCL	3.4029E-4
90% KM Chebyshev UCL	3.8544E-4	95% KM Chebyshev UCL	4.3901E-4
97.5% KM Chebyshev UCL	5.1335E-4	99% KM Chebyshev UCL	6.5937E-4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.515	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.166	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.492	k star (bias corrected MLE)	4.438
Theta hat (MLE)	7.3080E-5	Theta star (bias corrected MLE)	9.0435E-5
nu hat (MLE)	164.8	nu star (bias corrected)	133.1
Mean (detects)	4.0133E-4		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	1.4000E-4	Mean	0.00467
Maximum	0.01	Median	6.5000E-4
SD	0.00486	CV	1.042
k hat (MLE)	0.577	k star (bias corrected MLE)	0.538
Theta hat (MLE)	0.00809	Theta star (bias corrected MLE)	0.00868
nu hat (MLE)	31.17	nu star (bias corrected)	29.04
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (29.04, α)	17.74	Adjusted Chi Square Value (29.04, β)	17.18
95% Gamma Approximate UCL (use when n>=50)	0.00764	95% Gamma Adjusted UCL (use when n<50)	0.00789

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Methyl mercury (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.6720E-4	SD (KM)	1.9628E-4
Variance (KM)	3.8527E-8	SE of Mean (KM)	3.9415E-5
k hat (KM)	1.853	k star (KM)	1.672
nu hat (KM)	100.1	nu star (KM)	90.28
theta hat (KM)	1.4419E-4	theta star (KM)	1.5982E-4
80% gamma percentile (KM)	4.0844E-4	90% gamma percentile (KM)	5.4233E-4
95% gamma percentile (KM)	6.7146E-4	99% gamma percentile (KM)	9.6102E-4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (90.28, α)	69.38	Adjusted Chi Square Value (90.28, β)	68.2
95% Gamma Approximate KM-UCL (use when n>=50)	3.4773E-4	95% Gamma Adjusted KM-UCL (use when n<50)	3.5371E-4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.7987E-4	Mean in Log Scale	-8.388
SD in Original Scale	1.8827E-4	SD in Log Scale	0.648
95% t UCL (assumes normality of ROS data)	3.4167E-4	95% Percentile Bootstrap UCL	3.3834E-4
95% BCA Bootstrap UCL	3.4801E-4	95% Bootstrap t UCL	3.5128E-4
95% H-UCL (Log ROS)	3.6725E-4		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-8.51	KM Geo Mean	2.0149E-4
KM SD (logged)	0.762	95% Critical H Value (KM-Log)	2.229
KM Standard Error of Mean (logged)	0.156	95% H-UCL (KM -Log)	3.7567E-4
KM SD (logged)	0.762	95% Critical H Value (KM-Log)	2.229
KM Standard Error of Mean (logged)	0.156		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.6563E-4	Mean in Log Scale	-8.545
SD in Original Scale	2.0182E-4	SD in Log Scale	0.839
95% t UCL (Assumes normality)	3.3188E-4	95% H-Stat UCL	4.0534E-4

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 3.34E-04

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nickel

General Statistics

Total Number of Observations	27	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	4.1	Mean	16.34
Maximum	26	Median	17
SD	5.269	Std. Error of Mean	1.014
Coefficient of Variation	0.322	Skewness	-0.539

Normal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	18.07	95% Adjusted-CLT UCL (Chen-1995)	17.9
		95% Modified-t UCL (Johnson-1978)	18.05

Gamma GOF Test

A-D Test Statistic	0.987	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.168	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.372	k star (bias corrected MLE)	6.578
Theta hat (MLE)	2.216	Theta star (bias corrected MLE)	2.484
nu hat (MLE)	398.1	nu star (bias corrected)	355.2
MLE Mean (bias corrected)	16.34	MLE Sd (bias corrected)	6.371
		Approximate Chi Square Value (0.05)	312.5
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	310

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	18.57	95% Adjusted Gamma UCL (use when n<50)	18.73

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.411	Mean of logged Data	2.724
Maximum of Logged Data	3.258	SD of logged Data	0.42

Assuming Lognormal Distribution

95% H-UCL	19.48	90% Chebyshev (MVUE) UCL	20.73
95% Chebyshev (MVUE) UCL	22.61	97.5% Chebyshev (MVUE) UCL	25.22
99% Chebyshev (MVUE) UCL	30.33		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nickel (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	18.01	95% Jackknife UCL	18.07
95% Standard Bootstrap UCL	18.01	95% Bootstrap-t UCL	18.06
95% Hall's Bootstrap UCL	17.9	95% Percentile Bootstrap UCL	18
95% BCA Bootstrap UCL	17.89		
90% Chebyshev(Mean, Sd) UCL	19.38	95% Chebyshev(Mean, Sd) UCL	20.76
97.5% Chebyshev(Mean, Sd) UCL	22.67	99% Chebyshev(Mean, Sd) UCL	26.43

Suggested UCL to Use

95% Student's-t UCL	18.07

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

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Selenium

General Statistics

Total Number of Observations	27	Number of Distinct Observations	21
Number of Detects	26	Number of Non-Detects	1
Number of Distinct Detects	20	Number of Distinct Non-Detects	1
Minimum Detect	0.14	Minimum Non-Detect	0.12
Maximum Detect	1.8	Maximum Non-Detect	0.12
Variance Detects	0.151	Percent Non-Detects	3.704%
Mean Detects	0.868	SD Detects	0.388
Median Detects	0.855	CV Detects	0.447
Skewness Detects	0.294	Kurtosis Detects	0.351
Mean of Logged Detects	-0.268	SD of Logged Detects	0.569

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.84	KM Standard Error of Mean	0.0783
KM SD	0.399	95% KM (BCA) UCL	0.976
95% KM (t) UCL	0.974	95% KM (Percentile Bootstrap) UCL	0.968
95% KM (z) UCL	0.969	95% KM Bootstrap t UCL	0.975
90% KM Chebyshev UCL	1.075	95% KM Chebyshev UCL	1.182
97.5% KM Chebyshev UCL	1.329	99% KM Chebyshev UCL	1.62

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.548	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.141	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.172	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.12	k star (bias corrected MLE)	3.67
Theta hat (MLE)	0.211	Theta star (bias corrected MLE)	0.236
nu hat (MLE)	214.2	nu star (bias corrected)	190.8
Mean (detects)	0.868		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.14	Mean	0.843
Maximum	1.8	Median	0.82
SD	0.402	CV	0.477
k hat (MLE)	3.553	k star (bias corrected MLE)	3.183
Theta hat (MLE)	0.237	Theta star (bias corrected MLE)	0.265
nu hat (MLE)	191.9	nu star (bias corrected)	171.9
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (171.88, α)	142.6	Adjusted Chi Square Value (171.88, β)	140.9
95% Gamma Approximate UCL (use when n>=50)	1.016	95% Gamma Adjusted UCL (use when n<50)	1.029

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Selenium (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.84	SD (KM)	0.399
Variance (KM)	0.159	SE of Mean (KM)	0.0783
k hat (KM)	4.427	k star (KM)	3.96
nu hat (KM)	239.1	nu star (KM)	213.8
theta hat (KM)	0.19	theta star (KM)	0.212
80% gamma percentile (KM)	1.16	90% gamma percentile (KM)	1.406
95% gamma percentile (KM)	1.633	99% gamma percentile (KM)	2.117

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (213.85, α)	181	Adjusted Chi Square Value (213.85, β)	179.1
95% Gamma Approximate KM-UCL (use when n>=50)	0.992	95% Gamma Adjusted KM-UCL (use when n<50)	1.003

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.843	Mean in Log Scale	-0.317
SD in Original Scale	0.402	SD in Log Scale	0.614
95% t UCL (assumes normality of ROS data)	0.975	95% Percentile Bootstrap UCL	0.965
95% BCA Bootstrap UCL	0.973	95% Bootstrap t UCL	0.98
95% H-UCL (Log ROS)	1.128		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.337	KM Geo Mean	0.714
KM SD (logged)	0.65	95% Critical H Value (KM-Log)	2.11
KM Standard Error of Mean (logged)	0.127	95% H-UCL (KM -Log)	1.154
KM SD (logged)	0.65	95% Critical H Value (KM-Log)	2.11
KM Standard Error of Mean (logged)	0.127		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.838	Mean in Log Scale	-0.362
SD in Original Scale	0.411	SD in Log Scale	0.742
95% t UCL (Assumes normality)	0.973	95% H-Stat UCL	1.264

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.974

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Silver

General Statistics

Total Number of Observations	27	Number of Distinct Observations	20
Number of Detects	22	Number of Non-Detects	5
Number of Distinct Detects	17	Number of Distinct Non-Detects	5
Minimum Detect	0.049	Minimum Non-Detect	0.022
Maximum Detect	0.35	Maximum Non-Detect	0.12
Variance Detects	0.00428	Percent Non-Detects	18.52%
Mean Detects	0.108	SD Detects	0.0654
Median Detects	0.0925	CV Detects	0.607
Skewness Detects	2.79	Kurtosis Detects	9.139
Mean of Logged Detects	-2.341	SD of Logged Detects	0.449

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.685	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0943	KM Standard Error of Mean	0.0129
KM SD	0.065	95% KM (BCA) UCL	0.117
95% KM (t) UCL	0.116	95% KM (Percentile Bootstrap) UCL	0.117
95% KM (z) UCL	0.116	95% KM Bootstrap t UCL	0.127
90% KM Chebyshev UCL	0.133	95% KM Chebyshev UCL	0.15
97.5% KM Chebyshev UCL	0.175	99% KM Chebyshev UCL	0.222

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.956	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.194	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.186	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.559	k star (bias corrected MLE)	3.967
Theta hat (MLE)	0.0236	Theta star (bias corrected MLE)	0.0272
nu hat (MLE)	200.6	nu star (bias corrected)	174.6
Mean (detects)	0.108		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.0921
Maximum	0.35	Median	0.08
SD	0.0683	CV	0.741
k hat (MLE)	1.969	k star (bias corrected MLE)	1.775
Theta hat (MLE)	0.0468	Theta star (bias corrected MLE)	0.0519
nu hat (MLE)	106.3	nu star (bias corrected)	95.84
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (95.84, α)	74.26	Adjusted Chi Square Value (95.84, β)	73.05
95% Gamma Approximate UCL (use when n>=50)	0.119	95% Gamma Adjusted UCL (use when n<50)	0.121

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Silver (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0943	SD (KM)	0.065
Variance (KM)	0.00422	SE of Mean (KM)	0.0129
k hat (KM)	2.109	k star (KM)	1.9
nu hat (KM)	113.9	nu star (KM)	102.6
theta hat (KM)	0.0447	theta star (KM)	0.0497
80% gamma percentile (KM)	0.142	90% gamma percentile (KM)	0.186
95% gamma percentile (KM)	0.227	99% gamma percentile (KM)	0.32

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (102.58, α)	80.21	Adjusted Chi Square Value (102.58, β)	78.94
95% Gamma Approximate KM-UCL (use when n>=50)	0.121	95% Gamma Adjusted KM-UCL (use when n<50)	0.123

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.16	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.096	Mean in Log Scale	-2.492
SD in Original Scale	0.0642	SD in Log Scale	0.529
95% t UCL (assumes normality of ROS data)	0.117	95% Percentile Bootstrap UCL	0.118
95% BCA Bootstrap UCL	0.123	95% Bootstrap t UCL	0.135
95% H-UCL (Log ROS)	0.117		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.556	KM Geo Mean	0.0776
KM SD (logged)	0.638	95% Critical H Value (KM-Log)	2.099
KM Standard Error of Mean (logged)	0.13	95% H-UCL (KM -Log)	0.124
KM SD (logged)	0.638	95% Critical H Value (KM-Log)	2.099
KM Standard Error of Mean (logged)	0.13		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0929	Mean in Log Scale	-2.608
SD in Original Scale	0.0672	SD in Log Scale	0.749
95% t UCL (Assumes normality)	0.115	95% H-Stat UCL	0.135

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.116	KM H-UCL	0.124

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc

General Statistics

Total Number of Observations	27	Number of Distinct Observations	23
		Number of Missing Observations	0
Minimum	13	Mean	99.3
Maximum	390	Median	89
SD	68.8	Std. Error of Mean	13.24
Coefficient of Variation	0.693	Skewness	2.982

Normal GOF Test

Shapiro Wilk Test Statistic	0.723	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	121.9	95% Adjusted-CLT UCL (Chen-1995)	129.2
		95% Modified-t UCL (Johnson-1978)	123.1

Gamma GOF Test

A-D Test Statistic	0.654	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.114	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.17	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.901	k star (bias corrected MLE)	2.604
Theta hat (MLE)	34.22	Theta star (bias corrected MLE)	38.14
nu hat (MLE)	156.7	nu star (bias corrected)	140.6
MLE Mean (bias corrected)	99.3	MLE Sd (bias corrected)	61.54
		Approximate Chi Square Value (0.05)	114.2
Adjusted Level of Significance	0.0401	Adjusted Chi Square Value	112.7

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	122.3	95% Adjusted Gamma UCL (use when n<50)	123.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.167	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.565	Mean of logged Data	4.416
Maximum of Logged Data	5.966	SD of logged Data	0.639

Assuming Lognormal Distribution

95% H-UCL	132	90% Chebyshev (MVUE) UCL	140.1
95% Chebyshev (MVUE) UCL	158.1	97.5% Chebyshev (MVUE) UCL	182.9
99% Chebyshev (MVUE) UCL	231.8		

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc (cont.'d)

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	121.1	95% Jackknife UCL	121.9
95% Standard Bootstrap UCL	120.1	95% Bootstrap-t UCL	136.2
95% Hall's Bootstrap UCL	226.6	95% Percentile Bootstrap UCL	122.6
95% BCA Bootstrap UCL	129.5		
90% Chebyshev(Mean, Sd) UCL	139	95% Chebyshev(Mean, Sd) UCL	157
97.5% Chebyshev(Mean, Sd) UCL	182	99% Chebyshev(Mean, Sd) UCL	231

Suggested UCL to Use

95% Adjusted Gamma UCL	123.9

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aroclor-1242 (PCB-1242)

General Statistics

Total Number of Observations	27	Number of Distinct Observations	24
Number of Detects	10	Number of Non-Detects	17
Number of Distinct Detects	9	Number of Distinct Non-Detects	17
Minimum Detect	43	Minimum Non-Detect	23
Maximum Detect	130	Maximum Non-Detect	100
Variance Detects	588.8	Percent Non-Detects	62.96%
Mean Detects	72.8	SD Detects	24.27
Median Detects	66	CV Detects	0.333
Skewness Detects	1.495	Kurtosis Detects	3.045
Mean of Logged Detects	4.244	SD of Logged Detects	0.305

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	44.1	KM Standard Error of Mean	5.908
KM SD	27.58	95% KM (BCA) UCL	56.44
95% KM (t) UCL	54.17	95% KM (Percentile Bootstrap) UCL	53.99
95% KM (z) UCL	53.81	95% KM Bootstrap t UCL	54.85
90% KM Chebyshev UCL	61.82	95% KM Chebyshev UCL	69.85
97.5% KM Chebyshev UCL	80.99	99% KM Chebyshev UCL	102.9

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.333	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	11.56	k star (bias corrected MLE)	8.157
Theta hat (MLE)	6.299	Theta star (bias corrected MLE)	8.925
nu hat (MLE)	231.1	nu star (bias corrected)	163.1
Mean (detects)	72.8		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	17.69	Mean	41.03
Maximum	130	Median	28.91
SD	28.98	CV	0.706
k hat (MLE)	2.613	k star (bias corrected MLE)	2.347
Theta hat (MLE)	15.7	Theta star (bias corrected MLE)	17.48
nu hat (MLE)	141.1	nu star (bias corrected)	126.8
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (126.76, α)	101.8	Adjusted Chi Square Value (126.76, β)	100.3
95% Gamma Approximate UCL (use when n>=50)	51.12	95% Gamma Adjusted UCL (use when n<50)	51.85

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aroclor-1242 (PCB-1242) (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	44.1	SD (KM)	27.58
Variance (KM)	760.6	SE of Mean (KM)	5.908
k hat (KM)	2.557	k star (KM)	2.297
nu hat (KM)	138.1	nu star (KM)	124
theta hat (KM)	17.25	theta star (KM)	19.2
80% gamma percentile (KM)	64.94	90% gamma percentile (KM)	83.04
95% gamma percentile (KM)	100.2	99% gamma percentile (KM)	137.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (124.05, α)	99.32	Adjusted Chi Square Value (124.05, β)	97.91
95% Gamma Approximate KM-UCL (use when n>=50)	55.07	95% Gamma Adjusted KM-UCL (use when n<50)	55.87

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	48.14	Mean in Log Scale	3.783
SD in Original Scale	24.12	SD in Log Scale	0.409
95% t UCL (assumes normality of ROS data)	56.06	95% Percentile Bootstrap UCL	56.28
95% BCA Bootstrap UCL	57.27	95% Bootstrap t UCL	58.91
95% H-UCL (Log ROS)	55.63		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.618	KM Geo Mean	37.26
KM SD (logged)	0.562	95% Critical H Value (KM-Log)	2.026
KM Standard Error of Mean (logged)	0.125	95% H-UCL (KM -Log)	54.53
KM SD (logged)	0.562	95% Critical H Value (KM-Log)	2.026
KM Standard Error of Mean (logged)	0.125		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	42.67	Mean in Log Scale	3.549
SD in Original Scale	28.65	SD in Log Scale	0.653
95% t UCL (Assumes normality)	52.07	95% H-Stat UCL	56.46

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	54.17

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aroclor-1254 (PCB-1254)

General Statistics

Total Number of Observations	27	Number of Distinct Observations	23
Number of Detects	4	Number of Non-Detects	23
Number of Distinct Detects	4	Number of Distinct Non-Detects	19
Minimum Detect	69	Minimum Non-Detect	28
Maximum Detect	420	Maximum Non-Detect	130
Variance Detects	29943	Percent Non-Detects	85.19%
Mean Detects	160.5	SD Detects	173
Median Detects	76.5	CV Detects	1.078
Skewness Detects	1.997	Kurtosis Detects	3.991
Mean of Logged Detects	4.737	SD of Logged Detects	0.87

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.65	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.433	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	49.01	KM Standard Error of Mean	16.66
KM SD	74.49	95% KM (BCA) UCL	N/A
95% KM (t) UCL	77.42	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	76.41	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	98.98	95% KM Chebyshev UCL	121.6
97.5% KM Chebyshev UCL	153	99% KM Chebyshev UCL	214.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.866	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.662	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.456	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.399	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.612	k star (bias corrected MLE)	0.57
Theta hat (MLE)	99.56	Theta star (bias corrected MLE)	281.7
nu hat (MLE)	12.9	nu star (bias corrected)	4.558
Mean (detects)	160.5		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	23.79
Maximum	420	Median	0.01
SD	82.65	CV	3.475
k hat (MLE)	0.124	k star (bias corrected MLE)	0.135
Theta hat (MLE)	192.4	Theta star (bias corrected MLE)	176.8
nu hat (MLE)	6.675	nu star (bias corrected)	7.266
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (7.27, α)	2.318	Adjusted Chi Square Value (7.27, β)	2.143
95% Gamma Approximate UCL (use when n>=50)	74.57	95% Gamma Adjusted UCL (use when n<50)	N/A

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aroclor-1254 (PCB-1254) (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	49.01	SD (KM)	74.49
Variance (KM)	5548	SE of Mean (KM)	16.66
k hat (KM)	0.433	k star (KM)	0.409
nu hat (KM)	23.38	nu star (KM)	22.11
theta hat (KM)	113.2	theta star (KM)	119.7
80% gamma percentile (KM)	79.3	90% gamma percentile (KM)	137.8
95% gamma percentile (KM)	202	99% gamma percentile (KM)	362.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (22.11, α)	12.42	Adjusted Chi Square Value (22.11, β)	11.96
95% Gamma Approximate KM-UCL (use when n>=50)	87.23	95% Gamma Adjusted KM-UCL (use when n<50)	90.62

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.685	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.419	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	29.02	Mean in Log Scale	2.183
SD in Original Scale	81.13	SD in Log Scale	1.188
95% t UCL (assumes normality of ROS data)	55.65	95% Percentile Bootstrap UCL	57.94
95% BCA Bootstrap UCL	74.9	95% Bootstrap t UCL	149
95% H-UCL (Log ROS)	34.33		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.57	KM Geo Mean	35.51
KM SD (logged)	0.59	95% Critical H Value (KM-Log)	2.052
KM Standard Error of Mean (logged)	0.137	95% H-UCL (KM -Log)	53.59
KM SD (logged)	0.59	95% Critical H Value (KM-Log)	2.052
KM Standard Error of Mean (logged)	0.137		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	50.44	Mean in Log Scale	3.584
SD in Original Scale	75.82	SD in Log Scale	0.66
95% t UCL (Assumes normality)	75.33	95% H-Stat UCL	58.96

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

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	121.6

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

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

alpha-Chlordane

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
Number of Detects	1	Number of Non-Detects	26
Number of Distinct Detects	1	Number of Distinct Non-Detects	21

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

The data set for variable alpha-Chlordane was not processed!

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

gamma-Chlordane

General Statistics

Total Number of Observations	27	Number of Distinct Observations	20
Number of Detects	5	Number of Non-Detects	22
Number of Distinct Detects	5	Number of Distinct Non-Detects	17
Minimum Detect	2.3	Minimum Non-Detect	1.5
Maximum Detect	12	Maximum Non-Detect	40
Variance Detects	14.52	Percent Non-Detects	81.48%
Mean Detects	5.4	SD Detects	3.811
Median Detects	4.5	CV Detects	0.706
Skewness Detects	1.881	Kurtosis Detects	3.88
Mean of Logged Detects	1.524	SD of Logged Detects	0.607

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.781	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.373	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	2.498	KM Standard Error of Mean	0.527
KM SD	2.199	95% KM (BCA) UCL	3.804
95% KM (t) UCL	3.397	95% KM (Percentile Bootstrap) UCL	3.491
95% KM (z) UCL	3.365	95% KM Bootstrap t UCL	3.349
90% KM Chebyshev UCL	4.08	95% KM Chebyshev UCL	4.797
97.5% KM Chebyshev UCL	5.791	99% KM Chebyshev UCL	7.745

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.44	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.682	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.322	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.359	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.244	k star (bias corrected MLE)	1.431
Theta hat (MLE)	1.664	Theta star (bias corrected MLE)	3.773
nu hat (MLE)	32.44	nu star (bias corrected)	14.31
Mean (detects)	5.4		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	1.019
Maximum	12	Median	0.01
SD	2.601	CV	2.552
k hat (MLE)	0.216	k star (bias corrected MLE)	0.217
Theta hat (MLE)	4.714	Theta star (bias corrected MLE)	4.699
nu hat (MLE)	11.68	nu star (bias corrected)	11.71
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (11.71, α)	5.038	Adjusted Chi Square Value (11.71, β)	4.76
95% Gamma Approximate UCL (use when n>=50)	2.369	95% Gamma Adjusted UCL (use when n<50)	2.508

Table B.4

Summary of ProUCL Output for Quarry Pond Sediments Bioaccumulation to Fish
South Dayton Dump Site
Moraine, Ohio

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2019 3:10:09 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

gamma-Chlordane (cont.'d)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.498	SD (KM)	2.199
Variance (KM)	4.837	SE of Mean (KM)	0.527
k hat (KM)	1.29	k star (KM)	1.171
nu hat (KM)	69.66	nu star (KM)	63.26
theta hat (KM)	1.936	theta star (KM)	2.132
80% gamma percentile (KM)	3.964	90% gamma percentile (KM)	5.531
95% gamma percentile (KM)	7.079	99% gamma percentile (KM)	10.63

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (63.26, α)	45.96	Adjusted Chi Square Value (63.26, β)	45.02
95% Gamma Approximate KM-UCL (use when n>=50)	3.438	95% Gamma Adjusted KM-UCL (use when n<50)	3.51

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.799	Mean in Log Scale	0.226
SD in Original Scale	2.318	SD in Log Scale	0.735
95% t UCL (assumes normality of ROS data)	2.56	95% Percentile Bootstrap UCL	2.584
95% BCA Bootstrap UCL	3.013	95% Bootstrap t UCL	3.82
95% H-UCL (Log ROS)	2.255		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.73	KM Geo Mean	2.075
KM SD (logged)	0.518	95% Critical H Value (KM-Log)	1.986
KM Standard Error of Mean (logged)	0.143	95% H-UCL (KM -Log)	2.902
KM SD (logged)	0.518	95% Critical H Value (KM-Log)	1.986
KM Standard Error of Mean (logged)	0.143		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.593	Mean in Log Scale	0.869
SD in Original Scale	4.367	SD in Log Scale	0.82
95% t UCL (Assumes normality)	5.026	95% H-Stat UCL	4.828

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

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.397

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Attachment C

TABLE C.1 (RAGS D IEUBK LEAD WORKSHEET)
Site Name: South Dayton Dump – Quarry Pond
Receptor: Child Fisher Eater (Age 12 to 72 Months) Exposure to Media as Described

1. Lead Screening Questions

Medium	Lead Concentration Used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Soil	200	mg/kg	Default values in IEUBK model	400	mg/kg	Recommended Soil Screening Level
Water	4	ug/L	Default values in IEUBK model	15	ug/L	Recommended Drinking Water Action Level
Fish Tissue	0.742	ug/g	Average Detected Value			

2. Lead Model Questions

Question	Response for Residential Lead Model
What lead model (version and date) was used?	IEUBK version 1.1 Build 11, 2010
Where are the input values located in the risk assessment report?	Attachment C
What range of media concentrations were used for the model?	Soil and water are based on default values in IEUBK model. Fish tissue concentrations model based on average sediment concentration – see Table 7
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Mean of the data and ProUCL stats used to calculate mean. Data presented in Attachment A and ProUCL output provided in Attachment B
Was soil sample taken from top 2 cm? If not, why?	No, as this was sediment
Was soil sample sieved? What size screen was used? If not sieved, provide rationale.	No, sediment sample
What was the point of exposure/location?	Ingestion of fish based on uptake from sediment
Where are the output values located in the risk assessment report?	Attachment C
Was the model run using default values only?	Yes for soil and water. Site specific fish tissue concentration
Was the default soil bioavailability used?	Yes, Default is 30%
Was the default soil ingestion rate used?	Yes, Default values for 7 age groups are 85, 135, 135, 100, 090, and 85 mg/day
If non-default values were used, where are the rationale for the values located in the risk assessment report?	Located in Attachment C

TABLE C.1 (RAGS D IEUBK LEAD WORKSHEET)
Site Name: South Dayton Dump – Quarry Pond
Receptor: Child Fisher Eater (Age 12 to 72 Months) Exposure to Media as Described

3. Final Result

Medium	Result	Comment/PRG [1]
<MEDIUM>	Input value of 0.742 ug/g in fish tissue (plus 200 mg/kg in soil and 4 ug/L in water) results in 0.631% of child fish eater below a blood lead level of 10 ug/dL. Geometric mean blood lead = 3.096 ug/dL. This is below the blood lead goal as described in the 1994 OSWER Directive of no more than 5% of children exceeding 10 ug/dL blood lead.	PRG was not calculated for fish tissue..

1. Attach the IEUBK text output file and graph upon which the PRG was based as an appendix. For additional information, see www.epa.gov/superfund/programs/lead

LEAD MODEL FOR WINDOWS Version 1.1

==========
Model Version: 1.1 Build11
User Name: GHD
Date: 09/12/2020
Site Name: South Dayton Dump
Operable Unit: Quarry Pond - fish ingestion
Run Mode: Site Risk Assessment

Maternal Data
USEPA 2017 update
Diet Data
USEPA 2017 update
==========

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.652
1-2	3.055
2-3	3.540
3-4	3.550
4-5	3.563
5-6	3.793
6-7	4.231

Alternative Dietary Values
Home grown fruits concentration: 0.000 µg/g
Home grown vegetables concentration: 0.000 µg/g
Fish from fishing concentration: 0.742 µg/g
Game animals from hunting concentration: 0.000 µg/g
Home grown fruits factor: 0.000 % of all fruits
Home grown vegetables factor: 0.000 % of all vegetables
Fish from fishing factor: 5.000 %of all meat
Game animals from hunting factor: 0.000 % of all meat

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520

3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 150.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	200.000	150.000
1-2	200.000	150.000
2-3	200.000	150.000
3-4	200.000	150.000
4-5	200.000	150.000
5-6	200.000	150.000
6-7	200.000	150.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

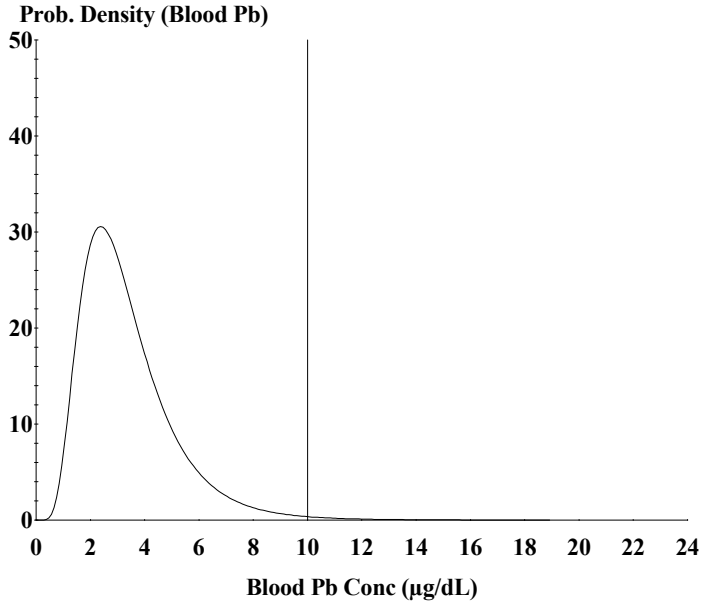
Maternal Blood Concentration: 0.600 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.242	0.000	0.375
1-2	0.034	1.414	0.000	0.926
2-3	0.062	1.653	0.000	0.971
3-4	0.067	1.673	0.000	0.999
4-5	0.067	1.708	0.000	1.054
5-6	0.093	1.829	0.000	1.119
6-7	0.093	2.047	0.000	1.142

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	4.120	5.758	3.1
1-2	6.466	8.839	3.6
2-3	6.525	9.212	3.4

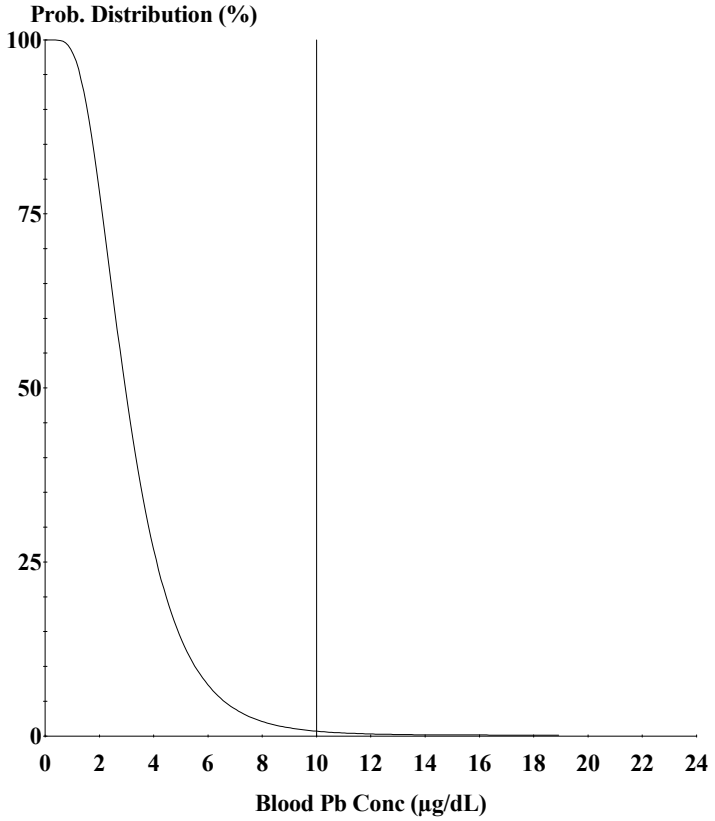
3-4	**6.587**	**9.326**	**3.3**
4-5	**4.961**	**7.790**	**2.8**
5-6	**4.492**	**7.534**	**2.4**
6-7	**4.255**	**7.537**	**2.2**



Cutoff = 10.000 µg/dl
Geo Mean = 3.096
GSD = 1.600
% Above = 0.631
% Below = 99.369

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment



Cutoff = 10.000 µg/dl
Geo Mean = 3.096
GSD = 1.600
% Above = 0.631

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment