LOWER LEY CREEK SITE
SYRACUSE, NEW YORK
HUMAN HEALTH RISK ASSESSMENT

U.S. EPA Work Assignment Number: 0-007
Lockheed Martin Work Order Number: SER00007
U.S. EPA Contract Number: EP-W09-031

Prepared for:
U.S. EPA/ERT

Prepared by:
Lockheed Martin/SERAS

_____ _____
Chris Gussman Date
Task Leader

_____ _____
Dennis A. Miller Date
SERAS Program Manager

255826

This page intentionally left blank to facilitate double-sided printing.

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 Overview of the Site 1
1.2 Purpose of this Document 1
1.3 Organization of this Document 1

2 SITE CHARACTERIZATION 3

3 EXPOSURE ASSESSMENT 4
3.1 Site Conceptual Model 4
3.1.1 Sources and Transport/Fate Processes 4
3.1.2 Exposure Areas 4
3.1.3 Exposed Populations 4
3.1.4 Exposure Pathways 5
3.2 Selection of Chemicals of Potential Concern 5
3.3 Evaluation of Exposures to Non-Lead Chemicals 5
3.3.1 Basic Equations 5
3.3.2 Exposure Parameters 9
3.3.3 Exposure Point Concentrations (EPCs) 9
3.4 Evaluation of Exposures to Lead 9

4 TOXICITY ASSESSMENT 11
4.1 Overview 11
4.2 Non-Cancer Effects 11
4.3 Cancer Effects 11
4.4 Toxicity Values for Ingestion Exposures 13
4.5 Toxicity Values for Dermal Exposures 13
4.6 Toxicity Values for TCDD-like Congeners 14
4.7 Toxicity Values for PCB Mixtures 14

5 RISK CHARACTERIZATION 16
5.1 Non-Cancer Approach 16
5.2 Cancer Approach 16
5.2.1 Evaluation of PCB Mixtures 17
5.2.2 Evaluation of Carcinogens with Mutagenic Modes of Action 17
5.3 Combining Risks across Chemicals and Exposure Pathways 17
5.4 Non-Cancer Summary 18
5.4.1 Recreational Visitor – Adult 18
5.4.2 Recreational Visitor – Older Child (6–<16 years old) 18
5.4.3 Recreational Visitor – Younger Child (<6 years old) 18
5.4.4 Construction Worker – Adult 18
5.5 Cancer Risk Summary 18
5.5.1 Recreational Visitor – Adult 18
5.5.2 Recreational Visitor – Older Child (6–<16 years old) 19

5.5.3 Recreational Visitor – Younger Child (<6 years old) 19
5.5.4 Construction Worker – Adult 19

6 UNCERTAINTY ASSESSMENT 20
6.1 Chemicals Not Evaluated 20
6.2 Exposure Pathways Not Evaluated 20
6.3 Exposure Point Concentrations 21
6.4 Human Exposure Parameters 21
6.5 Uncertainties in Toxicity Values 21
6.6 Uncertainties in Risk Estimates 22

7 REFERENCES 23

8 TABLES 29
8.1 Series 1 Tables 30
8.2 Series 2 Tables 34
8.3 Series 3 Tables 74
8.4 Series 4 Tables 81
8.5 Series 5 Tables 106
8.6 Series 6 Tables 111
8.7 Series 7 Tables 114
8.8 Series 9 Tables 139

ACRONYMS AND ABBREVIATIONS

95UCL	95% Upper Confidence Limit
ABS_d	dermal absorption fraction
ADAF	age-dependent adjustment factor
Ah	arylhydrocarbon
ALM	Adult Lead Model
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
BW	body weight
CF	conversion factor or correction factor
COPCs	chemicals of potential concern
CTE	central tendency exposure
DAD	dermally absorbed dose
DA_{event}	absorbed dose per event
DAF	dermal adherence factor
DI	daily intake
ED	exposure duration
EF	exposure frequency
EPC	exposure point concentration
EV	event frequency
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HIF	human intake factor
HQ	hazard quotient
IR	intake rate
IRIS	Integrated Risk Information System
K_p	dermal permeability coefficient
LOAEL	lowest observed adverse effect level
MRL	minimal risk level
NOAEL	no observed adverse effect level
NYSDEC	New York State Department of Environmental Conservation
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxin
PCDF	polychlorinated dibenzofuran
PPRTV	Provisional Peer Reviewed Toxicity Value
RAGS	Risk Assessment Guidance for Superfund
RfD	reference dose
RME	reasonable maximum exposure
RSL	regional screening level
SA	surface area
SF	slope factor

ACRONYMS AND ABBREVIATIONS (cont.)

STSC	Superfund Health Risk Technical Support Center
TCDD	2,3,7,8-tetrachlorodibenzo-para-dioxin (dioxin)
TEF	toxicity equivalency factor
TEQ	toxicity equivalent
t_{event}	event duration
TWA	time-weighted average
TWF	time-weighting factor
UF	uncertainty factor
USEPA	U.S. Environmental Protection Agency
WOE	weight of evidence

1 INTRODUCTION

1.1 Overview of the Site

The following site overview is taken from Gussman (2009) and is based on previous investigations of Lower Ley Creek and the Onondaga Lake Superfund Site (e.g., TAMS 2002a, 2002b, 2002c, 2003a, 2003b, 2003c). Lower Ley Creek consists of channel sediments and surface water and floodplain soil/sediment from the Brewerton Road (U.S. Route 11) bridge downstream to Onondaga Lake. Ley Creek has been impacted by a number of facilities located near the creek including the GM Inland Fisher Guide facility in East Syracuse, New York. The facility operated between 1952 and 1993, initially as a plating facility and later for the manufacture of plastic automotive components. Lower Ley Creek has received a wide range of contaminants, including PCBs and heavy metals. Polychlorinated biphenyls (PCBs) (Aroclors 1016, 1248, 1254, and 1260) were detected in Lower Ley Creek at concentrations as high as 360,000 µg/kg. The Onondaga Lake Remedial Investigation report (TAMS, 2002c) estimated PCB loads of 23, 3.3, and 1.1 kg/year of Aroclors 1016, 1242, and 1260, respectively. Cadmium, chromium, copper, lead, mercury, and nickel were also detected at elevated levels in Ley Creek sediment. Sediment data obtained near the mouth of Ley Creek suggest that Ley Creek is a source of polychlorinated dibenzo-dioxin/polychlorinated dibenzo-furans (PCDD/PCDFs) to Onondaga Lake. In consideration of the above, Ley Creek is a source of PCBs, heavy metals, and PCDD/PCDFs and may be contributing to unacceptable human health and ecological risks in Onondaga Lake resulting from the consumption of fish.

1.2 Purpose of this Document

The purpose of this document is to provide a human health risk assessment (HHRA) for the Lower Ley Creek Site. The HHRA process presented in this report has three components: exposure assessment, toxicity assessment, and risk characterization. The exposure assessment includes an identification of relevant human receptors and the mechanisms by which they may be exposed to site contaminants, and a description of how exposure estimates will be derived. The toxicity assessment includes a summary of the toxicity data that will be used to evaluate the potential risks associated with site-related exposures. The risk characterization integrates the exposure estimates and toxicity data to quantify potential site-related human health risks.

1.3 Organization of this Document

In addition to this introduction, this report is organized into the following sections:

Section 2 This section provides a brief description of the site location and land uses that are relevant to the exposure assessment.

Section 3 This section describes the methods that will be used to characterize human exposure at the site, including the chemicals of potential concern present in

environmental media, the potential human exposure pathways, and the scenarios, factors, and equations used to estimate exposures.

Section 4 This section summarizes the toxicity factors used to quantify potential human health risks associated with the chemicals of interest at the site.

Section 5 This section characterizes non-cancer and cancer risks associated with exposures to chemicals of interest in environmental media at the site.

Section 6 This section identifies the primary sources of uncertainty in the HHRA and discusses the likely magnitude and direction of the error attributable to these uncertainties.

Section 7 This section provides citations for the documents and scientific publications referenced in the HHRA.

Section 8 This section provides all tables that are cited in the text.

2 SITE CHARACTERIZATION

Information concerning the Lower Ley Creek Site was summarized in Section 1. Additional information is available in Gussman (2009) and previous reports (TAMS, 2002a, 2002b, 2002c, 2003a, 2003b, 2003c) (see Section 7, References).

The data addressed in this HHRA were collected by SERAS personnel in November-December 2009. Samples of sediment, surface water, and fish were collected. Additional information concerning the areas sampled, the collection methods, and the numbers of samples collected and analyzed are presented in Gussman (2009). Analytical data regarding chemical concentrations detected in these samples are summarized and discussed in the following section.

In this assessment, all sediment and surface water data were pooled and addressed as one exposure area. Only surficial/shallow sediment data (i.e., collected from depths of 0-12 inches) are addressed in this HHRA. In addition, all fish fillet data were pooled into one data set for the HHRA without regard to differences among samples (i.e., different fish species, sizes).

3 EXPOSURE ASSESSMENT

Exposure is the process by which human or ecological receptors come into contact with chemicals in the environment. In general, receptors can be exposed to chemicals in a variety of environmental media (e.g., soil, water, food), and these exposures can occur through several routes (e.g., ingestion, dermal contact). This section summarizes the environmental media and chemicals of potential concern (COPCs) at the Lower Ley Creek Site, identifies potential human exposure pathways, and describes the methods used to quantify exposure from each pathway.

3.1 Site Conceptual Model

3.1.1 Sources and Transport/Fate Processes

Ley Creek has been impacted by a number of facilities located near the creek, including the GM Inland Fisher Guide facility in East Syracuse, New York. Lower Ley Creek has received a wide range of contaminants including PCBs and heavy metals. PCBs (Aroclors 1016, 1248, 1254, and 1260) were detected in Lower Ley Creek at concentrations as high as 360,000 µg/kg. The Onondaga Lake Remedial Investigation report (TAMS 2002c) estimated PCB loads of 23, 3.3, and 1.1 kg/year of Aroclors 1016, 1242, and 1260, respectively. Cadmium, chromium, copper, lead, mercury, and nickel were also detected at elevated levels in Ley Creek sediment. Sediment data obtained near the mouth of Ley Creek suggest that Ley Creek is a source of PCDD/PCDFs to Onondaga Lake.

3.1.2 Exposure Areas

The Lower Ley Creek Site consists of channel sediments and surface water and floodplain soil/sediment from the Brewerton Road (U.S. Route 11) bridge downstream to Onondaga Lake. For purposes of this HHRA, all sediment, surface water, and fish samples collected during the November 2009 sampling are considered as one exposure area. In addition, samples from the Dredge Spoil Area are considered as a soil exposure area.

3.1.3 Exposed Populations

For the purposes of this risk assessment, the current and future land uses of the Lower Ley Creek Site and its immediate surroundings are assumed to be consistent. The land surrounding the site is in commercial/industrial use or is undeveloped. There are no residential areas in the immediate vicinity, and thus, residential exposure scenarios are not evaluated in this HHRA. Other receptors that may be exposed to media at the site are potential recreational users who may come to the site to fish. It is also possible that hypothetical future construction activities could occur at the site, and thus, a future construction worker scenario is also considered. A summary of the various receptor groups considered for inclusion in the HHRA is presented in Table 1.1, along with a brief rationale for their inclusion/exclusion.

3.1.4 Exposure Pathways

As noted above, recreational users (both adults and children) and future construction workers are the primary receptor groups evaluated in this HHRA. Potential exposure pathways include contact with Ley Creek sediments and surface water via incidental ingestion and dermal contact, as well as potential consumption of contaminated fish and wildlife. Additional information on exposure pathways evaluated in this HHRA is presented in Table 1.1.

3.2 Selection of Chemicals of Potential Concern

The Risk Assessment Guidance for Superfund (RAGS) D Table 2 series (2.1, 2.2. 2.3, 2.4) summarizes the analytical data used to identify COPCs for this risk assessment. As noted previously, these data were collected in November–December 2009 (Gussman, 2009). COPCs are identified based on a screening analysis that uses the U.S. Environmental Protection Agency (USEPA) (2009) regional screening levels (RSLs). Chemicals are selected as COPCs if their maximum detected concentration in a given medium (sediment, surface water, fish) is greater than the relevant RSL and their detection frequency is greater than 5%. In addition, all chemicals classified as category A – known human carcinogens – are selected as COPCs. Additional information about the screening process and decision criteria used to select COPCs is provided in the tables and associated footnotes.

3.3 Evaluation of Exposures to Non-Lead Chemicals

3.3.1 Basic Equations

3.3.1.1 Ingestion Exposures

The amount of a chemical that is ingested is referred to as “intake” or “dose”. For non-lead chemicals, exposure is quantified using an equation of the following general form:

$$DI = C \cdot (IR / BW) \cdot (EF \cdot ED / AT)$$

where:

DI = Daily intake of chemical (mg of chemical per kg of body weight per day).

C = Concentration of the chemical in the contaminated environmental medium (soil, sediment, water, food) to which the person is exposed. The units are mg/L for water, and mg/kg for solid media.

IR = Intake rate of the contaminated environmental medium. The units are L/day for aqueous media, and kg/day for solid media.

BW = Body weight of the exposed person (kg).

EF = Exposure frequency (days/year). This describes how often a person is likely to be exposed to the contaminated medium over the course of a typical year.

ED = Exposure duration (years). This describes how long a person is likely to be exposed to the contaminated medium during their lifetime.

AT = Averaging time (days). This term specifies the length of time over which the average dose is calculated. Usually, two different averaging times are considered:

> "Chronic" exposure includes averaging times on the scale of years (typically ranging from 7 to 70 years), which are used to assess non-cancer hazards.
>
> "Lifetime" exposure employs an averaging time of 70 years to evaluate cancer risks.

Note that the factors EF, ED, and AT combine to yield a factor between zero and one. Values near 1.0 indicate that exposure occurs nearly continuously over the specified averaging period, while values near zero indicate that exposure occurs infrequently.

For mathematical convenience, the general equation for calculating dose can be written as:

$$DI = C \cdot HIF$$

where:

HIF = Human intake factor. This term describes the average amount of an environmental medium contacted by the exposed person each day. The value of HIF is typically given by:

$$HIF = (IR / BW) \cdot (EF \cdot ED / AT)$$

The units of HIF are L/kg-day for aqueous media and kg/kg-day for solid media.

Because one or more exposure parameter (e.g., intake rates, body weight, and exposure frequency) may change as a function of age, exposure calculations for non-cancer risks are often performed separately for children and adults. However, for estimating excess cancer risks from exposure to a chemical, because the same individual may be exposed beginning as a child and extending into adulthood, exposure is calculated as the time-weighted average (TWA) lifetime exposure:

$$DI_{TWA} = C \cdot [(IR_c / BW_c) \cdot (EF_c \cdot ED_c / AT) + [(IR_a / BW_a) \cdot (EF_a \cdot ED_a / AT)]$$

where the subscripts "c" and "a" refer to child and adult, respectively.

3.3.1.2 Dermal Exposures

Exposure to a chemical by the dermal pathway is generally expressed in terms of the amount of chemical that is absorbed into the body. The amount of a chemical absorbed across the skin is referred to as the dermally absorbed dose (DAD), which is quantified using an equation of the following general form (USEPA, 2004):

$$DAD = DA_{event} \cdot EF \cdot ED \cdot EV \cdot SA / (BW \cdot AT)$$

where:

DAD = Dermally absorbed dose (mg of chemical per kg of body weight per day).

DA_{event} = Absorbed dose per event (mg of chemical per square centimeter of skin surface area per event). This is medium-specific and is further described below.

EF = Exposure frequency (days/year). This describes how often a person is likely to be exposed to the contaminated medium over the course of a typical year.

ED = Exposure duration (years). This describes how long a person is likely to be exposed to the contaminated medium during their lifetime.

EV = Event frequency (events/day). This describes the number of times per day a person comes in contact with a contaminant in soil.

SA = Surface area (cm^2). This describes the amount of skin exposed to contaminated media.

BW = Body weight of the exposed person (kg).

AT = Averaging time (days). This term specifies the length of time over which the average dose is calculated.

For chemicals in soil or sediment, DA_{event} is estimated as follows:

$$DA_{event} = C \cdot CF \cdot DAF \cdot ABS_d$$

where:

C = Chemical concentration in soil or sediment (mg of chemical per kg of soil or sediment).

CF = Conversion factor (10^{-6} kg/mg).

DAF = Dermal adherence factor (mg of soil per square centimeter of skin surface area per event). This describes the amount of soil that adheres to the skin per unit of surface area.

ABS_d = Dermal absorption fraction (unitless). This value is chemical-specific and represents the contribution of dermal absorption to the systemic dose. Table 5.2 summarizes the ABS_d values for each chemical.

For chemicals in water, DA_{event} is estimated as follows:

$$DA_{event} = K_p \cdot C \cdot t_{event}$$

where:

K_p = Dermal permeability coefficient of compound in water (cm/hr). This value is chemical-specific. Table 5.3 summarizes the dermal permeability coefficients for each chemical.

C = Chemical concentration in water (mg of chemical per cubic centimeter of water).

t_{event} = Event duration (hr/event). This describes how long a person is likely to be exposed to the contaminated medium per exposure event.

For mathematical convenience, the general equation for calculating DAD can be written as:

Soil/Sediment: $DAD = C_{soil/sediment} \cdot ABS_d \cdot HIF_{soil/sediment}$
Water: $DAD = C_{water} \cdot K_p \cdot HIF_{water}$

where:

$$HIF_{soil/sediment} = (SA \cdot DAF \cdot EF \cdot ED \cdot EV \cdot CF) / (BW \cdot AT)$$

$$HIF_{water} = (SA \cdot EV \cdot EF \cdot ED \cdot t_{event}) / (BW \cdot AT)$$

The units of HIF are kg/kg-day for soil and sediment, and cm^2-hr/kg-day for water.

As described above, when the same individual may be exposed beginning as a child and extending into adulthood, exposure was calculated as the time-weighted average (TWA) lifetime exposure for evaluating cancer risks. For non-cancer risks, children and adults were evaluated separately.

Dermal exposures will only be evaluated for COPCs with appropriate ABS_d values (for soil/sediment exposures) or dermal permeability coefficients (for water exposures).

3.3.2 Exposure Parameters

There are differences among individuals in intake rates, body weights, exposure frequencies, and exposure durations that determine the actual extent of chemical exposure in an exposed population. Typically, the HHRA addresses intakes that are "average" or otherwise near the central portion of the range of possible exposures, and intakes that are near the upper end of the range (e.g., the 95th percentile). These two exposure estimates are referred to as central tendency exposure (CTE) and reasonable maximum exposure (RME), respectively. Both CTE and RME are evaluated in this HHRA.

When selecting CTE parameters, the intake variables for a specific exposure pathway (e.g., body weight, ingestion rate, exposure frequency, exposure duration) are usually based on mean or median values, so that the CTE represents the "typical" or "average" exposure. When selecting RME parameters, the intake variables are selected to provide a "reasonable" maximum estimate of the daily intake (USEPA, 1989a). In other words, some inputs are set equal to mean values (e.g., body weight), and some inputs are set equal to upper bound values (e.g., ingestion rates, exposure frequency, and exposure duration), such that the resulting combination yields an estimate that is considered a RME (USEPA ,1989a). As noted above, because exposure parameters (e.g., intake rates, body weight, and exposure frequency) may change as a function of age, different values are used for children and adults. Exposure factors used to quantify exposures via the pathways identified above are presented in the USEPA (2001a) RAGS Part D Table 4 series.

3.3.3 Exposure Point Concentrations (EPCs)

USEPA (1992) recommends that the 95% upper confidence limit (95UCL) of the arithmetic mean at each exposure point be used when calculating exposure and risk at that location.

The appropriate approach to calculate a 95UCL depends on a number of factors, including the number of data points available, the shape of the distribution of the values, and the degree of censoring (i.e., samples below the detection limit) (USEPA, 2002c). Because of the complexity of this process, USEPA (2007a) has developed a software application called ProUCL v4.0 to assist in the estimation of 95UCL values. ProUCL calculates 95UCLs for a data set using several different strategies and recommends which 95UCL is preferred based on the properties of the data set. A minimum of 5 samples and 2 distinct detected values is required to calculate 95UCLs in ProUCL. If the minimum data requirements for ProUCL are not met, the exposure point concentration (EPC) is set equal to the maximum detected value. If ProUCL provides more than one "recommended" 95UCL to use (e.g., Chebyshev or Bootstrap), the higher recommended value is used as the EPC.

3.4 Evaluation of Exposures to Lead

In accordance with USEPA (1994a, 2003b) guidance, potential health effects of lead are evaluated differently than other compounds. As such, the EPC for lead is calculated as the

arithmetic mean of the measured concentrations for that medium/area. The arithmetic mean lead concentration in sediments (101 mg/kg, Table 3.3) and dredge spoil area soils (144.6 mg/kg, Table 3.2) are less than the USEPA (2009) RSLs for both residential (400 mg/kg) and commercial/industrial (800 mg/kg) land uses. Per USEPA (2009) guidance, "at sites where contaminant concentrations fall below screening levels, no further action or study is warranted under the Superfund program." As such, lead is not evaluated further in this HHRA.

4 TOXICITY ASSESSMENT

4.1 Overview

The objective of toxicity assessment is to identify what adverse health effects are associated with exposure to a given chemical. The toxicity assessment usually addresses cancer and non-cancer effects separately. This approach is due to differences in the mode of action and the shape of the dose-response curve for cancer and non-cancer effects and differences in the ways associated risks are quantified.

4.2 Non-Cancer Effects

Essentially all chemicals can cause adverse health effects at a sufficient dose. However, when the dose is sufficiently low, typically no adverse effect is observed. Thus, in characterizing the non-cancer effects of a chemical, the key parameter is the threshold dose at which an adverse effect first becomes evident. Doses below the threshold are considered to be safe, while doses above the threshold may cause an effect.

The threshold dose is typically estimated from toxicological data (derived from studies of humans and/or animals) by finding the highest dose that does not produce an observable adverse effect, and the lowest dose that does produce an effect. These are referred to as the no-observed-adverse-effect level (NOAEL) and the lowest-observed-adverse-effect level (LOAEL), respectively. The threshold is presumed to lie between the NOAEL and the LOAEL. Non-cancer evaluations rely on the reference dose (RfD) as a health-protective estimate of the human toxicity threshold. The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

The RfD is derived from toxicity data using uncertainty factors (UFs) that reflect limitations of the data used. If the data are from studies in humans, and if the observations are considered to be very reliable, the UF may be as small as 1. However, the UF is normally at least 10, and can be much higher if the data are limited. UFs are assigned to account for uncertainty arising from extrapolation of animal data to humans, the use of a LOAEL instead of a NOAEL, the use of less-than-chronic exposure, and other limitations in the available data (e.g., lack of reproductive data, etc.). Use of UFs to derive the RfD ensures that the RfD is not higher than the “true” human threshold for adverse effects. Doses higher than the RfD may carry some risk, but a dose above the RfD does not mean that an effect will necessarily occur.

4.3 Cancer Effects

For cancer effects, the toxicity assessment process has two components. The first is a qualitative evaluation of the weight of evidence (WOE) that the chemical does or does not cause cancer in

humans. Typically, this evaluation is performed by USEPA (1986a), using the system summarized below:

WOE Group	Meaning	Description
A	Known human carcinogen	Sufficient evidence of cancer in humans.
B1	Probable human carcinogen	Suggestive evidence of cancer incidence in humans.
B2	Probable human carcinogen	Sufficient evidence of cancer in animals, but lack of data or insufficient data in humans.
C	Possible human carcinogen	Suggestive evidence of carcinogenicity in animals.
D	Cannot be evaluated	No evidence or inadequate evidence of cancer in animals or humans.
E	Not carcinogenic to humans	Strong evidence that it does not cause cancer in humans.

More recently, USEPA has revised the WOE descriptions and its approach for evaluating the carcinogenic potential of environmental contaminants, as described in USEPA (2005a). However, these revised descriptions have not yet been developed for some chemicals.

For chemicals that are considered potentially carcinogenic (i.e., classified in Group A, B1, B2, or C using USEPA [1986a] guidelines), the second part of the toxicity assessment is to describe the carcinogenic potency of the chemical. This is done by quantifying how the number of cancers observed in exposed animals or humans increases as the dose increases. Typically, it is assumed that the dose-response curve for cancer has no threshold (i.e., that any dose above zero is associated with an increased cancer risk that increases until high doses are reached). Thus, the most convenient descriptor of cancer potency is the slope of the dose-response curve at low doses (where the slope is still linear). This is referred to as the slope factor (SF), which has dimensions of risk of cancer per unit dose.

Estimating the SF is often complicated by the fact that observable increases in cancer incidence usually occur only at relatively high doses, frequently in the part of the dose-response curve that is no longer linear. Thus, it is necessary to use mathematical models to extrapolate from the observed high dose data to the desired (but immeasurable) slope at low dose. To account for the uncertainty in this extrapolation process, USEPA typically employs the upper 95th confidence limit of the slope to provide a conservative (health-protective) estimate of the SF.

4.4 Toxicity Values for Ingestion Exposures

USEPA (2003a) describes the recommended hierarchy for selecting toxicity values for use in human health risk assessment at Superfund sites. Generally, the first preference is for USEPA consensus values as listed in the Integrated Risk Information System (IRIS), an electronic database containing human health assessments for various chemicals (available online at http://www.epa.gov/iris/). If values are not available from IRIS, then the next preference is to seek Provisional Peer Reviewed Toxicity Values (PPRTVs) for Superfund developed by USEPA's Superfund Health Risk Technical Support Center (STSC). If PPRTVs are not available, toxicity values may be obtained from other sources, such as the Agency for Toxic Substances and Disease Registry's (ATSDR) minimal risk levels (MRLs) (available online at http://www.atsdr.cdc.gov/mrls/index.asp), California EPA's Toxicity Criteria Database (available online at http://www.oehha.ca.gov/risk/ChemicalDB/index.asp), and USEPA's Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b).

These toxicity values are compiled in the "Regional Screening Levels for Chemical Contaminants at Superfund Sites" tables (USEPA, 2009) developed and maintained by the Department of Energy Oak Ridge National Laboratory under an interagency agreement with USEPA.

Tables 5.1 and 6.1 summarize the non-cancer and cancer oral toxicity values used for evaluating human health risks from chemicals at the Lower Ley Creek Site. There are several COPCs for which toxicity values are not available. As appropriate, the HHRA will address these COPCs qualitatively in the uncertainty section of the report.

4.5 Toxicity Values for Dermal Exposures

Oral toxicity factors are expressed in terms of toxicity per unit dose of chemical ingested, rather than in terms of toxicity per unit amount of chemical absorbed. However, the equations for characterizing dermal contact with chemicals provide exposure values that are based on absorbed dose rather than ingested dose. Thus, oral RfD and SF values must be adjusted for use in evaluating dermal exposures as follows:

$$\text{RfD(dermal)} = \text{RfD(oral)} \cdot \text{Oral absorption fraction}$$

$$\text{SF(dermal)} = \text{SF(oral)} / \text{Oral absorption fraction}$$

Table 4.18 lists the absorption fractions (ABS_{GI}) used to adjust oral toxicity values for use in assessing dermal exposure, as recommended by USEPA (2004). If chemical-specific absorption fractions are not available, a value of 1.0 was assumed consistent with USEPA (2004) guidance.

4.6 Toxicity Values for TCDD-like Congeners

In the case of dioxins/furans and PCBs, sediment and fish tissue concentrations were reported as individual congeners. When individual congener results are available, the data are consolidated into a single toxicity-weighted concentration value. This concentration, referred to as "TEQ" (TCDD equivalent concentration), is equal to the concentration of 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) that would be of equivalent toxicity to humans.

The relative potency of an individual congener compared to TCDD is expressed in terms of the toxicity equivalency factor (TEF). Table 5.2 lists current consensus TEF values for mammals (including humans) for the subset of 6 dioxin, 10 furan, and 12 PCB congeners that act by a mechanism similar to TCDD. These TEF values were developed by a panel of experts assembled by the World Health Organization (Van den Berg et al., 2006). Note that TEFs are often based on limited data, and they are thus only approximations of the relative toxicity of each congener, rounded up (in order to be conservative) to the nearest half order of magnitude. Also note that most TEFs are based on relative binding affinity of the congener for the aryl-hydrocarbon (Ah) receptor, and so do not account for potential differences between congeners with regard to absorption and distribution to target tissues.

Using the TEF values, the toxicity of any mixture of dioxin/furan/PCB congeners can be estimated by calculating the TEQ concentration as the TEF-weighted sum of each of the TCDD-like congeners, as follows:

$$TEQ = \sum C_i \cdot TEF_i$$

where:

C_i = Concentration of congener 'i'.

TEF_i = Toxicity equivalency factor for congener 'i'.

4.7 Toxicity Values for PCB Mixtures

PCBs consist of 209 individual congeners. Aroclors are commercial mixtures of PCB congeners that contain many of the individual congeners in varying ratios. When Aroclors are released into the environment, the original congener composition of the PCB mixture changes due to differential fate and transport processes. Chemical analyses of environmental samples often report PCB concentrations in terms of the Aroclor mixture(s) they most closely resemble. USEPA has developed RfDs for some (but not all) Aroclors, and when corresponding RfDs are available, the Aroclor-specific concentration data are compared to the Aroclor-specific RfD to assess potential non-cancer effects as described previously. However, RfD values are not available for all of the Aroclors identified as COPCs in this assessment (Aroclors 1242, 1248, 1254, and 1260). For the purposes of this assessment, the RfD for Aroclor 1254 (2E-05 mg/kg-day) is used as a surrogate for higher chlorinated Aroclors (1248 and 1260), and the RfD for Aroclor 1016 is used as a surrogate for the lower chlorinated Aroclors (1242). The cancer

potency of PCB mixtures is assessed using the USEPA SF of 2 $(mg/kg\text{-}day)^{-1}$, which is applied to the total PCB (total Aroclor) concentration data to assess PCB risks.

5 RISK CHARACTERIZATION

5.1 Non-Cancer Approach

The potential for non-cancer effects is evaluated by comparing the estimated exposure intake or dose for a receptor over a specified time period to a RfD that represents the threshold exposure below which it is unlikely for even sensitive populations to experience adverse health effects (USEPA, 1989a). This ratio of estimated exposure dose to RfD is called a hazard quotient (HQ). If the HQ for a chemical is equal to or less than 1, it is concluded that there is no appreciable risk that non-cancer health effects will occur. If the HQ exceeds one, there is some possibility that non-cancer effects may occur. Non-cancer HQs for each chemical are calculated as described below (USEPA, 1989a):

$$HQ = DI / RfD$$

where:

DI = Daily intake (mg/kg-day).

RfD = Reference dose (mg/kg-day).

5.2 Cancer Approach

Cancer risks are expressed as the increased risk of developing cancer as a result of a given exposure to a given chemical. These "excess" cancer risks are summed across all carcinogenic chemicals and all exposure pathways for each receptor category. In general, USEPA considers excess cancer risks less than 1 in 1 million (expressed as 1E-06) to be so small as to be negligible, and risks above 1E-04 to be sufficiently large that some action may be necessary (USEPA, 1991c). Excess cancer risks between 1E-04 and 1E-06 are generally evaluated on a case-by-case basis, and USEPA may determine that risks in this range warrant remedial action.

The excess risk of cancer from ingestion and dermal exposure to a chemical is calculated as follows (USEPA, 1989a):

$$\text{Excess cancer risk} = 1 - \exp(-DI_L \cdot SF)$$

where:

exp = The exponential.

DI_L = Daily intake, averaged over a lifetime (mg/kg-day).

SF = Slope factor $(mg/kg\text{-}day)^{-1}$.

In most cases (except when the product of $DI_L \cdot SF$ is larger than about 0.01), this equation may be accurately approximated by the following:

$$\text{Excess cancer risk} = DI_L \cdot SF$$

5.2.1 Evaluation of PCB Mixtures

Because PCBs can cause cancer through both dioxin-like and non-dioxin-like modes of action, it is important to consider the contribution from both when estimating the total risk. In accordance with USEPA (1996d, 2000c) guidance, cancer risk from ingestion of dioxin-like PCB congeners is evaluated using TEFs as described previously to calculate a TEQ concentration. The calculated TEQ concentration is evaluated using the TCDD SF of 1.56E-04 $(pg/kg\text{-}day)^{-1}$. Non-dioxin-like PCB cancer risks are evaluated using the upper-bound SF of 2 $(mg/kg\text{-}day)^{-1}$ for total PCBs, which the USEPA IRIS Summary recommends be used for evaluation of food chain exposure and sediment/soil ingestion. (The USEPA IRIS Summary also lists a lower SF of 0.4 $[mg/kg\text{-}day]^{-1}$, which is recommended for use in evaluating ingestion of water-soluble congeners and other pathways, but this SF is not used in this HHRA because PCBs were not identified as COPCs in surface water.)

5.2.2 Evaluation of Carcinogens with Mutagenic Modes of Action

For chemicals identified as having a mutagenic mode of action for carcinogenesis, cancer risks were estimated in accordance with the *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (USEPA, 2005d). In brief, because chemical-specific data are not available for these chemicals, the default age-dependent adjustment factors (ADAFs) were applied to the non-age-dependent cancer SF to account for differences in potency that may occur from exposure during early life (up to age 16). The supplemental guidance further indicates that any grouping of ages in the exposure assessment will need to be integrated with the ADAF age groupings to derive age group-specific risk estimates.

For example, under current Superfund guidance, residential exposures are divided into two age intervals:

Child = 0-6 years
Adult = 7-30 years

Thus, residential risks may be assessed by dividing the exposure into four intervals:

Age Interval	Age (years)	Exposure Duration (years)	ADAF
1	**0-<2**	**2**	**10**
2	**2-<6**	**4**	**3**
3	**6-<16**	**10**	**3**
4	**16-<30**	**14**	**1**

For each age interval 'i', the cancer risk for exposure by a specified pathway is computed as:

$$Risk_i = C \cdot (HIF \cdot ED_i / ED_{total}) \cdot SF \cdot ADAF_i$$

where:

$Risk_i$ = Excess cancer risk for age interval 'i'.

C = Concentration of chemical in the exposure medium (e.g., mg/kg for sediment).

HIF = Human intake factor for the exposure medium (e.g., kg/kg-day for sediment).

ED_i = Exposure duration for age interval 'i' (years).

ED_{total} = Total exposure duration (years).

SF = Cancer slope factor $(mg/kg\text{-}day)^{-1}$.

$ADAF_i$ = Age-dependent adjustment factor for age interval 'i' (unitless).

Total risk to the individual is the sum of the risks across all age intervals:

$$\text{Total Risk} = Risk_{0-<2} + Risk_{2-<6} + Risk_{6-<16} + Risk_{16+}$$

As seen in the equation above, the HIF term is time-weighted (ED_i / ED_{total}) to be specific to the age interval 'i'. Table 7.5 summarizes how the HIFs were adjusted for each receptor population to account for early-life susceptibility.

5.3 Combining Risks across Chemicals and Exposure Pathways

In this HHRA, the risks and HQs for the CTE and RME receptors are summed across all pathways and all chemicals. These results are provided in Section 8 (series 7 tables). For non-carcinogenic effects, an initial estimate of the total non-cancer risk is derived simply by summing the HQ values across all chemicals to calculate a hazard index (HI). If the HI is less than 1, non-cancer risks are not considered to be significant. If the HI is greater than 1, then it may be appropriate to examine individual chemical HQs and only sum HQs for COPCs that affect the same target tissue or organ system (e.g., the liver). This approach would produce HIs for chemicals that affect the same target organs and have the same mode of action, consistent with USEPA (1989a) guidance because chemicals that only cause toxicity in different tissues are not likely to produce additive effects. Target-organ-specific HIs are presented in the Table 9 series for those chemicals for which target organ information was readily available.

5.4 Non-Cancer Summary

5.4.1 Recreational Visitor – Adult

The total HI for the adult recreational visitor is above 1 for both the RME and CTE scenarios, with HI values of 32 and 10, respectively. The exceedances are primarily due to exposures via fish ingestion, with Aroclor 1254 as the primary risk driver and to a lesser extent Aroclor 1260 and chromium.

5.4.2 Recreational Visitor – Older Child (6-<16 years old)

The total HI for the older child recreational visitor is above 1 for both the RME and CTE scenarios, with HI values of 32 and 8, respectively. The exceedances are primarily due to exposures via fish ingestion and to a lesser extent via dermal exposure to sediment in Lower Ley Creek. Risk from ingestion of fish tissue is primarily driven by Aroclor 1254 and to a lesser extent Aroclor 1260 and chromium. Risk from dermal exposure to sediment in Lower Ley Creek is primarily driven by Aroclor 1260.

5.4.3 Recreational Visitor – Younger Child (<6 years old)

The total HI for the younger child recreational visitor is above 1 for both the RME and CTE scenarios, with HI values of 65 and 18, respectively. The pathway that contributes the greatest hazard is fish ingestion, although direct contact (ingestion and dermal) with sediment in Lower Ley Creek or in the Dredge Spoils area also contributes to an HI greater than 1 for the RME scenario. Risk from ingestion of fish is primarily driven by Aroclor 1254, Aroclor 1260, and chromium, and to a lesser extent arsenic and mercury. Risks from direct contact exposure to sediment are primarily driven by Aroclor 1260 or Aroclor 1248.

5.4.4 Construction Worker – Adult

The total HI for the adult construction worker is below 1 for both the RME and CTE scenarios.

5.5 Cancer Risk Summary

5.5.1 Recreational Visitor – Adult

The total cancer risk for the adult recreational visitor is 4E-04 for the CTE scenario and 4E-03 for the RME scenario. The primary risk driver is ingestion of fish tissue, with total Aroclors, chromium, and arsenic contributing the greatest to total risk.

5.5.2 Recreational Visitor – Older Child (6-<16 years old)

The total cancer risk for the older child recreational visitor is 3E-04 for the CTE scenario and 1E-03 for the RME scenario. The primary risk drivers are total Aroclors, chromium, and arsenic via fish ingestion and benzo(a)pyrene via sediment exposure.

5.5.3 Recreational Visitor – Younger Child (<6 years old)

The total cancer risks for the younger child recreational visitor are 5E-04 and 2E-03 for the RME and CTE scenarios, respectively. Risk drivers include total Aroclors, chromium, and arsenic in fish tissue, polycyclic aromatic hydrocarbons (PAHs) (e.g., benzo(a)pyrene) in sediments, and total Aroclors, PAHs, and chromium in the Dredge Spoils Area.

5.5.4 Construction Worker – Adult

The total cancer risk for the adult construction worker is 2E-06 and 8E-06 for the RME and CTE scenarios, respectively.

6 UNCERTAINTY ASSESSMENT

Quantitative evaluation of human health risks due to environmental contamination is frequently limited by uncertainty regarding a number of key inputs, including chemical concentrations in the environment, the true level of human contact with contaminated media, and the true dose-response relationships for non-cancer and cancer effects in humans. This uncertainty is usually addressed by making assumptions or estimates for uncertain parameters based on available information. Because of these assumptions and estimates, the results of risk calculations are themselves uncertain, and it is important for risk managers and the public to keep this in mind when interpreting the results of a risk assessment. The following sections review the main sources of uncertainty in the risk calculations performed for the Lower Ley Creek Site.

6.1 Chemicals Not Evaluated

As discussed above, exposure and risk were quantified only for a selected subset (the COPCs) of chemicals detected in environmental media. While omission of other chemicals might tend to underestimate total risks, this is not a significant source of uncertainty because the chemicals that were excluded were present at concentrations well below a level of concern.

6.2 Exposure Pathways Not Evaluated

As discussed above, humans may be exposed to site-related chemicals by a number of pathways, but not all of these pathways were evaluated quantitatively in this risk assessment. In most cases, this is because the contribution of the pathway omitted is believed to be minor compared to one or more other pathways that were evaluated. In these cases, omission of the minor pathways will result in a small underestimation of exposure and risk, but the magnitude of this underestimation is not expected to be significant.

Other pathways were identified (Table 1.1), but were not addressed quantitatively in this HHRA. Specifically, potential exposure via subsistence-level fish consumption and potential exposure of hunters via wildlife consumption were identified as potential exposure pathways. The New York State Department of Environmental Conservation (NYSDEC) (2002) Onondaga Lake HHRA considered the potential presence of a subsistence fishing population for Onondaga Lake as a whole, but concluded that the evidence was insufficient to warrant its inclusion in the HHRA as a complete pathway. Similarly, the NYSDEC (2002) HHRA evaluated the potential for the hunting/game consumption pathway, but decided not to include a quantitative evaluation of that pathway in the HHRA due to: (1) the presence of state-wide consumption advisories limiting consumption of waterfowl and snapping turtles; (2) the lack of site-specific data on contaminant levels in wildlife species; and (3) the fact that some game species (waterfowl) are migratory, and determining the amount of contamination/risk due to Onondaga Lake would be difficult.

Because the Lower Ley Creek Site is a much smaller area and probably supports more limited fish and wildlife populations than Onondaga Lake as a whole, the NYSDEC (2002) rationale for not addressing these pathways quantitatively also applies to the Lower Ley Creek HHRA.

6.3 Exposure Point Concentrations

USEPA (1989a, 1992) recommends that the EPC estimate be based on the 95UCL of the mean. This approach ensures that the "true" EPC is unlikely to be greater than the estimated EPC used in risk calculations. In addition, when calculated UCLs exceed the maximum detected concentration (due to limited data, etc.), the maximum detected concentration is used as EPC, thereby assuring that the EPC is within the range of concentrations actually observed at the site. At this site, the data for sediments are of sufficient quantity and quality that the 95UCL of the mean is only moderately larger than the sample mean, so this source of uncertainty is relatively minor.

6.4 Human Exposure Parameters

Many of the required exposure parameters used to calculate exposure doses/intakes are not known with certainty and must be estimated from limited data or knowledge. For example, the amount of soil, sediment, and surface water ingested by recreational visitors are estimates often based on professional judgment. In general, when exposure data were limited or absent, the exposure parameters were chosen in a way that was intended to be conservative (health-protective). This approach is intended to produce results that are more likely to overestimate than underestimate actual exposure and risk.

6.5 Uncertainties in Toxicity Values

Toxicity information for many chemicals is often limited. Consequently, there are varying degrees of uncertainty associated with toxicity values (i.e., cancer SFs, RfDs). For example, uncertainties can arise from the following sources:

- Extrapolation from animal studies to humans
- Extrapolation from high dose to low dose
- Extrapolation from continuous exposure to intermittent exposure
- Limited or inconsistent toxicity studies

USEPA intentionally uses conservative approaches to develop toxicity factors to ensure that any uncertainties are more likely to result in an overestimation rather than an underestimation of risk. In addition, toxicity factors for chronic exposure (chronic oral RfD) were used to assess risks for all exposure scenarios, even those that involved less-than-chronic duration (i.e., construction

worker), which is also likely to overestimate risk. This approach was used because very few COPCs have Agency-approved subchronic RfD values.

Since RfD values are not currently available for Aroclors 1242, 1248, or 1260, the RfD for Aroclor 1254 was used as a surrogate representative of higher chlorinated Aroclors and the RfD for Aroclor 1016 was used as a surrogate representative of lower chlorinated Aroclors.

6.6 Uncertainties in Risk Estimates

Because risk estimates for a chemical are derived by combining uncertain estimates of exposure and toxicity (see above), the risk estimates for each chemical are more uncertain than either the exposure estimate or the toxicity estimate alone. Additional uncertainty arises from the issue of how to combine risk estimates across different chemicals. In some cases, the effects caused by one chemical do not influence the effects caused by other chemicals. In other cases, the effects of one chemical may interact with effects of other chemicals, causing responses that are approximately additive, greater than additive (synergistic), or less than additive (antagonistic). In most cases, available toxicity data are not sufficient to define what type of interaction is expected, so USEPA generally assumes that effects are additive for carcinogens that act on all target tissues and for non-carcinogens that act on the same target tissue.

7 REFERENCES

Choate, LM; Ranville, JF; Bunge, AL; et al. (2006) Dermally adhered soil. 1. Amount and particle-size distribution. Integr Environ Assess Manag 2: 375–384.

FDA (Food and Drug Administration). (2001) Total diet study. U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition Office of Plant and Dairy Foods and Beverages.

Goyer, RA. (1990) Transplacental transport of lead. Environ Health Perspect 89:101–105.

Gussman, C. (2009) November 2009 field effort at the Lower Ley Creek Superfund Site. WA #SER0007 Trip Report. Memorandum to J. Catanzarita, U.S. Environmental Protection Agency, 12/7/09.

NYSDEC (New York State Department of Environmental Conservation) (2002) Onondaga Lake human health risk assessment. Onondaga Lake Project, site No. 7-34-030-002, Contract Number C004365, Task Order 1, Prepared by TAMS Consultants, December 2002.

Rodier, PM. (1995) Developing brain as a target of toxicity. Environ Health Perspect 103(Suppl 6):73–76.

Rodier, PM. (2004) Environmental causes of central nervous system maldevelopment. Pediatrics 113:1076–1083.

Singh, A; Maichle, R; Singh, AK; et al. (2009) ProUCL version 4.00.04 user guide (Draft). EPA/600/R-07/038.

TAMS Consultants Inc. (TAMS). (2002a) Onondaga Lake baseline ecological risk assessment. Original document prepared for Honeywell, East Syracuse NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, New York by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. December 2002.

TAMS Consultants Inc. (TAMS) (2002b) Onondaga Lake human health risk assessment report. Original document prepared for Honeywell, East Syracuse NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, NY by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. December 2002.

TAMS Consultants Inc. (TAMS) (2002c) Onondaga Lake remedial investigation report. Original document prepared for Honeywell, East Syracuse NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, NY by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. December 2002.

TAMS Consultants Inc. (TAMS) (2003a) Geddes Brook/Ninemile Creek human health risk assessment report. Original document prepared for Honeywell, East Syracuse NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, NY by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. July 2003.

TAMS Consultants Inc. (TAMS) (2003b) Geddes Brook/Ninemile Creek remedial investigation report. Original document prepared for Honeywell, East Syracuse NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, NY by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. July 2003.

TAMS Consultants Inc. (TAMS) and U.S. EPA (2003c) Geddes Brook/Ninemile Creek Baseline Ecological Risk Assessment. Volume 1 of 2 (text, tables, and figures). Original document prepared for Honeywell, East Syracuse NY by Exponent, Bellevue, WA. Revision prepared for New York State Department of Environmental Conservation, Albany, NY by TAMS Consultants, Inc., New York, NY and YEC, Valley Cottage, NY. July 2003.

Thompson, TH. (1977) Use of infrared imagery in bank-storage studies. U. S. Geological Survey Journal of Research 5(1):1–10.

USEPA (U.S. Environmental Protection Agency). (1985) Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office. Cincinnati, OH. EPA 600/8-84-014F.

USEPA (U.S. Environmental Protection Agency). (1986a) Guidelines for carcinogen risk assessment. U.S. Environmental Protection Agency, Office of Research and Development. EPA/630/R-00/004.

USEPA (U.S. Environmental Protection Agency). (1986b) Air quality criteria for lead. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Research Triangle Park, NC. EPA600/8-83-028F.

USEPA (U.S. Environmental Protection Agency). (1989a) Risk assessment guidance for Superfund (RAGS). Vol I. Human health evaluation manual (part A). U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA (U.S. Environmental Protection Agency). (1989b) Review of the national ambient air quality standards for lead: exposure analysis methodology and validation. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/450/2-89/011.

USEPA (U.S. Environmental Protection Agency). (1991a) Human health evaluation manual, supplemental guidance: standard default exposure factors. Washington, DC. OSWER Directive 9285.6-03.

USEPA (U.S. Environmental Protection Agency). (1991b) Update on OSWER soil lead cleanup guidance. Memo from Don R. Clay, Assistant Administrator, dated August 29, 1991. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

USEPA (U.S. Environmental Protection Agency). (1991c) Role of the baseline risk assessment in Superfund remedy selection decisions. U.S. Environmental Protection Agency. Washington, DC. OSWER Directive 9355.0-30.

USEPA (U.S. Environmental Protection Agency). (1992) Supplemental guidance to RAGS: calculating the concentration term. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. 9285.7-081.

USEPA (U.S. Environmental Protection Agency). (1993) Superfund's standard default exposure factors for the central tendency and reasonable maximum exposure. Draft. U.S. Environmental Protection Agency.

USEPA (U.S. Environmental Protection Agency). (1994a) Guidance manual for the integrated exposure uptake biokinetic model for lead in children. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. Publication Number 9285.7-15-1. EPA/540/R-93/081.

USEPA (U.S. Environmental Protection Agency). (1994b) Methods for derivation of inhalation reference concentrations and application of inhalation dosimetry. U.S. Environmental Protection Agency, Office of Research and Development, Research Triangle Park, NC. EPA/600/8-90/066F. Available online at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=71993 (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (1994c) Revised interim soil lead guidance for CERCLA sites and RCRA corrective action facilities. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. OSWER Directive 9355.4-12. Available online at http://www.epa.gov/superfund/health/contaminants/lead/products/oswerdir.pdf (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (1996a) Recommendations of the technical review workgroup for lead for an interim approach to assessing risks associated with adult exposures to lead in soil. U.S. Environmental Protection Agency.

USEPA (U.S. Environmental Protection Agency). (1996b) Soil screening guidance: user's guide. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington DC. Publication 9355.4-23.

USEPA (U.S. Environmental Protection Agency). (1996c) Bioavailability of arsenic and lead in environmental substrates. U.S. Environmental Protection Agency, Region 10, Office of Environmental Assessment, Seattle, WA. EPA 910/R-96-002.

USEPA (U.S. Environmental Protection Agency). (1996d) PCBs: cancer dose-response assessment and application to environmental mixtures. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. EPA/600/P-96/001F.

USEPA (U.S. Environmental Protection Agency). (1997a). Exposure factors handbook, volumes I, II, and III. U.S. Environmental Protection Agency, Office of Research and Development. EPA/600/P-95/002Fa.

USEPA (U.S. Environmental Protection Agency). (1997b) Health effects assessment summary tables. FY 1997 Update. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Washington, DC. EPA-540-R-97-036.

USEPA (U.S. Environmental Protection Agency). (1998a). Ambient water quality criteria derivation methodology human health technical support document. Final draft. U.S. Environmental Protection Agency, Office of Science and Technology. EPA/822/B-98/005.

USEPA (U.S. Environmental Protection Agency). (1998b) Clarification to the 1994 revised interim soil lead guidance for CERCLA sites and RCRA corrective action facilities. OSWER Directive 9200.4-27. EPA/540-F98/030.

USEPA (U.S. Environmental Protection Agency). (2000a) Soil screening guidance for radionuclides: technical background document. U.S. Environmental Protection Agency, Office of Radiation and Indoor Air. EPA/540-R-00-006. Available online at http://www.epa.gov/superfund/health/contaminants/radiation/pdfs/sstbd.pdf (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2000b) Interim guidance for EPA Region 10 human health risk assessments regarding bioavailability of arsenic contaminated soil.

USEPA (U.S. Environmental Protection Agency). (2000c) Supplementary guidance for conducting health risk assessment of chemical mixtures. U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, DC. EPA/630/R-00/002.

USEPA (U.S. Environmental Protection Agency). (2001a) Risk assessment guidance for Superfund (RAGS). Vol 1. Human health evaluation manual (part D, standardized planning, reporting, and review of Superfund risk assessments). U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Publication 9285.7–47.

USEPA (U.S. Environmental Protection Agency). (2001b) Baseline human health risk assessment Vasquez Boulevard and I-70 Superfund site, Denver, Co. U.S. Environmental Protection Agency, Region 8, Denver, CO.

USEPA (U.S. Environmental Protection Agency). (2002a) Guidance for comparing background and chemical concentrations in soil for CERCLA sites. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA 540-R-01-003. Available online at http://www.epa.gov/oswer/riskassessment/pdf/background.pdf (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2002b) Supplemental guidance for developing soil screening Levels for Superfund Sites. U.S. Environmental Protection Agency. OSWER 9355.4-24.

USEPA (U.S. Environmental Protection Agency). (2002c) Calculating upper confidence limits for exposure point concentrations at hazardous waste sites. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. OSWER 9285.6-10.

USEPA (U.S. Environmental Protection Agency). (2002d) Child-specific exposure factors handbook. Interim report. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. EPA-600-P-00-002B.

USEPA (U.S. Environmental Protection Agency). (2002e) Estimated per capita fish consumption in the United States, Vol 1. U.S. Environmental Protection Agency, Office of Water. EPA-821-C-02-003.

USEPA (U.S. Environmental Protection Agency). (2003a) Assessing intermittent or variable exposures at lead sites. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA-540-R-03-008. OSWER 9285.7-76.

USEPA (U.S. Environmental Protection Agency). (2003b) Recommendations of the technical review workgroup for lead for an interim approach to assessing risks associated with adult exposures to lead in soil. EPA-540-R-03-001.

USEPA (U.S. Environmental Protection Agency). (2003c) Human health toxicity values in Superfund risk assessments. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. OSWER Directive 9285.7-53.

USEPA (U.S. Environmental Protection Agency). (2003d) Recommendations of the technical review workgroup for lead for an interim approach to assessing risks associated with adult exposures to lead in soil. EPA-540-R-03-001.

USEPA (U.S. Environmental Protection Agency). (2004) Risk assessment guidance for Superfund (RAGS). Vol 1: human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Final. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA/540/R/99/005.

USEPA (U.S. Environmental Protection Agency). (2005a) Guidance on selecting age groups for monitoring and assessing childhood exposures to environmental contaminants. U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, DC. EPA/630/P-03/003F. Available online at http://www.epa.gov/raf/publications/pdfs/agegroups.pdf (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2005b) Guidelines for carcinogenic risk assessment. U.S. Environmental Protection Agency, Office of Research and Development. EPA/630/P-03/001F.

USEPA (U.S. Environmental Protection Agency). (2005c) Human health risk assessment protocol for hazardous waste combustion facilities. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC. EPA/530/R05/006. Available online at http://www.epa.gov/wastes/hazard/tsd/td/combust/finalmact/ssra/05hhrapcover.pdf (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2005d) Supplemental guidance for assessing susceptibility from early-Life exposure to carcinogens. U.S. Environmental Protection Agency, Washington, DC. EPA/630/R-03/003F. Available online at http://epa.gov/ttn/atw/childrens_supplement_final.pdf (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2007a) ProUCL version 4.0.01 user guide. EPA/600/R-07/038. Available online at http://www.epa.gov/esd/tsc/software.htm (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2007b) Cadmium. Integrated Risk Information System (IRIS). U.S. Environmental Protection Agency. Available online at http://www.epa.gov/ncea/iris/subst/0141.htm (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2007c) Guidance for evaluating the oral bioavailability of metals in soils for use in human health risk assessment. OSWER 9285.7-80. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

USEPA (U.S. Environmental Protection Agency). (2007d) Estimation of relative bioavailability of lead in soil and soil-like materials using in vivo and in vitro methods. OSWER 9285.7-77. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

USEPA (U.S. Environmental Protection Agency). (2009) Regional screening levels for chemical contaminants at Superfund sites. Summary table. Available online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (accessed May 13, 2010).

USEPA (U.S. Environmental Protection Agency). (2010) Frequent questions from risk assessors on the adult lead methodology (ALM). Available online at http://www.epa.gov/superfund/health/contaminants/lead/almfaq.htm (accessed May 14, 2010).

Van den Berg, M, Birnbaum, LS; Bosveld, ATC; et al. (1998) Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ Health Perspect 106(12):775–792.

Van den Berg M, LS Birnbaum, M Denison, et al. (2006) The 2005 World Health Organization (WHO) reevaluation of human and mammalian toxic equivalency factors for dioxins and dioxin-like compounds. Toxicol Sci 93(2):223–241.

8 TABLES

8.1 Series 1 Tables

Table 1.1
Selection of Exposure Pathways
Lower Ley Creek Human Health Risk Assessment

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Sediment	Sediment to a depth of 12 inches[b]	Lower Ley Creek	Resident	Adult	Dermal Ingestion	On-Site	None	Residential populations are not evaluated in the RA due to lack of current residential use and unlikdley future development for residential use.
						Inhalation	On-Site	None	No residential structures exist or are likely to be built in the future and concentrations of VOCs in sediment are low, indicating that the inhalation pathway is unlikely.
					Child [c] (< 6 yrs) (6-16 yrs)	Dermal Ingestion	On-Site	None	Residential populations are not evaluated in the RA due to lack of current residential use and unlikdley future development for residential use.
						Inhalation	On-Site	None	No residential structures exist or are likely to be built in the future and concentrations of VOCs in sediment are low, indicating that the inhalation pathway is unlikely.
				Construction worker (future)	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated sediments during construction activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of sediments is low; off-gassing from excavated sediment is expected to be negligible.
				Recreational visitor	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated sediments during angling or other wading activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of sediments is low; off-gassing from exposed sediment is expected to be negligible.
					Child [c] (< 6 yrs) (6-16 yrs)	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated sediments during angling or other wading activities is possible, and therefore is quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of sediments is low; off-gassing from exposed sediment is expected to be negligible.
			Dredge Spoils Area	Recreational visitor	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated sediments during angling or other wading activities is possible, and therefore is quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of sediments is low; off-gassing from exposed sediment is expected to be negligible.

Table 1.1
Selection of Exposure Pathways
Lower Ley Creek Human Health Risk Assessment

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Sediment	Sediment to a depth of 12 inches[b]	Dredge Spoils Area		Child [c] (< 6 yrs) (6-16 yrs)	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated sediments during angling or other wading activities is possible, and therefore is quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of sediments is low; off-gassing from exposed sediment is expected to be negligible.
				Construction worker (future)	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated sediments during construction activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of sediments is low; off-gassing from excavated sediment is expected to be negligible.
	Surface water	Surface water	Lower Ley Creek	Recreational visitor	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated surface water during angling or other wading activities is possible, and therefore are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of surface water is low; off-gassing is expected to be negligible.
					Child [c] (< 6 yrs) (6-16 yrs)	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated surface water during angling or other wading activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of surface water is low; off-gassing is expected to be negligible.
				Construction worker	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated surface water during construction activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of surface water is low; off-gassing is expected to be negligible.
		Potable water from Ley Creek	Tap Water	Resident	Adult	Dermal Ingestion	On-Site	None	Residential populations are not evaluated in the RA due to lack of current residential use and unlikdley future development for residential use; neither Ley Creek, nor Onondaga Lake into which it drains, are used as potable water supplies or arel likely to be developed as such in the foreseeable future.
						Inhalation	On-Site	None	No residential structures exist or are likely to be built in the future and concentrations of VOCs in surface water are low, indicating that the inhalation pathway is unlikely.

Table 1.1
Selection of Exposure Pathways
Lower Ley Creek Human Health Risk Assessment

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Surface water	Potable water from Ley Creek	Tap Water	Resident	Child	Dermal Ingestion	On-Site	None	Residential populations are not evaluated in the RA due to lack of current residential use and unlikdley future development for residential use; Ley Creek is not used as a potable water supplies.
						Inhalation	On-Site	None	No residential structures exist or are likely to be built in the future and concentrations of VOCs in surface water are low, indicating that the inhalation pathway is unlikely.
	Edible Fish[d]	Edible fish tissue	Lower Ley Creek	Recreational anglers and fish consumers	Adult	Ingestion	On-Site	Quantitative	Edible fish with contaminated filets have been detected in Ley Creek; It is possible that nearby residents or other anglers would catch and eat these fish.
					Child[c] (<6; 6-16 yrs)	Ingestion	On-Site	Quantitative	Edible fish with contaminated filets have been detected in Ley Creek; It is possible that nearby residents or other anglers would catch and eat these fish.
				Subsistence anglers	Adult	Ingestion	On-Site	Qualitative	This scenario is possible due to the existence of a possible subsistence fishing community within the greater Onondaga Lake area. This pathway is discussed qualitatively in Section 6.
					Child[c] (<6; 6-16 yrs)	Ingestion	On-Site	Qualitative	This scenario is possible due to the existence of a possible subsistence fishing community within the greater Onondaga Lake area. This pathway is discussed qualitatively in Section 6.
	Edible waterfowl and turtles	Edible tissue	Lower Ley Creek	Hunters and their families	Adult, Child[c] (<6; 6-16 yrs)	Ingestion	On-Site	Qualitative	Hunting is legally permitted on nearby Onondaga Lake. There is a state-wide advisory (New York) recommending restricted consumption of water fowl and snapping turtles. The lack of data on ingestion rates for waterfowl and turtles precludes quantitative analysis of this pathway. This pathway is discussed qualitatively in Section 6.

[a] In accordance with NYCRR Part 895.3, Ley Creek would be considered a Class B stream, and therefore considered a protected stream. Access to this site is unrestricted, and the property is next to a public thoroughfare.

[b] Exposure to the sediments in both Ley Creek and on the banks of the Dredge Spoils area are possible for any given receptor population; separate estimates of risk will be estimated for each exposure point, but these risks will be summed for each receptor.

[c] Separate risks will be evaluated for a young child (<6 years) and an older child (6-16 years).

[d] White Sucker, Pike and Carp were caught in Ley Creek and are considered to be edible. Fillets (skin on) are considered to be the edible tissue. EPA, please advise on whether separate risks are to be estimated for upstream, middle and downstream reaches.

8.2 Series 2 Tables

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Fish Fillets
Exposure Medium: Fish Fillets
Exposure Point: Fillets from Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Fish Consumption[a]	COPC Flag	Rationale for Selection[f]
72-54-8	4,4'-DDD	0.001	J	0.0076	NJ	mg/kg	1-1-4	5 / 11	0.0033 - 0.0033	0.0076	0.0131	C	N	BSL
72-55-9	4,4'-DDE							0 / 7	0.0033 - 0.0033	ND	0.00928	C	N	ND
50-29-3	4,4'-DDT	0.0037	NJ	0.0037	NJ	mg/kg	1-2-3	1 / 5	0.0033 - 0.0033	0.0037	0.00928	C	N	BSL
309-00-2	Aldrin							0 / 14	0.0017 - 0.0017	ND	0.000186	C	N	ND
319-84-6	alpha-BHC							0 / 14	0.0017 - 0.0017	ND	0.000501	C	N	ND
5103-71-9	alpha-Chlordane	0.00089	J	0.0096	J	mg/kg	1-1-3	10 / 13	0.0017 - 0.0033	0.0096	9.01E-03	C	Y	ASL
7429-90-5	ALUMINUM	15.4	J	88.4	J	mg/kg	1-1-1	6 / 14	75.8 - 95.6	88.4	135	NC	N	BSL
7440-36-0	ANTIMONY							0 / 14	22.7 - 29.3	ND	0.0541	NC	N	ND
12674-11-2	Aroclor-1016							0 / 14	0.033 - 0.033	ND	0.00946	NC	N	ND
11104-28-2	Aroclor-1221							0 / 14	0.033 - 0.033	ND	0.00158	C	N	ND
11141-16-5	Aroclor-1232							0 / 14	0.033 - 0.033	ND	0.00158	C	N	ND
53469-21-9	Aroclor-1242							0 / 14	0.033 - 0.033	ND	0.00158	C	N	ND
12672-29-6	Aroclor-1248							0 / 14	0.033 - 0.033	ND	0.00158	C	N	ND
11097-69-1	Aroclor-1254	0.17		2		mg/kg	1-1-3	14 / 14	NA	2	0.00158	C	Y	ASL
11096-82-5	Aroclor-1260	0.087		0.86		mg/kg	1-1-3	14 / 14	NA	0.86	0.00158	C	Y	ASL
37324-23-5	Aroclor-1262							0 / 14	0.033 - 0.033	ND	0.00158	C[b]	N	ND
11100-14-4	Aroclor-1268							0 / 14	0.033 - 0.033	ND	0.00158	C[b]	N	ND
1336-36-3	Total Aroclors[g]	0.26		2.8		mg/kg	1-1-3	14/14	NA	2.8	0.00158	C	Y	ASL
7440-38-2	ARSENIC	0.92	J	1.9	J	mg/kg	1-1-4	12 / 14	3.8 - 4.7	1.9	0.0021	C	Y	ASL
7440-39-3	BARIUM							0 / 14	75.8 - 97.1	ND	27	NC	N	ND
7440-41-7	BERYLLIUM	0.14	J	0.18	J	mg/kg	1-1-2	2 / 14	1.9 - 2.4	0.18	0.27	NC	N	BSL
319-85-7	beta-BHC							0 / 14	0.0017 - 0.0017	ND	0.00175	C	N	BSL
7440-43-9	CADMIUM							0 / 14	1.9 - 2.4	ND	0.135	NC	N	ND
7440-70-2	CALCIUM	700	J	5910	J	mg/kg	1-2-2	11 / 14	2030 - 2210	5910	NV		N	EN
7440-47-3	CHROMIUM	5.5	J	61.7	J	mg/kg	1-2-4	2 / 14	3.8 - 4.9	61.7	6.31E-03	C[c]	Y	ASL
7440-48-4	COBALT							0 / 14	18.9 - 24.3	ND	0.0406	NC	N	ND
7440-50-8	COPPER							0 / 14	9.5 - 12.1	ND	5.41	NC	N	ND
319-86-8	delta-BHC	0.0017	NJ	0.0031	NJ	mg/kg	4-2-1	2 / 13	0.0017 - 0.0017	0.0031	NV		N	NV
60-57-1	Dieldrin	0.004	NJ	0.018	NJ	mg/kg	1-1-2	3 / 5	0.0033 - 0.0033	0.018	0.000197	C	Y	ASL
	Dioxins/Furans													
35822-46-9	HPCDD1234678	0.0000016	J	0.0000058		mg/kg	1-1-5	3 / 3	NA	0.0000058			Y	TEQ
67562-39-4	HPCDF1234678	0.0000014	J	0.0000014	J	mg/kg	1-1-5	1 / 3	NA	0.0000014			Y	TEQ
39227-28-6	HXCDD123478	0.00000041	J	0.00000085	J	mg/kg	1-1-5	3 / 3	NA	0.00000085			Y	TEQ
57653-85-7	HXCDD123678	0.0000013	J	0.0000028		mg/kg	1-1-5	2 / 3	NA	0.0000028			Y	TEQ
19408-74-3	HXCDD123789	0.0000004	J	0.00000096	J	mg/kg	1-1-5	3 / 3	NA	0.00000096			Y	TEQ
72918-21-9	HXCDF123789	0.00000023	J	0.00000027	J	mg/kg	1-1-5	2 / 3	NA	0.00000027			Y	TEQ
60851-34-5	HXCDF234678	0.00000031	J	0.0000006	J	mg/kg	1-1-5	2 / 3	NA	0.0000006			Y	TEQ
40321-76-4	PECDD12378	0.00000077	J	0.0000018	J	mg/kg	1-1-5	3 / 3	NA	0.0000018			Y	TEQ
57117-41-6	PECDF12378	0.00000087	J	0.00000087	J	mg/kg	1-1-1	1 / 3	NA	0.00000087			y	TEQ

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Fish Fillets
Exposure Medium: Fish Fillets
Exposure Point: Fillets from Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Fish Consumption[a]	COPC Flag	Rationale for Selection[f]
57117-31-4	PECDF23478	0.0000011	J	0.0000032		mg/kg	1-1-5	3 / 3	NA	0.0000032		Y	TEQ
55673-89-7	HPCDF1234789							0 /3	NA	ND		N	ND
70648-26-9	HXCDF123478							0 /3	NA	ND		N	ND
57117-44-9	HXCDF123678							0 /3	NA	ND		N	ND
1746-01-6	TCDD2378							0 /3	NA	ND		N	ND
39001-02-0	OCDF							0 /3	NA	ND		N	ND
51207-31-9	TCDF2378	0.0000006		0.00000091		mg/kg	1-1-5	3 / 3	NA	0.00000091		Y	TEQ
37871-00-4	Total HPCDD	0.0000016	J	0.0000058		mg/kg	1-1-5	3 / 3	NA	0.0000058		N	No TEF[e]
38998-75-3	Total HPCDF	0.000014		0.000026		mg/kg	4-1-1	3 / 3	NA	0.000026		N	No TEF[e]
34465-46-8	Total HXCDD	0.000019		0.000034		mg/kg	4-1-1	3 / 3	NA	0.000034	5.40E-05	C	N	BSL
55684-94-1	Total HXCDF	0.00015		0.00032		mg/kg	4-1-1	3 / 3	NA	0.00032		N	No TEF[e]
55684-94-1	Total HXCDF	0.00015	J	0.00032		mg/kg	4-1-1	3 / 3	NA	0.00032		N	No TEF[e]
36088-22-9	Total PECDD	0.00000077	J	0.0000018	J	mg/kg	1-1-5	3 / 3	NA	0.0000018		N	No TEF[e]
30402-15-4	Total PECDF	0.00017		0.00037		mg/kg	4-1-1	3 / 3	NA	0.00037		N	No TEF[e]
41903-57-5	Total TCDD	0.0000015		0.000004		mg/kg	1-1-5	3 / 3	NA	0.000004		N	No TEF[e]
55722-27-5	Total TCDF	0.00013		0.00029		mg/kg	1-1-5	3 / 3	NA	0.00029		N	No TEF[e]
3268-87-9	OCDD	0.0000058		0.0000058		mg/kg	1-1-5	1 / 3	NA	0.0000058		Y	TEQ
959-98-8	Endosulfan I	0.0039	J	0.0039	J	mg/kg	4-3-1	1 / 12	0.0017 - 0.0017	0.0039	0.811	NC[d]	N	BSL
33213-65-9	Endosulfan II							0 / 14	0.0033 - 0.0033	ND	0.811	NC[d]	N	ND
1031-07-8	Endosulfan sulfate							0 / 14	0.0033 - 0.0033	ND	NV		N	ND
72-20-8	Endrin	0.0037	J	0.021	J	mg/kg	1-1-3	10 / 14	0.0033 - 0.0033	0.021	0.0406	NC	N	BSL
7421-93-4	Endrin aldehyde							0 / 8	0.0033 - 0.0033	ND	NV		N	ND
53494-70-5	Endrin ketone							0 / 14	0.0033 - 0.0033	ND	NV		N	ND
58-89-9	gamma-BHC (Lindane)	0.00089	J	0.00089	J	mg/kg	1-2-3	1 / 12	0.0017 - 0.0017	0.00089	0.00287	C	N	BSL
5103-74-2	gamma-Chlordane	0.003	J	0.049	J	mg/kg	1-1-3	14 / 14	NA	0.049	9.01E-03	C	Y	ASL
76-44-8	Heptachlor							0 / 12	0.0017 - 0.0019	ND	0.000701	C	N	ND
1024-57-3	Heptachlor epoxide	0.0072	NJ	0.0072	NJ	mg/kg	1-2-4	1 / 2	0.0017 - 0.0017	0.0072	0.000347	C	Y	ASL
7439-89-6	IRON	14.5	J	370	J	mg/kg	1-2-4	14 / 14	NA	370	94.6	NC	Y	ASL
7439-95-4	MAGNESIUM	795	J	1190	J	mg/kg	1-2-3	14 / 14	NA	1190	NV		N	EN
7439-96-5	MANGANESE	9.4	J	9.4	J	mg/kg	1-2-5	1 / 14	5.7 - 7.3	9.4	18.9	NC	N	BSL
7439-97-6	MERCURY	0.24		0.74	J	mg/kg	4-1-1	7 / 14	0.38 - 0.49	0.74	0.0216	NC	Y	ASL
72-43-5	Methoxychlor							0 / 14	0.017 - 0.017	ND	0.676	NC	N	ND
7440-02-0	NICKEL							0 / 14	15.2 - 19.4	ND	2.7	NC	N	ND
7440-09-7	POTASSIUM	11600	J	16500	J	mg/kg	1-2-5	14 / 14	NA	16500	NV		N	EN
7782-49-2	SELENIUM	2.4	J	3.3	J	mg/kg	1-1-1	14 / 14	NA	3.3	0.676	NC	Y	ASL
7440-22-4	SILVER	0.4	J	0.4	J	mg/kg	1-2-5	1 / 14	3.8 - 4.9	0.4	0.676	NC	N	BSL
7440-23-5	SODIUM	1990	J	3610	J	mg/kg	1-2-5	12 / 14	2030 - 2210	3610	NV		N	EN
7440-28-0	THALLIUM							0 / 14	9.5 - 12.1	ND	NV		N	ND
8001-35-2	Toxaphene							0 / 14	0.17 - 0.17	ND	0.00287	C	N	ND

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Fish Fillets
Exposure Medium: Fish Fillets
Exposure Point: Fillets from Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Fish Consumption[a]		COPC Flag	Rationale for Selection[f]
7440-62-2	VANADIUM							0 / 14	18.9 - 24.3	ND	0.00946	NC	N	ND
7440-66-6	ZINC	41.7	J	99.4	J	mg/kg	1-1-5	14 / 14	NA	99.4	40.6	NC	Y	ASL

[a]Screening toxicity values for fish are USEPA Regional Screening Levels (RSLs) (December, 2009). RSLs correspond to 1E-06 cancer risk or a hazard quotient of 0.1, whichever is lower.

[b]The default screening value is for PCBs.

[c]The default screening value is for hexavalent chromium.

[d]The default screening value is for endosulfan.

[e]There is no TEF for PCB/PCDD/PCDF; all detected PCB/PCDD/PCDF congeners that have TEF values are selected as COPCs and included in the TEQ calculation.

[f]Selection Rationale Codes:

ASL = Above screening level
BSL = Below screening level
ND = Not detected
EN = Essential nutrient
NV = No toxicity value or RSL; this chemical cannot be evaluated quantitatively in the risk assessment
TEQ = Compound is included because it is a contributor to TEQ for 2,3,7,8-TCDD

[g]Multiple PCB Aroclors were reported in fish samples, and therefore a total Aroclor concentration is also provided to evaluate potential carcinogenic risks using the total PCB slope factor.

Other Notes: NA = Not applicable
ND = Not detected
Y = Yes
N = No

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[d]
1000187-02-9	(7a-Isopropenyl-4,5-dimethyloctahydroinden-4-yl)	0.13	JN	0.13	JN	mg/kg	SS-01	1 / 1		0.13			N	NV
83-47-6	.gamma.-Sitosterol	0.13	JN	0.13	JN	mg/kg	SP-4B	1 / 1		0.13			N	NV
71-55-6	1,1,1-Trichloroethane							0 / 12	0.0072 - 0.023		874	NC	N	BSL
79-34-5	1,1,2,2-Tetrachloroethane							0 / 12	0.0072 - 0.023		0.562	C	N	ND
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane							0 / 12	0.0072 - 0.023		4250	NC	N	ND
79-00-5	1,1,2-Trichloroethane							0 / 12	0.0072 - 0.023		1.07	C	N	ND
92-52-4	1,1'-Biphenyl							0 / 12	0.32 - 1.3		391	NC	N	ND
35693-99-3	1,1'-Biphenyl, 2,2',5,5'-tetrachloro-	0.17	JN	0.89	JN	mg/kg	SP-1B	4 / 4		0.89			N	NV
15968-05-5	1,1'-Biphenyl, 2,2',6,6'-tetrachloro-	0.18	JN	0.18	JN	mg/kg	SP-3B	1 / 1		0.18			N	NV
41464-43-1	1,1'-Biphenyl, 2,3,3',4'-tetrachloro-	0.5	JN	0.5	JN	mg/kg	SP-1B	1 / 1		0.5			N	NV
32598-10-0	1,1'-Biphenyl, 2,3',4,4'-tetrachloro-	0.14	JN	0.14	JN	mg/kg	SS-01	1 / 1		0.14			N	NV
32598-11-1	1,1'-Biphenyl, 2,3',4',5-tetrachloro-	0.14	JN	0.14	JN	mg/kg	SS-01	1 / 1		0.14			N	NV
33284-53-6	1,1'-Biphenyl, 2,3,4,5-tetrachloro-	0.13	JN	0.13	JN	mg/kg	SS-01	1 / 1		0.13			N	NV
52663-58-8	1,1'-Biphenyl, 2,3,4',6-tetrachloro-	0.13	JN	0.27	JN	mg/kg	SP-3B	3 / 3		0.27			N	NV
38444-86-9	1,1'-Biphenyl, 2',3,4-trichloro	0.24	JN	0.24	JN	mg/kg	SP-2B	1 / 1		0.24			N	NV
32598-12-2	1,1'-Biphenyl, 2,4,4',6-tetrachloro-	0.15	JN	0.15	JN	mg/kg	SS-01	1 / 1		0.15			N	NV
7012-37-5	1,1'-Biphenyl, 2,4,4'-trichloro	0.15	JN	0.15	JN	mg/kg	SS-01	1 / 1		0.15			N	NV
16606-02-3	1,1'-Biphenyl, 2,4',5-trichloro	0.26	JN	0.26	JN	mg/kg	SS-01	1 / 1		0.26			N	NV
32598-13-3	1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	0.17	JN	0.52	JN	mg/kg	SP-1A	3 / 3		0.52	0.0341	C	Y	ASL/TEQ
1000126-34-5	1,1'-Biphenyl, 5-hydroxy-3,4'-dimethoxy-	0.19	JN	0.19	JN	mg/kg	SP-3B	1 / 1		0.19			N	NV
25323-68-6	1,1'-Biphenyl, trichloro-	0.14	JN	0.32	JN	mg/kg	SS-01	2 / 2		0.32			N	NV
75-34-3	1,1-Dichloroethane							0 / 12	0.0072 - 0.023		3.31	C	N	ND
75-35-4	1,1-Dichloroethene							0 / 12	0.0072 - 0.023		24.3	NC	N	ND
87-61-6	1,2,3-Trichlorobenzene							0 / 9	0.0072 - 0.023		4.89	NC	N	ND
95-94-3	1,2,4,5-Tetrachlorobenzene							0 / 12	0.32 - 1.3		1.83	NC	N	ND
120-82-1	1,2,4-Trichlorobenzene							0 / 9	0.0072 - 0.023		6.19	NC	N	ND
17151-09-6	1,2-Bis(trimethylsilyl)benzene	0.16	JN	0.16	JN	mg/kg	SS-01	1 / 1		0.16			N	NV
96-12-8	1,2-Dibromo-3-chloropropane							0 / 9	0.0072 - 0.023		0.00535	C	N	ND

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag		Rationale for Selection[d]
106-93-4	1,2-Dibromoethane							0 / 12	0.0072 - 0.023		0.0337	C	N	ND
95-50-1	1,2-Dichlorobenzene							0 / 9	0.0072 - 0.023		191	NC	N	ND
107-06-2	1,2-Dichloroethane							0 / 12	0.0072 - 0.023		0.432	C	N	ND
78-87-5	1,2-Dichloropropane							0 / 12	0.0072 - 0.023		0.895	C	N	ND
67685-32-9	1,3-Benzenediol, 4-(6-methoxy-2-benzofuranyl)-	0.23	JN	0.23	JN	mg/kg	SP-4A	1 / 1		0.23			N	NV
541-73-1	1,3-Dichlorobenzene							0 / 9	0.0072 - 0.023				N	ND
106-46-7	1,4-Dichlorobenzene							0 / 9	0.0072 - 0.023		2.44	C	N	ND
97985-58-5	1,5-Hexadiene, 1,1,2,4,4,5-hexachloro-	0.15	JN	0.15	JN	mg/kg	SP-4B	1 / 1		0.15			N	NV
238-84-6	11H-Benzo[a]fluorene	0.16	JN	0.21	JN	mg/kg	SS-01	4 / 4		0.21			N	NV
243-17-4	11H-Benzo[b]fluorene	0.22	JN	0.53	JN	mg/kg	SP-1A	4 / 4		0.53			N	NV
1000143-48-5	11-Heptadecenal	0.51	JN	0.51	JN	mg/kg	SP-1A	1 / 1		0.51			N	NV
87953-47-7	15-Isobutyl-(13alphah)-isocopalane	0.21	JN	0.21	JN	mg/kg	SP-4A	1 / 1		0.21			N	NV
1000197-08-4	1-Cyclohexene, 1,3,3-trimethyl-2-(1-methylbut-1-	0.2	JN	0.2	JN	mg/kg	SP-4A	1 / 1		0.2			N	NV
57984-03-9	1H-Cyclopenta[a]pentalen-7-ol, decahydro-3,3,4,7	0.14	JN	0.14	JN	mg/kg	SS-02	1 / 1		0.14			N	NV
33064-19-6	1H-Pyrazole, 3-(4-chlorophenyl)-1-phenyl-	0.18	JN	0.6	JN	mg/kg	SP-1A	2 / 2		0.6			N	NV
461-05-2	1-Propanaminium, 3-carboxy-2-hydroxy-N,N,N-trime	0.24	JN	0.24	JN	mg/kg	SP-2B	1 / 1		0.24			N	NV
108-60-1	2,2'-Oxybis(1-chloropropane)							0 / 12	0.32 - 1.3		4.57	C	N	ND
58-90-2	2,3,4,6-Tetrachlorophenol							0 / 12	0.32 - 1.3		183	NC	N	ND
2888-60-0	2,3-Dihydro-7-methyl-5-phenyl-1H-1,4-benzodiazep	1.3	JN	1.3	JN	mg/kg	SP-1A	1 / 1		1.3			N	NV
95-95-4	2,4,5-Trichlorophenol							0 / 12	0.32 - 1.3		611	NC	N	ND
88-06-2	2,4,6-Trichlorophenol							0 / 12	0.32 - 1.3		6.11	NC	N	ND
88-06-2	2,4,6-Trichlorophenol							0 / 12	0.32 - 1.3		6.11	C	N	ND
120-83-2	2,4-Dichlorophenol							0 / 12	0.32 - 1.3		18.3	NC	N	ND
105-67-9	2,4-Dimethylphenol							0 / 12	0.32 - 1.3		122	NC	N	ND
51-28-5	2,4-Dinitrophenol							0 / 12	0.61 - 2.4		12.2	NC	N	ND
121-14-2	2,4-Dinitrotoluene							0 / 12	0.32 - 1.3		1.56	C	N	ND
606-20-2	2,6-Dinitrotoluene							0 / 12	0.32 - 1.3		6.12	NC	N	ND
1000227-32-1	2-[p-Cyanophenyl]-5-chlorobenzimidazole	0.13	JN	0.13	JN	mg/kg	SP-4B	1 / 1		0.13			N	NV
53584-60-4	28-Nor-17.alpha.(H)-hopane	0.22	JN	0.22	JN	mg/kg	SP-4B	1 / 1		0.22			N	NV
78-93-3	2-Butanone	0.013	J	0.039		mg/kg	SP-2B	6 / 12	0.014 - 0.033	0.039	2780	NC	N	BSL
91-58-7	2-Chloronaphthalene							0 / 12	0.32 - 1.3		626	NC	N	ND
95-57-8	2-Chlorophenol							0 / 12	0.32 - 1.3		39.1	NC	N	ND
591-78-6	2-Hexanone							0 / 12	0.014 - 0.045		20.9	NC	N	ND
91-57-6	2-Methylnaphthalene	0.01	J	0.11	J	mg/kg	SP-1A	11 / 12	0.39 - 0.39	0.11	31.3	NC	N	BSL

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[d]
95-48-7	2-Methylphenol							0 / 12	0.32 - 1.3		306	NC	N	ND
88-74-4	2-Nitroaniline							0 / 12	0.61 - 2.4		60.6	NC	N	ND
88-75-5	2-Nitrophenol							0 / 12	0.32 - 1.3					
13323-66-5	2-Propen-1-one, 1-(2-hydroxyphenyl)-3-(4-hydroxy	0.18	JN	0.18	JN	mg/kg	SP-4B	1 / 1		0.18			N	NV
1604-34-8	2-Undecanone, 6,10-dimethyl-	0.46	JN	0.46	JN	mg/kg	SP-5B	1 / 1		0.46			N	NV
91-94-1	3,3'-Dichlorobenzidine							0 / 12	0.32 - 1.3		1.08	C	N	BSL
1000130-21-2	3,5-Dibromophloretic acid	0.2	JN	0.2	JN	mg/kg	SP-5A	1 / 1		0.2			N	NV
99-09-2	3-Nitroaniline							0 / 12	0.61 - 2.4				N	ND
111536-74-4	4-(4-Fluorophenyl)-2,3-dihydro-2-methyl-1H-1,5-b	0.14	JN	0.14	JN	mg/kg	SP-3B	1 / 1		0.14			N	NV
72-54-8	4,4'-DDD							0 / 12	0.0046 - 0.0099		2.02	C	N	ND
72-55-9	4,4'-DDE	0.01	NJ	0.021	J	mg/kg	SP-3B	3 / 12	0.0046 - 0.0099	0.021	1.43	C	N	BSL
50-29-3	4,4'-DDT	0.0027	J	0.094		mg/kg	SP-1B	5 / 12	0.0046 - 0.0099	0.094	1.72	C	N	BSL
534-52-1	4,6-Dinitro-2-methylphenol							0 / 12	0.61 - 2.4		0.611	NC	N	ND
101-55-3	4-Bromophenyl-phenylether							0 / 12	0.32 - 1.3				N	ND
59-50-7	4-Chloro-3-methylphenol							0 / 12	0.32 - 1.3		611	NC	N	ND
106-47-8	4-Chloroaniline							0 / 12	0.32 - 1.3		2.43	C	N	ND
7005-72-3	4-Chlorophenyl-phenylether							0 / 12	0.32 - 1.3				N	ND
203-64-5	4H-Cyclopenta[def]phenanthrene	0.18	JN	0.64	JN	mg/kg	SP-1B	2 / 2		0.64			N	NV
108-10-1	4-Methyl-2-Pentanone							0 / 12	0.014 - 0.045		532	NC	N	ND
1000130-88-9	4-Methyl-E-4-hexadecen-1-ol	0.43	JN	0.43	JN	mg/kg	SP-4A	1 / 1		0.43			N	NV
106-44-5	4-Methylphenol	0.012	J	0.027	J	mg/kg	SP-4B	5 / 12	0.32 - 1.3	0.027	30.6	NC	N	BSL
100-01-6	4-Nitroaniline							0 / 12	0.61 - 2.4		24.3	C	N	ND
100-02-7	4-Nitrophenol							0 / 12	0.61 - 2.4				N	ND
1000193-54-0	5-(7a-Isopropenyl-4,5-dimethyl-octahydroinden-4-	0.16	JN	0.16	JN	mg/kg	SS-02	1 / 1		0.16			N	NV
1000148-24-4	5-Methyl-4'-hydroxy-2-benzylidene-coumaran-3-one	0.28	JN	0.28	JN	mg/kg	SS-01	1 / 1		0.28			N	NV
82-05-3	7H-Benz[de]anthracen-7-one	0.2	JN	0.53	JN	mg/kg	SP-1A	2 / 2		0.53			N	NV
84-65-1	9,10-Anthracenedione	0.21	JN	1.1	JN	mg/kg	SP-1A	2 / 2		1.1			N	NV
481-74-3	9,10-Anthracenedione, 1,8-dihydroxy-3-methyl-	0.7	JN	0.7	JN	mg/kg	SP-1A	1 / 1		0.7			N	NV
781-43-1	9,10-Dimethylanthracene	0.16	JN	0.16	JN	mg/kg	SP-4A	1 / 1		0.16			N	NV
301-02-0	9-Octadecenamide, (Z)-	0.18	JN	0.21	JN	mg/kg	SS-01	2 / 2		0.21			N	NV
92174-35-1	9-Phenanthrenemethyl glycolate	0.13	JN	0.13	JN	mg/kg	SP-3B	1 / 1		0.13			N	NV

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[d]
83-32-9	Acenaphthene	0.016	J	0.15	J	mg/kg	SP-1A	11 / 12	0.43 - 0.43	0.15	344	NC	N	BSL
208-96-8	Acenaphthylene	0.015	J	0.12	J	mg/kg	SP-1A	11 / 12	0.43 - 0.43	0.12	170	NC[e]	N	BSL
67-64-1	Acetone	0.0082	J	0.15		mg/kg	SP-4B	7 / 12	0.019 - 0.033	0.15	6130	NC	N	BSL
98-86-2	Acetophenone							0 / 12	0.082 - 1.3		782	NC	N	ND
309-00-2	Aldrin							0 / 12	0.0023 - 0.0051		0.0286	C	N	ND
319-84-6	alpha-BHC							0 / 12	0.0023 - 0.0051		0.0771	C	N	ND
5103-71-9	alpha-Chlordane							0 / 12	0.0023 - 0.0051				N	ND
7429-90-5	ALUMINUM	5320		12700	J	mg/kg	SS-01	12 / 12		12700	7740	NC	Y	ASL
490-55-1	Amiphenazole	0.24	JN	0.24	JN	mg/kg	SS-01	1 / 1		0.24			N	NV
120-12-7	Anthracene	0.022	J	0.37	J	mg/kg	SP-1A	12 / 12		0.37	1720	NC	N	BSL
610-48-0	Anthracene, 1-methyl-	0.14	JN	0.14	JN	mg/kg	SP-4B	1 / 1		0.14			N	NV
613-12-7	Anthracene, 2-methyl-	0.19	JN	0.49	JN	mg/kg	SP-1A	4 / 4		0.49			N	NV
55401-75-7	Anthracene, 9-dodecyltetradecahydro-	0.14	JN	0.14	JN	mg/kg	SP-4B	1 / 1		0.14			N	NV
779-02-2	Anthracene, 9-methyl-	0.14	JN	0.56	JN	mg/kg	SP-1A	2 / 2		0.56			N	NV
7440-36-0	ANTIMONY	1.9	J	4.1	J	mg/kg	SP-3A	3 / 12	1.1 - 2.4	4.1	3.13	NC	Y	ASL
12674-11-2	Aroclor-1016							0 / 12	0.046 - 0.099		0.393	NC	N	ND
11104-28-2	Aroclor-1221							0 / 12	0.046 - 0.099		0.141	C	N	ND
11141-16-5	Aroclor-1232							0 / 12	0.046 - 0.099		0.141	C	N	ND
53469-21-9	Aroclor-1242	0.31	JN	0.71	JN	mg/kg	SP-4B	5 / 12	0.046 - 0.077	0.71	0.221	C	Y	ASL
12672-29-6	Aroclor-1248	0.23		1.7		mg/kg	SP-1B	7 / 12	0.062 - 0.099	1.7	0.221	C	Y	ASL
11097-69-1	Aroclor-1254							0 / 12	0.046 - 0.099		0.112	NC	N	ND
11096-82-5	Aroclor-1260							0 / 12	0.046 - 0.099		0.221	C	N	ND
37324-23-5	Aroclor-1262							0 / 12	0.046 - 0.099		0.221	C[b]	N	ND
11100-14-4	Aroclor-1268							0 / 12	0.046 - 0.099		0.221	C[b]	N	ND
7440-38-2	ARSENIC	6.1		11.9	J	mg/kg	SP-3A	12 / 12		11.9	0.389	C	Y	ASL
1912-24-9	Atrazine							0 / 12	0.32 - 1.3		2.11	C	N	ND
7440-39-3	BARIUM	93.3		176	J	mg/kg	SS-01	12 / 12		176	1530	NC	N	BSL
100-52-7	Benzaldehyde	0.059	J	0.72	J	mg/kg	SP-1A	12 / 12		0.72	782	NC	N	BSL
90-60-8	Benzaldehyde, 3,5-dichloro-2-hydroxy-	0.32	JN	0.32	JN	mg/kg	SS-01	1 / 1		0.32			N	NV
1628-58-6	Benzenamine, 4-[2-(2-benzothiazolyl)ethenyl]-N,N	0.56	JN	0.56	JN	mg/kg	SP-1A	1 / 1		0.56			N	NV
71-43-2	Benzene							0 / 12	0.0072 - 0.023		1.08	C	N	ND
106984-17-2	Benzene, 2-methoxy-1-(2-methylpropyl)-3,5-dinitr	0.14	JN	0.14	JN	mg/kg	SS-01	1 / 1		0.14			N	NV
56-55-3	Benzo(a)anthracene	0.13	J	2.8		mg/kg	SP-1A	12 / 12		2.8	0.148	C	Y	ASL
50-32-8	Benzo(a)pyrene	0.12	J	3.2		mg/kg	SP-1A	12 / 12		3.2	0.0148	C	Y	ASL
205-99-2	Benzo(b)fluoranthene	0.2	J	4.5		mg/kg	SP-1A	12 / 12		4.5	0.148	C	Y	ASL
191-24-2	Benzo(g,h,i)perylene	0.11	J	1.9		mg/kg	SP-1B	11 / 12	1.2 - 1.2	1.9	170	NC[e]	N	BSL
207-08-9	Benzo(k)fluoranthene	0.07	J	2		mg/kg	SP-1A	12 / 12		2	1.48	C	Y	ASL
16587-58-9	Benzo[1,2-b:4,3-b']dithiophene, 1-phenyl-	0.15	JN	0.15	JN	mg/kg	SP-4B	1 / 1		0.15			N	NV
239-35-0	Benzo[b]naphtho[2,1-d]thiophene	0.16	JN	0.16	JN	mg/kg	SP-4A	1 / 1		0.16			N	NV

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[d]
522-75-8	Benzo[b]thiophen-3(2H)-one, 2-(3-oxobenzo[b]thie	0.28	JN	0.28	JN	mg/kg	SS-02	1 / 1		0.28		N	NV
215-58-7	Benzo[b]triphenylene	0.14	JN	0.27	JN	mg/kg	SP-5A	2 / 2		0.27		N	NV
195-19-7	Benzo[c]phenanthrene	0.51	JN	0.73	JN	mg/kg	SP-1A	2 / 2		0.73		N	NV
192-97-2	Benzo[e]pyrene	0.19	JN	0.61	JN	mg/kg	SP-5A	5 / 5		0.61		N	NV
203-12-3	Benzo[ghi]fluoranthene	0.15	JN	0.15	JN	mg/kg	SP-3B	1 / 1		0.15		N	NV
205-82-3	Benzo[j]fluoranthene	0.24	JN	0.86	JN	mg/kg	SP-4A	5 / 5		0.86	0.532	C	Y	ASL
7440-41-7	BERYLLIUM	0.43		0.63	J	mg/kg	SP-3B	8 / 12	0.39 - 0.6	0.63	15.6	NC	N	BSL
319-85-7	beta-BHC							0 / 12	0.0023 - 0.0051		0.27	C	N	ND
111-91-1	Bis(2-chloroethoxy)methane							0 / 12	0.32 - 1.3		18.3	NC	N	ND
111-44-4	Bis(2-chloroethyl)ether							0 / 12	0.32 - 1.3		0.214	C	N	ND
117-81-7	Bis(2-ethylhexyl)phthalate							0 / 12	0.32 - 1.3		34.7	C	N	ND
74-97-5	Bromochloromethane							0 / 12	0.0072 - 0.023				N	ND
75-27-4	Bromodichloromethane							0 / 12	0.0072 - 0.023		0.273	C	N	ND
75-25-2	Bromoform							0 / 9	0.0072 - 0.023		61.5	C	N	ND
74-83-9	Bromomethane							0 / 12	0.0072 - 0.023		0.732	NC	N	ND
85-68-7	Butylbenzylphthalate	0.017	J	0.14	J	mg/kg	SP-1A	10 / 12	0.33 - 1.3	0.14	256	C	N	BSL
7440-43-9	CADMIUM	2	J	15.2	J	mg/kg	SS-01	12 / 12		15.2	7	NC	Y	ASL
7440-70-2	CALCIUM	38000		70500	J	mg/kg	SP-5A	12 / 12		70500			N	EN
105-60-2	Caprolactam							0 / 12	0.32 - 1.3		3060	NC	N	ND
86-74-8	Carbazole	0.03	J	0.34	J	mg/kg	SP-1A	12 / 12		0.34			Y	FD
75-15-0	Carbon disulfide							0 / 12	0.0072 - 0.023		82.1	NC	N	ND
56-23-5	Carbon tetrachloride							0 / 12	0.0072 - 0.023		0.248	C	N	ND
N/A	Chlorinated aromatic	0.13	J	0.13	J	mg/kg	SS-01	1 / 1		0.13			N	NV
N/A	Chlorinated aromatic	0.13	J	0.13	J	mg/kg	SP-4A	1 / 1		0.13			N	NV
N/A	Chlorinated aromatic	0.13	J	0.13	J	mg/kg	SP-4B	1 / 1		0.13			N	NV
108-90-7	Chlorobenzene							0 / 12	0.0072 - 0.023		29.4	NC	N	ND
75-00-3	Chloroethane							0 / 12	0.0072 - 0.023		1450	NC	N	ND
67-66-3	Chloroform							0 / 12	0.0072 - 0.023		0.295	C	N	ND
74-87-3	Chloromethane							0 / 12	0.0072 - 0.023		11.9	NC	N	ND
88-04-0	Chloroxylenol	0.16	JN	0.67	JN	mg/kg	SP-5A	6 / 6		0.67			Y	FD
7440-47-3	CHROMIUM	52	J	379	J	mg/kg	SP-3B	12 / 12		379	0.29	C[c]	Y	ASL
218-01-9	Chrysene	0.14	J	3.4		mg/kg	SP-1A	12 / 12		3.4	14.8	C	N	BSL
3351-28-8	Chrysene, 1-methyl-	0.14	JN	0.14	JN	mg/kg	SP-4A	1 / 1		0.14			N	NV
3351-31-3	Chrysene, 3-methyl-	0.52	JN	0.52	JN	mg/kg	SP-1B	1 / 1		0.52			N	NV
156-59-2	cis-1,2-Dichloroethene							0 / 12	0.0072 - 0.023		78.2	NC	N	ND
10061-01-5	cis-1,3-Dichloropropene							0 / 12	0.0072 - 0.023					
5556-76-3	cis-3,4,5-Trimethoxy-b-methyl-b-nitrostyrene	0.18	JN	0.18	JN	mg/kg	SS-01	1 / 1		0.18			N	NV
7440-48-4	COBALT	5.8	J	8.9	J	mg/kg	SP-3A	12 / 12		8.9	2.34	NC	Y	ASL
7440-50-8	COPPER	78.8	J	230	J	mg/kg	SP-3B	12 / 12		230	313	NC	N	BSL
110-82-7	Cyclohexane							0 / 12	0.0072 - 0.023		702	NC	N	ND
5737-13-3	Cyclopenta(def)phenanthrenone	0.16	JN	0.22	JN	mg/kg	SP-4A	2 / 2		0.22			N	NV
27208-37-3	Cyclopenta[cd]pyrene	0.18	JN	0.2	JN	mg/kg	SP-4A	2 / 2		0.2			N	NV

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[d]
80655-44-3	Decahydro-4,4,8,9,10-pentamethylnaphthalene	0.11	JN	0.16	JN	mg/kg	SP-3B	2 / 2		0.16		N	NV
319-86-8	delta-BHC							0 / 12	0.0023 - 0.0051			N	ND
54833-57-7	D-Homoestra-1,3,5(10),14-tetraen-17-one, 3-metho	0.3	JN	0.3	JN	mg/kg	SP-4A	1 / 1		0.3		N	NV
53-70-3	Dibenzo(a,h)anthracene	0.024	J	0.14	J	mg/kg	SP-4A	5 / 12	0.32 - 1.3	0.14	0.0148	C	Y	ASL
191-26-4	Dibenzo[def,mno]chrysene	1.5	JN	1.5	JN	mg/kg	SP-1A	1 / 1		1.5		N	NV
132-64-9	Dibenzofuran	0.012	J	0.11	J	mg/kg	SP-1A	10 / 12	0.43 - 0.51	0.11	7.82	NC	N	ND
124-48-1	Dibromochloromethane							0 / 12	0.0072 - 0.023		0.68	C	N	ND
75-71-8	Dichlorodifluoromethane							0 / 12	0.0072 - 0.023		18.4	NC	N	ND
60-57-1	Dieldrin							0 / 12	0.0046 - 0.0099		0.0303	C	N	ND
84-66-2	Diethylphthalate	0.011	J	0.011	J	mg/kg	SP-4A	1 / 12	0.32 - 1.3	0.011	4890	NC	N	BSL
54063-09-1	Diisoamylene	0.35	JN	0.35	JN	mg/kg	SP-5B	1 / 1		0.35			N	NV
131-11-3	Dimethylphthalate							0 / 12	0.32 - 1.3				N	ND
84-74-2	Di-n-butylphthalate							0 / 12	0.32 - 1.3		611	NC	N	ND
117-84-0	Di-n-octylphthalate							0 / 12	0.32 - 1.3				N	ND
3347-22-6	Dithianone	0.27	JN	0.27	JN	mg/kg	SP-5A	1 / 1		0.27			N	NV
1000131-00-3	E-11,13-Tetradecadien-1-ol	0.21	JN	0.21	JN	mg/kg	SP-5B	1 / 1		0.21			N	NV
959-98-8	Endosulfan I							0 / 12	0.0023 - 0.0051				N	ND
33213-65-9	Endosulfan II							0 / 10	0.0024 - 0.0099				N	ND
1031-07-8	Endosulfan sulfate							0 / 12	0.0046 - 0.0099				N	ND
72-20-8	Endrin	0.006	J	0.011		mg/kg	SP-1B	2 / 12	0.0062 - 0.0099	0.011	1.83	NC	N	BSL
7421-93-4	Endrin aldehyde	0.0078		0.0079		mg/kg	SP-3A	2 / 12	0.0046 - 0.0099	0.0079			N	NV
53494-70-5	Endrin ketone							0 / 12	0.0046 - 0.0099				N	ND
100-41-4	Ethylbenzene							0 / 12	0.0072 - 0.023		5.39	C	N	ND
206-44-0	Fluoranthene	0.28	J	5.6		mg/kg	SP-1A	12 / 12		5.6	229	NC	N	BSL
86-73-7	Fluorene	0.013	J	0.18	J	mg/kg	SP-1A	12 / 12		0.18	229	NC	N	BSL
58-89-9	gamma-BHC (Lindane)	0.002	J	0.002	J	mg/kg	SP-5A	1 / 11	0.0023 - 0.0044	0.002	0.516	C	N	BSL
5103-74-2	gamma-Chlordane							0 / 12	0.0023 - 0.0051				N	ND
76-44-8	Heptachlor	0.0033	J	0.006	NJ	mg/kg	SP-4B	3 / 9	0.0032 - 0.0051	0.006	0.108	C	N	BSL
1024-57-3	Heptachlor epoxide							0 / 8	0.0032 - 0.0051		0.0533	C	N	ND
118-74-1	Hexachlorobenzene							0 / 12	0.32 - 1.3		0.303	C	N	ND
87-68-3	Hexachlorobutadiene							0 / 12	0.32 - 1.3		6.11	NC	N	ND
77-47-4	Hexachlorocyclopentadiene							0 / 12	0.32 - 1.3		36.6	NC	N	ND
67-72-1	Hexachloroethane							0 / 12	0.32 - 1.3		6.11	NC	N	ND
55019-46-0	Hexadecanal, 2-methyl-	0.36	JN	0.36	JN	mg/kg	SS-02	1 / 1		0.36			N	NV
629-54-9	Hexadecanamide	0.2	JN	0.2	JN	mg/kg	SS-02	1 / 1		0.2			N	NV
1492-30-4	Hexadecanoic acid, 4-nitrophenyl ester	0.32	JN	0.63	JN	mg/kg	SP-5A	2 / 2		0.63			N	NV
193-39-5	Indeno(1,2,3-cd)pyrene	0.13	J	1.9		mg/kg	SP-1B	11 / 12	1.2 - 1.2	1.9	0.148	C	Y	ASL
193-43-1	Indeno[1,2,3-cd]fluoranthene	0.17	JN	2	JN	mg/kg	SP-1A	4 / 4		2			N	NV
7439-89-6	IRON	10400		24400	J	mg/kg	SP-5B	12 / 12		24400	5480	NC	Y	ASL
78-59-1	Isophorone							0 / 12	0.32 - 1.3		511	C	N	ND
98-82-8	Isopropylbenzene							0 / 12	0.0072 - 0.023		205	NC	N	ND
7439-92-1	LEAD	80	J	252	J	mg/kg	SS-01	12 / 12		252	40	NC	Y	ASL

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[d]
179601-23-1	m,p-Xylene							0 / 12	0.0072 - 0.023				N	ND
7439-95-4	MAGNESIUM	11900	J	18600	J	mg/kg	SS-02	12 / 12		18600			N	EN
7439-96-5	MANGANESE	188	J	465		mg/kg	SP-2A	8 / 8		465	183	NC	Y	ASL
7439-97-6	MERCURY	0.15	J	0.91	J	mg/kg	SP-5B	12 / 12		0.91	0.56	NC	Y	ASL
72-43-5	Methoxychlor							0 / 12	0.023 - 0.051		30.6	NC	N	ND
79-20-9	Methyl acetate							0 / 12	0.0072 - 0.023		7820	NC	N	ND
1634-04-4	Methyl tert-butyl ether							0 / 12	0.0072 - 0.023		43.3	C	N	ND
108-87-2	Methylcyclohexane							0 / 12	0.0072 - 0.023				N	ND
75-09-2	Methylene chloride							0 / 12	0.0072 - 0.023		10.7	C	N	ND
91-20-3	Naphthalene	0.023	J	0.19	J	mg/kg	SP-1A	12 / 12		0.19	3.57	C	N	BSL
22360-77-6	Naphthalene, 1,8-di-1-propynyl-	0.18	JN	0.18	JN	mg/kg	SP-4B	1 / 1		0.18			N	NV
612-94-2	Naphthalene, 2-phenyl-	0.21	JN	0.21	JN	mg/kg	SP-5A	1 / 1		0.21			N	NV
191-37-7	Naphtho[2,1,8,7-klmn]xanthene	0.16	JN	0.16	JN	mg/kg	SP-4B	1 / 1		0.16			N	NV
7440-02-0	NICKEL	28.2	J	100	J	mg/kg	SS-01	12 / 12		100	155	NC	N	BSL
98-95-3	Nitrobenzene							0 / 12	0.32 - 1.3		4.79	C	N	ND
621-64-7	N-Nitroso-di-n-propylamine							0 / 12	0.32 - 1.3		0.0694	C	N	ND
86-30-6	N-Nitrosodiphenylamine							0 / 12	0.32 - 1.3		99.1	C	N	ND
1120-07-6	Nonanamide	1.9	JN	1.9	JN	mg/kg	SP-5B	1 / 1		1.9			N	NV
112-05-0	Nonanoic acid	0.2	JN	0.2	JN	mg/kg	SP-5A	1 / 1		0.2			N	NV
638-66-4	Octadecanal	0.5	JN	0.5	JN	mg/kg	SP-1A	1 / 1		0.5			N	NV
95-47-6	o-Xylene							0 / 12	0.0072 - 0.023		383	NC	N	ND
87-86-5	Pentachlorophenol	0.064	J	0.064	J	mg/kg	SP-5B	1 / 12	0.61 - 2.4	0.064	2.97	C	N	BSL
1000163-86-1	Pentadecanamide, 15-bromo-	0.38	JN	0.38	JN	mg/kg	SP-5B	1 / 1		0.38			N	NV
626-97-1	Pentanamide	0.17	JN	0.17	JN	mg/kg	SP-5B	1 / 1		0.17			N	NV
198-55-0	Perylene	0.32	JN	2.7	JN	mg/kg	SP-1A	6 / 6		2.7			Y	FD
24471-47-4	Perylene, 3-methyl-	0.16	JN	0.16	JN	mg/kg	SP-4A	1 / 1		0.16			N	NV
85-01-8	Phenanthrene	0.14	J	2.4		mg/kg	SP-1A	12 / 12		2.4	170	NC[e]	N	BSL
3674-65-5	Phenanthrene, 2,3-dimethyl-	0.18	JN	0.18	JN	mg/kg	SS-01	1 / 1		0.18			N	NV
3674-66-6	Phenanthrene, 2,5-dimethyl-	0.18	JN	0.6	JN	mg/kg	SP-1A	2 / 2		0.6			N	NV
832-71-3	Phenanthrene, 3-methyl-	0.28	JN	0.28	JN	mg/kg	SP-5A	1 / 1		0.28			N	NV
108-95-2	Phenol	0.024	J	0.07	J	mg/kg	SP-1A	11 / 12	1.3 - 1.3	0.07	1830	NC	N	BSL
7440-09-7	POTASSIUM	538	J	1780	J	mg/kg	SS-01	12 / 12		1780			N	EN
92-94-4	p-Terphenyl	0.17	JN	0.17	JN	mg/kg	SP-4A	1 / 1		0.17			N	NV
2847-30-5	Pyrazine, 2-methoxy-3-methyl-	0.15	JN	0.15	JN	mg/kg	SP-4B	1 / 1		0.15			N	NV
129-00-0	Pyrene	0.27	J	5.6		mg/kg	SP-1A	12 / 12		5.6	172	NC	N	BSL
2381-21-7	Pyrene, 1-methyl-	0.13	JN	0.13	JN	mg/kg	SP-4A	1 / 1		0.13			N	NV
3442-78-2	Pyrene, 2-methyl-	0.13	JN	0.31	JN	mg/kg	SS-01	3 / 3		0.31			N	NV
4053-42-3	Quinoline, 6-methyl-, 1-oxide	0.14	JN	0.18	JN	mg/kg	SP-2B	3 / 3		0.18			N	NV

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[d]
7782-49-2	SELENIUM	0.7	J	1.3	J	mg/kg	SP-5B	12 / 12		1.3	39.1	NC	N	BSL
7440-22-4	SILVER	1.2	J	6.9	J	mg/kg	SP-5B	12 / 12		6.9	39.1	NC	N	BSL
7440-23-5	SODIUM	730		730		mg/kg	SP-4A	1 / 12	621 - 1130	730			N	EN
100-42-5	Styrene							0 / 12	0.0072 - 0.023		628	NC	N	ND
127-18-4	Tetrachloroethene							0 / 12	0.0072 - 0.023		0.554	C	N	ND
7440-28-0	THALLIUM							0 / 12	0.56 - 1.2				N	ND
108-88-3	Toluene							0 / 12	0.0072 - 0.023		497	NC	N	ND
8001-35-2	Toxaphene							0 / 12	0.23 - 0.51		0.441	C	N	ND
156-60-5	trans-1,2-Dichloroethene							0 / 12	0.0072 - 0.023		15.3	NC	N	ND
10061-02-6	trans-1,3-Dichloropropene							0 / 12	0.0072 - 0.023				N	ND
79-01-6	Trichloroethene							0 / 12	0.0072 - 0.023		2.82	C	N	ND
75-69-4	Trichlorofluoromethane							0 / 12	0.0072 - 0.023		78.7	NC	N	ND
7440-62-2	VANADIUM	18.4	J	26.7	J	mg/kg	SP-3B	8 / 8		26.7	0.548	NC	Y	ASL
75-01-4	Vinyl chloride							0 / 12	0.0072 - 0.023		0.0597	C	N	ND
104576-48-9	Xanthine, 1,3-diethyl-8-[4-[[[ethylamino]carbony	0.14	JN	0.14	JN	mg/kg	SS-02	1 / 1		0.14			N	NV
7440-66-6	ZINC	261	J	402	J	mg/kg	SP-3A	12 / 12		402	2350	NC	N	BSL

[a] Screening toxicity values for sediment are USEPA Regional Screening Levels (RSLs) for soil exposure by oral, dermal and inhalation routes (December, 2009). RSLs correspond to 1E-06 cancer risk or a hazard quotient of 0.1, whichever is lower.

[b] The default screening value is for PCBs.

[c] The default screening value is for hexavalent chromium

[d] Selection Rationale Codes:

ASL = Above screening level
BSL = Below screening level
IFD = Infrequent detection; i.e., < 5% detection frequency with a minimum of 20 sample
FD = Frequent Detection, but no toxicity value; this chemical cannot be evaluated quantitatively in the risk assessmen
ND = Not detected
EN = Essential nutrient
NV = No toxicity value or RSL; this chemical cannot be evaluated quantitatively in the risk assessmen
TEQ = Compound is included because it is a contributor to TEQ for 2,3,7,8-TCDD per WHO (2005)

[e] The default screening value is for pyrene

[f] Certain tentatively identified compounds (TICs) were reported in the SCRIBE database and are included in this table for the sake of completeness; the listed detection frequencies (1/1, 2/2, etc.) indicate the number of samples in which these TICs were reported. Due to lack of RSLs, these TICs are generally not selected as COPCs.

Other Notes:

blank space = Not applicable

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
2272-40-4	(4,6-Dichloro[1,3,5]triazin-2-yl)-phenyl-amine	0.14	JN	0.14	JN	mg/kg	R1-2A	1 / 1		0.14		N	NV
1000127-00-1	.alpha.-Ketostearic acid	0.17	JN	0.17	JN	mg/kg	R1-2A	1 / 1		0.17		N	NV
559-70-6	.beta.-Amyrin	0.84	JN	0.84	JN	mg/kg	R2-7A	1 / 1		0.84		N	NV
3301-94-8	.delta. Nonalactone	0.27	JN	0.27	JN	mg/kg	R2-7A	1 / 1		0.27		N	NV
83-47-6	.gamma.-Sitosterol	0.42	JN	0.93	JN	mg/kg	R2-6B	2 / 2		0.93		N	NV
83242-83-5	[1,1'-Bicyclohexyl]-4-carboxylic acid, 4'-propyl	0.27	JN	0.27	JN	mg/kg	R2-10A	1 / 1		0.27		N	NV
81701-13-5	[1,1'-Bicyclohexyl]-4-carboxylic acid, 4'-propyl	0.24	JN	0.24	JN	mg/kg	R2-2A	1 / 1		0.24		N	NV
24973-49-7	[1,1'-Biphenyl]-2-carbonitrile	5.5	JN	5.5	JN	mg/kg	R3-3A	1 / 1		5.5		N	NV
20175-84-2	[1,2'-Binaphthalene]-5,5',8,8'-tetrone, 1',4-dih	0.24	JN	0.24	JN	mg/kg	R2-10A	1 / 1		0.24		N	NV
1000148-54-4	1-(1-Trimethylsiloxyethenyl)-3-trimethylsiloxy-b	0.23	JN	0.23	JN	mg/kg	R2-2B	1 / 1		0.23		N	NV
1000148-53-0	1-(1-Trimethylsiloxyethenyl)-4-trimethylsiloxy-b	0.13	JN	0.13	JN	mg/kg	R1-2A	1 / 1		0.13		N	NV
74069-53-7	1(4H)-Naphthalenone, 4a,5,8,8a-tetrahydro-4-hydr	6	JN	6	JN	mg/kg	R2-12A	1 / 1		6		N	NV
71-55-6	1,1,1-Trichloroethane	0.0066	J	0.035		mg/kg	R3-1A	2 / 67	0.0051 - 0.045	0.035	874	NC	N	BSL
79-34-5	1,1,2,2-Tetrachloroethane	0.0045	J	0.099		mg/kg	R2-10B	3 / 67	0.0051 - 0.045	0.099	0.562	C	N	BSL
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane							0 / 67	0.0051 - 0.045		4250	NC	N	ND
79-00-5	1,1,2-Trichloroethane							0 / 67	0.0051 - 0.045		1.07	C	N	ND
484-11-7	1,10-Phenanthroline, 2,9-dimethyl-	6.1	JN	6.1	JN	mg/kg	R2-12B	1 / 1		6.1			N	NV
4452-45-3	1,14-Docosanediol	0.31	JN	0.31	JN	mg/kg	SS-10	1 / 1		0.31			N	NV
604-53-5	1,1'-Binaphthalene	1.4	JN	1.4	JN	mg/kg	R3-5A	1 / 1		1.4			N	NV
92-52-4	1,1'-Biphenyl	0.0083	J	2.6		mg/kg	R2-16B	24 / 67	0.22 - 9.2	2.6	391	NC	N	BSL
52663-59-9	1,1'-Biphenyl, 2,2',3,4-tetrachloro-	1.2	JN	3.4	JN	mg/kg	R3-11B	2 / 2		3.4			N	No TEF[f]
37680-65-2	1,1'-Biphenyl, 2,2',5-trichloro	0.69	JN	3.6	JN	mg/kg	R3-9B	2 / 2		3.6			N	No TEF[f]
38444-84-7	1,1'-Biphenyl, 2,3,3'-trichloro	4	JN	4	JN	mg/kg	R3-9A	1 / 1		4			N	No TEF[f]
68194-12-7	1,1'-Biphenyl, 2,3',4,5,5'-pentachloro-	1.1	JN	1.1	JN	mg/kg	R3-11A	1 / 1		1.1			N	No TEF[f]
56558-18-0	1,1'-Biphenyl, 2,3',4,5',6-Pentachloro-	1.9	JN	1.9	JN	mg/kg	R3-9B	1 / 1		1.9			N	No TEF[f]
32598-11-1	1,1'-Biphenyl, 2,3',4',5-tetrachloro-	1	JN	1	JN	mg/kg	R3-11A	1 / 1		1			N	No TEF[f]
52663-58-8	1,1'-Biphenyl, 2,3,4',6-tetrachloro-	1.5	JN	1.5	JN	mg/kg	R3-9A	1 / 1		1.5			N	No TEF[f]

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
38444-86-9	1,1'-Biphenyl, 2',3,4-trichloro	0.19	JN	0.19	JN	mg/kg	R2-8A	1 / 1		0.19		N	No TEF[f]
41464-42-0	1,1'-Biphenyl, 2,3',5,5'-tetrachloro-	0.49	JN	4.9	JN	mg/kg	R3-11B	8 / 8		4.9		N	No TEF[f]
32598-12-2	1,1'-Biphenyl, 2,4,4',6-tetrachloro-	0.33	JN	0.33	JN	mg/kg	SS-10	1 / 1		0.33		N	No TEF[f]
7012-37-5	1,1'-Biphenyl, 2,4,4'-trichloro	0.17	JN	2.5	JN	mg/kg	R3-11A	3 / 3		2.5		N	No TEF[f]
16606-02-3	1,1'-Biphenyl, 2,4',5-trichloro	0.32	JN	15	JN	mg/kg	R3-11B	8 / 8		15		N	No TEF[f]
643-58-3	1,1'-Biphenyl, 2-methyl-	4.9	JN	6.2	JN	mg/kg	R2-16B	2 / 2		6.2		N	No TEF[f]
32598-13-3	1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	0.45	JN	6.2	JN	mg/kg	R3-11B	6 / 6		6.2	0.0341	C Y	TEQ
2050-68-2	1,1'-Biphenyl, 4,4'-dichloro-	0.5	JN	14	JN	mg/kg	R3-9A	8 / 8		14		N	No TEF[f]
2051-62-9	1,1'-Biphenyl, 4-chloro-	2.5	JN	3.7	JN	mg/kg	R3-9A	2 / 2		3.7		N	No TEF[f]
25323-68-6	1,1'-Biphenyl, trichloro-	0.11	JN	13	JN	mg/kg	R3-11B	22 / 22		13		N	No TEF[f]
75-34-3	1,1-Dichloroethane	0.00096	J	0.0014	J	mg/kg	R2-12B	3 / 67	0.0051 - 0.045	0.0014	3.31	C N	BSL
75-35-4	1,1-Dichloroethene							0 / 67	0.0051 - 0.045		24.3	NC N	BSL
1000159-90-0	1,1-Dimethyl-2,5-diphenyl-3-ethyl-silacyclopenta	1.6	JN	1.6	JN	mg/kg	R3-5B	1 / 1		1.6		N	NV
35822-46-9	1,2,3,4,6,7,8-HpCDD	0.0000041	J	0.0039	J	mg/kg	R2-12A	11 / 11		0.0039		Y	TEQ
67562-39-4	1,2,3,4,6,7,8-HpCDF	0.0000094	J	0.00047	J	mg/kg	R2-12A	10 / 11		0.00047		Y	TEQ
55673-89-7	1,2,3,4,7,8,9-HpCDF	0.00000094	J	0.000036	J	mg/kg	R2-12A	9 / 11		0.000036		Y	TEQ
39227-28-6	1,2,3,4,7,8-HxCDD	0.0000015	J	0.000098	J	mg/kg	R2-12A	5 / 11		0.000098		Y	TEQ
70648-26-9	1,2,3,4,7,8-HxCDF	0.0000021	J	0.000036	J	mg/kg	R2-12A, SS-07	9 / 11		0.000036		Y	TEQ
57653-85-7	1,2,3,6,7,8-HxCDD	0.00000045	J	0.00048	J	mg/kg	R2-12A	11 / 11		0.00048		Y	TEQ
57117-44-9	1,2,3,6,7,8-HxCDF	0.0000023	J	0.000017	J	mg/kg	SS-07	7 / 11		0.000017		Y	TEQ
19408-74-3	1,2,3,7,8,9-HxCDD	0.000002	J	0.0006	J	mg/kg	R2-12A	9 / 11		0.0006		Y	TEQ
72918-21-9	1,2,3,7,8,9-HxCDF	0.000005	J	0.0000084	J	mg/kg	SS-07	3 / 11		0.0000084		Y	TEQ
40321-76-4	1,2,3,7,8-PeCDD	0.0000015	J	0.00033	J	mg/kg	R2-12A	7 / 11		0.00033		Y	TEQ
57117-41-6	1,2,3,7,8-PeCDF	0.00000024	J	0.000023	J	mg/kg	R2-12A	7 / 11		0.000023		Y	TEQ
87-61-6	1,2,3-Trichlorobenzene							0 / 61	0.0051 - 0.037		4.89	NC N	ND
95-94-3	1,2,4,5-Tetrachlorobenzene							0 / 67	0.22 - 11		1.83	NC N	ND
120-82-1	1,2,4-Trichlorobenzene							0 / 61	0.0051 - 0.037		6.19	NC N	ND
33374-28-6	1,2-Benzenedicarboxylic acid, 2-butoxyethyl buty	0.18	JN	0.47	JN	mg/kg	R2-16A	2 / 2		0.47		N	NV
84-69-5	1,2-Benzenedicarboxylic acid, bis(2-methylpropyl	0.87	JN	0.87	JN	mg/kg	R2-15B	1 / 1		0.87		N	NV
84-64-0	1,2-Benzenedicarboxylic acid, butyl cyclohexyl e	0.19	JN	0.19	JN	mg/kg	R2-4B	1 / 1		0.19		N	NV
3648-21-3	1,2-Benzenedicarboxylic acid, diheptyl ester	0.27	JN	0.82	JN	mg/kg	R2-6B	2 / 2		0.82		N	NV
131-70-4	1,2-Benzenedicarboxylic acid, monobutyl ester	0.57	JN	0.57	JN	mg/kg	R2-5B	1 / 1		0.57		N	NV
17534-15-5	1,2-Benzenedithiol	0.27	JN	0.27	JN	mg/kg	R2-2B	1 / 1		0.27		N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
590-19-2	1,2-Butadiene	0.015	JN	0.015	JN	mg/kg	R3-7B	1 / 1		0.015		N	NV
96-12-8	1,2-Dibromo-3-chloropropane							0 / 61	0.0051 - 0.037		0.00535	C	N	ND
106-93-4	1,2-Dibromoethane							0 / 67	0.0051 - 0.045		0.0337	C	N	ND
95-50-1	1,2-Dichlorobenzene	0.00077	J	0.0056	J	mg/kg	R3-9B	13 / 61	0.0051 - 0.037	0.0056	191	NC	N	BSL
107-06-2	1,2-Dichloroethane							0 / 67	0.0051 - 0.045		0.432	C	N	ND
78-87-5	1,2-Dichloropropane							0 / 67	0.0051 - 0.045		0.895	C	N	ND
1000080-20-8	1,2-Dihydrobenzo[b]fluoranthene	0.47	JN	0.47	JN	mg/kg	SS-05	1 / 1		0.47			N	NV
121-91-5	1,3-Benzenedicarboxylic acid	0.58	JN	0.58	JN	mg/kg	R2-7B	1 / 1		0.58			N	NV
538-81-8	1,3-Butadiene, 1,4-diphenyl-, (E,E)-	0.14	JN	0.14	JN	mg/kg	SS-04	1 / 1		0.14			N	NV
541-73-1	1,3-Dichlorobenzene							0 / 61	0.0051 - 0.037				N	ND
17455-13-9	1,4,7,10,13,16-Hexaoxacyclooctadecane	0.37	JN	0.37	JN	mg/kg	R2-6B	1 / 1		0.37			N	NV
39707-55-6	1,4-Benzenediol, 2-[(1,4,4a,5,6,7,8,8a-octahydro	2.8	JN	3.2	JN	mg/kg	R2-11B	2 / 2		3.2			N	NV
106-46-7	1,4-Dichlorobenzene	0.00034	J	0.0075	J	mg/kg	R3-11A	5 / 61	0.0051 - 0.037	0.0075	2.44	C	N	BSL
123-91-1	1,4-Dioxane	0.76	J	1.2	J	mg/kg	R3-7A	2 / 2		1.2	44.1	C	N	NV
18319-27-2	1,4-Methanoazulen-7-ol, decahydro-4,8,8,9-tetram	0.36	JN	0.36	JN	mg/kg	R2-5A	1 / 1		0.36			N	NV
1000190-54-9	10-Bromo-1,2,3,4-tetrahydro-phenanthren-9-ol	0.14	JN	0.14	JN	mg/kg	R1-2A	1 / 1		0.14			N	NV
95008-11-0	10-Heneicosene (c,t)	0.65	JN	7.2	JN	mg/kg	R2-12B	2 / 2		7.2			N	NV
504-57-4	10-Nonadecanone	0.22	JN	0.22	JN	mg/kg	R2-5A	1 / 1		0.22			N	NV
1000130-78-5	11,12-Dibromo-tetradecan-1-ol acetate	0.22	JN	0.22	JN	mg/kg	R2-9B	1 / 1		0.22			N	NV
239-01-0	11H-Benzo[a]carbazole	0.51	JN	1.5	JN	mg/kg	R2-16B	4 / 4		1.5			N	NV
238-84-6	11H-Benzo[a]fluorene	0.14	JN	8.6	JN	mg/kg	R2-12A	10 / 10		8.6			N	NV
243-17-4	11H-Benzo[b]fluorene	0.24	JN	18	JN	mg/kg	R2-12B	21 / 21		18			N	NV
220-97-3	11H-Indeno[2,1-a]phenanthrene	0.69	JN	0.73	JN	mg/kg	R3-2A	2 / 2		0.73			N	NV
239-85-0	13H-Dibenzo[a,h]fluorene	0.19	JN	5.2	JN	mg/kg	R2-16B	5 / 5		5.2			N	NV
1000130-79-8	13-Tertadecen-1-ol acetate	1.2	JN	1.2	JN	mg/kg	R2-5B	1 / 1		1.2			N	NV
33100-27-5	15-Crown-5	0.38	JN	0.38	JN	mg/kg	R2-7B	1 / 1		0.38			N	NV
87953-47-7	15-Isobutyl-(13alphah)-isocopalane	0.88	JN	0.88	JN	mg/kg	R3-3B	1 / 1		0.88			N	NV
1000210-43-4	17-(1,5-Dimethylhexyl)-10,13-dimethylhexadecahyd	0.37	JN	0.37	JN	mg/kg	SS-05	1 / 1		0.37			N	NV
6971-40-0	17-Pentatriacontene	1.2	JN	1.2	JN	mg/kg	R2-11B	1 / 1		1.2			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
1000196-01-6	1-Cyclohexanol-2-(3-methyl-1,3-butadienyl)-1,3,3	0.24	JN	0.24	JN	mg/kg	R2-2A	1 / 1		0.24		N	NV
1000197-08-4	1-Cyclohexene, 1,3,3-trimethyl-2-(1-methylbut-1	0.13	JN	8.2	JN	mg/kg	R2-12B	9 / 9		8.2		N	NV
22914-94-9	1-Cyclohexene-1-glyoxylamide, N-1-naphthyl-	0.99	JN	0.99	JN	mg/kg	R3-11A	1 / 1		0.99		N	NV
21078-65-9	1-Decanol, 2-ethyl-	0.56	JN	0.56	JN	mg/kg	R2-12B	1 / 1		0.56		N	NV
2425-77-6	1-Decanol, 2-hexyl-	0.13	JN	0.13	JN	mg/kg	R1-4B	1 / 1		0.13		N	NV
1599-67-3	1-Docosene	1	JN	5.8	JN	mg/kg	R2-6B	5 / 5		5.8		N	NV
6624-79-9	1-Dotriacontanol	2.3	JN	5	JN	mg/kg	R2-6B	3 / 3		5		N	NV
629-96-9	1-Eicosanol	1.3	JN	6.2	JN	mg/kg	R2-5B	3 / 3		6.2		N	NV
15441-54-0	1H,3H-Thieno[3,4-c]thiophene, 4,6-dimethyl-	2.7	JN	2.7	JN	mg/kg	R3-9B	1 / 1		2.7		N	NV
4361-65-3	1H-1,3-Disilaindene, 2,3-dihydro-	0.48	JN	0.51	JN	mg/kg	R2-4B	2 / 2		0.51		N	NV
29100-33-2	1H-2,3-Benzodiazepine, 1-methyl-4-phenyl-	0.41	JN	0.41	JN	mg/kg	R2-2B	1 / 1		0.41		N	NV
51578-80-4	1H-2,6-Methano-2,3-benzodiazocin-8-ol, 3,4,5,6-t	0.66	JN	0.66	JN	mg/kg	R2-5B	1 / 1		0.66		N	NV
6892-80-4	1H-Benzocyclohepten-7-ol, 2,3,4,4a,5,6,7,8-octah	1.2	JN	2.1	JN	mg/kg	R2-11B	2 / 2		2.1		N	NV
71-43-2	1H-Cyclopropa[a]naphthalene, 1a,2,3,3a,4,5,6,7b-	0.36	JN	0.36	JN	mg/kg	R2-7B	1 / 1		0.36		N	NV
949-41-7	1H-Cyclopropa[l]phenanthrene,1a,9b-dihydro-	0.21	JN	12	JN	mg/kg	R2-12A	2 / 2		12		N	NV
6765-39-5	1-Heptadecene	0.44	JN	0.44	JN	mg/kg	R2-6B	1 / 1		0.44		N	NV
18835-33-1	1-Hexacosene	0.84	JN	0.84	JN	mg/kg	R3-3B	1 / 1		0.84		N	NV
36653-82-4	1-Hexadecanol	0.56	JN	0.56	JN	mg/kg	R2-7B	1 / 1		0.56		N	NV
645-72-7	1-Hexadecanol, 3,7,11,15-tetramethyl-	6.1	JN	6.1	JN	mg/kg	R2-12A	1 / 1		6.1		N	NV
629-73-2	1-Hexadecene	0.42	JN	0.42	JN	mg/kg	R2-10B	1 / 1		0.42		N	NV
104-76-7	1-Hexanol, 2-ethyl-	0.021	JN	3.3	JN	mg/kg	R2-6B	4 / 4		3.3		N	NV
16746-85-3	1-Hexene, 4-ethyl-	0.52	JN	0.52	JN	mg/kg	R1-3B	1 / 1		0.52		N	NV
61142-60-7	1H-Indene, 2,3,3a,4,7,7a-hexahydro-2,2,4,4,7,7-h	0.14	JN	1.6	JN	mg/kg	R3-9B	2 / 2		1.6		N	NV
17057-82-8	1H-Indene, 2,3-dihydro-1,2-dimethyl-	0.011	JN	0.011	JN	mg/kg	R2-12A	1 / 1		0.011		N	NV
6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl-	0.021	JN	0.021	JN	mg/kg	SS-08	1 / 1		0.021		N	NV
1075-22-5	1H-Indene, 2,3-dihydro-5,6-dimethyl-	0.018	JN	0.018	JN	mg/kg	R3-9A	1 / 1		0.018		N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
874-35-1	1H-Indene, 2,3-dihydro-5-methyl-	0.058	JN	0.081	JN	mg/kg	SS-08	2 / 2		0.081		N	NV
55044-33-2	1H-Indene, 2-butyl-5-hexyloctahydro-	0.24	JN	0.24	JN	mg/kg	R2-9A	1 / 1		0.24		N	NV
35099-60-6	1H-Indene, 2-methyl-3-phenyl-	0.12	JN	0.12	JN	mg/kg	SS-04	1 / 1		0.12		N	NV
4505-48-0	1H-Indene, 2-phenyl-	0.96	JN	0.96	JN	mg/kg	R3-4B	1 / 1		0.96		N	NV
55044-36-5	1H-Indene, 5-butyl-6-hexyloctahydro-	2	JN	2	JN	mg/kg	R2-11B	1 / 1		2		N	NV
54832-83-6	1H-Indene, octahydro-2,2,4,4,7,7-hexamethyl-, tr	0.014	JN	0.035	JN	mg/kg	R3-9B	2 / 2		0.035		N	NV
78529-79-0	1H-Phenanthro[9,10-c]pyrazole	0.17	JN	0.17	JN	mg/kg	R2-8A	1 / 1		0.17		N	NV
18712-47-5	1H-Pyrazole, 3,5-bis(1,1-dimethylethyl)-4-methy	0.19	JN	0.19	JN	mg/kg	R2-17B	1 / 1		0.19		N	NV
63865-64-5	1-Hydroxy-p-menth-3-one	0.43	JN	0.43	JN	mg/kg	R2-10A	1 / 1		0.43		N	NV
1000195-85-4	1-Isopropenyl-4,5-dimethylbicyclo[4.3.0]nonan-5-	0.29	JN	0.29	JN	mg/kg	SS-10	1 / 1		0.29		N	NV
76078-79-0	1-Mercapto-2-heptadecanone	0.23	JN	0.53	JN	mg/kg	R2-2B	9 / 9		0.53		N	NV
77370-00-4	1-Methoxy-6H-indolo[3,2,1-de][1,5]naphthyridin-6	6.8	JN	6.8	JN	mg/kg	R2-12B	1 / 1		6.8		N	NV
2958-75-0	1-Methyldecahydronaphthalene	0.023	JN	0.09	JN	mg/kg	R2-10B	5 / 5		0.09		N	NV
1438-62-6	1-Naphthalenepropanol, .alpha.-ethenyldecahydro-	0.41	JN	0.41	JN	mg/kg	R2-5B	1 / 1		0.41		N	NV
54972-52-0	1-Naphthalenol, decahydro-4a-methyl-	0.27	JN	0.27	JN	mg/kg	R2-2A	1 / 1		0.27		N	NV
18435-45-5	1-Nonadecene	0.36	JN	1.3	JN	mg/kg	R2-11B	2 / 2		1.3		N	NV
112-92-5	1-Octadecanol	0.26	JN	1.5	JN	mg/kg	R2-5A	2 / 2		1.5		N	NV
112-88-9	1-Octadecene	0.16	JN	1.1	JN	mg/kg	R2-7B	4 / 4		1.1		N	NV
111-87-5	1-Octanol	0.3	JN	0.3	JN	mg/kg	R1-1A	1 / 1		0.3		N	NV
4984-01-4	1-Octene, 3,7-dimethyl-	0.77	JN	0.77	JN	mg/kg	R2-13B	1 / 1		0.77		N	NV
1000157-61-6	1-Oxaspiro[4.5]dec-3-en-2-one, 6-isopropyl-9-met	1.6	JN	1.6	JN	mg/kg	SS-11	1 / 1		1.6		N	NV
26040-98-2	1-Pentacosanol	0.39	JN	0.39	JN	mg/kg	R2-10A	1 / 1		0.39		N	NV
13360-61-7	1-Pentadecene	0.17	JN	3	JN	mg/kg	R3-11B	2 / 2		3		N	NV
107-39-1	1-Pentene, 2,4,4-trimethyl-	0.013	JN	0.013	JN	mg/kg	R2-12B	1 / 1		0.013		N	NV
1000148-10-9	1-Phenyl-3-(4-fluorophenyl)-2-pyrazoline	4.5	JN	4.5	JN	mg/kg	R2-12B	1 / 1		4.5		N	NV
1000216-29-0	1-Phenyl-3,6-diazahomoadamantan-9-one hydrazone	10	JN	10	JN	mg/kg	R2-12B	1 / 1		10		N	NV
2201-24-3	1-Phenylcyclohexylamine	0.17	JN	0.17	JN	mg/kg	SS-05	1 / 1		0.17		N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
1000162-78-2	1-Phosphacyclopent-2-ene, 1,5-diphenyl-2,3-dimet	0.71	JN	0.72	JN	mg/kg	R3-2A	2 / 2		0.72		N	NV
7785-70-8	1R-.alpha.-Pinene	0.038	JN	0.038	JN	mg/kg	R2-14A	1 / 1		0.038		N	NV
1120-36-1	1-Tetradecene	3.2	JN	3.2	JN	mg/kg	R3-11B	1 / 1		3.2		N	NV
18835-32-0	1-Tricosene	0.76	JN	0.76	JN	mg/kg	R2-1B	1 / 1		0.76		N	NV
79516-25-9	1-Trimethylsilylpent-1-en-4-yne	0.37	JN	0.37	JN	mg/kg	R2-10B	1 / 1		0.37		N	NV
21102-88-5	2(1H)-Naphthalenone, octahydro-1-methyl-, (1.alp	0.012	JN	0.012	JN	mg/kg	R2-12A	1 / 1		0.012		N	NV
51557-64-3	2(1H)-Naphthalenone, octahydro-4a,5-dimethyl-, (	0.011	JN	0.011	JN	mg/kg	R2-12A	1 / 1		0.011		N	NV
54699-31-9	2(1H)-Naphthalenone, octahydro-4a,7,7-trimethyl-	0.011	JN	0.011	JN	mg/kg	R2-12A	1 / 1		0.011		N	NV
1000224-31-4	2-(4-Biphenylyl)-8-methylimidazo[1,2-a]pyridine	0.94	JN	0.94	JN	mg/kg	R3-5B	1 / 1		0.94		N	NV
1000201-97-9	2-(7-Methoxymethylphenanthren-3-yl)propan-2-ol	1.7	JN	1.7	JN	mg/kg	R3-7A	1 / 1		1.7		N	NV
6811-52-5	2,10-Phenanthrenediol, 4b,5,6,7,8,8a,9,10-octahy	0.47	JN	0.47	JN	mg/kg	R2-5B	1 / 1		0.47		N	NV
70412-52-1	2,11-Dioxabicyclo[4.4.1]undeca-3,5-dien-10-one,	0.89	JN	0.89	JN	mg/kg	R2-11B	1 / 1		0.89		N	NV
787-61-1	2,2'-Bi-1H-indene	0.75	JN	0.75	JN	mg/kg	R3-4B	1 / 1		0.75		N	NV
108-60-1	2,2'-Oxybis(1-chloropropane)							0 / 67	0.22 - 11		4.57	C	N	ND
60851-34-5	2,3,4,6,7,8-HxCDF	0.0000022	J	0.000035	J	mg/kg	R2-12A	4 / 11		0.000035			Y	TEQ
58-90-2	2,3,4,6-Tetrachlorophenol							0 / 67	0.22 - 11		183	NC	N	ND
57117-31-4	2,3,4,7,8-PeCDF	0.00000028	J	0.000035	J	mg/kg	R2-12A	11 / 11		0.000035			Y	TEQ
71989-96-3	2,3,4-Trimethoxybenzyl alcohol	0.94	JN	0.94	JN	mg/kg	R2-11B	1 / 1		0.94			N	NV
1746-01-6	2,3,7,8-TCDD	0.00000082	J	0.0002	J	mg/kg	R2-12A	6 / 11		0.0002	0.00000449	C	Y	TEQ
51207-31-9	2,3,7,8-TCDF	0.0000016	J	0.000027	J	mg/kg	R2-12A	20 / 21		0.000027			Y	TEQ
1000196-81-3	2,3-Dioxabicyclo[2.2.2]oct-7-en-5-one, 1-(3-oxo-	0.23	JN	0.23	JN	mg/kg	R2-17B	1 / 1		0.23			N	NV
54934-55-3	2,3-Nonadecanediol	0.3	JN	0.3	JN	mg/kg	R2-2B	1 / 1		0.3			N	NV
1000195-40-9	2,4,5,5,8a-Pentamethyl-6,7,8,8a-tetrahydro-5H-ch	1.5	JN	1.5	JN	mg/kg	R3-11A	1 / 1		1.5			N	NV
95-95-4	2,4,5-Trichlorophenol							0 / 67	0.22 - 11		611	NC	N	ND
17749-59-6	2,4,6,8-Tetrathiatricyclo[3.3.1.13,7]decane, 1,3	0.21	JN	0.21	JN	mg/kg	R2-9A	1 / 1		0.21			N	NV
88-06-2	2,4,6-Trichlorophenol							0 / 67	0.22 - 11		6.11	NC	N	ND
88-06-2	2,4,6-Trichlorophenol							0 / 67	0.22 - 11		6.11	C	N	ND
3102-70-3	2,4,6-Trimethyl-1,3-phenylenediamine	1	JN	1	JN	mg/kg	R2-6B	1 / 1		1			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
120-83-2	2,4-Dichlorophenol							0 / 67	0.22 - 11		18.3	NC	N	ND
105-67-9	2,4-Dimethylphenol	0.017	J	1.1	J	mg/kg	R2-16B	9 / 67	0.22 - 11	1.1	122	NC	N	BSL
51-28-5	2,4-Dinitrophenol							0 / 67	0.43 - 21		12.2	NC	N	ND
121-14-2	2,4-Dinitrotoluene							0 / 67	0.22 - 11		1.56	C	N	ND
1000215-77-8	2,5,5,6,1a-Pentamethyl-trans-1a,4a,5,6,7,8-hexah	0.35	JN	0.35	JN	mg/kg	R2-9B	1 / 1		0.35			N	NV
75581-03-2	2,6,10,14,18-Pentamethyl-2,6,10,14,18-eicosapent	0.35	JN	0.35	JN	mg/kg	R2-9A	1 / 1		0.35			N	NV
1000077-91-6	2,6-Dimethyl-7.alpha.-propylbicyclo[4.3.0]non-1-	2.7	JN	2.7	JN	mg/kg	R3-9B	1 / 1		2.7			N	NV
606-20-2	2,6-Dinitrotoluene							0 / 67	0.22 - 11		6.12	NC	N	ND
1207-15-4	2,8-Dimethyldibenzo(B,D)thiophene	0.15	JN	0.53	JN	mg/kg	SS-08	3 / 3		0.53			N	NV
1000227-32-1	2-[p-Cyanophenyl]-5-chlorobenzimidazole	0.2	JN	0.2	JN	mg/kg	R2-10A	1 / 1		0.2			N	NV
53584-60-4	28-Nor-17.alpha.(H)-hopane	0.82	JN	0.82	JN	mg/kg	R3-3B	1 / 1		0.82			N	NV
1000146-59-1	2-Benzylidenehydrazono-3-methyl-2,3-dihydrobenzo	0.17	JN	0.17	JN	mg/kg	R2-8A	1 / 1		0.17			N	NV
78-93-3	2-Butanone	0.0056	J	0.19		mg/kg	R2-4B	59 / 67	0.019 - 0.022	0.19	2780	NC	N	BSL
503-17-3	2-Butyne	0.026	JN	0.026	JN	mg/kg	R3-7A	1 / 1		0.026				
91-58-7	2-Chloronaphthalene							0 / 67	0.22 - 11		626	NC	N	ND
95-57-8	2-Chlorophenol							0 / 67	0.22 - 11		39.1	NC	N	ND
52210-15-8	2-Cyclohexen-1-one, 4-(3-hydroxy-1-butenyl)-3,5.	0.48	JN	0.48	JN	mg/kg	R2-10A	1 / 1		0.48			N	NV
19780-11-1	2-Dodecen-1-yl(-)succinic anhydride	0.26	JN	6.7	JN	mg/kg	R2-12A	10 / 10		6.7			N	NV
51306-43-5	2H-1,2,3-Triazole-4-carboxaldehyde, 2-(2-fluorop	0.29	JN	1.1	JN	mg/kg	R2-11B	4 / 4		1.1			N	NV
4222-08-6	2H-1-Benzopyran, 2,2-diphenyl-	0.94	JN	0.94	JN	mg/kg	R3-4B	1 / 1		0.94			N	NV
1000143-48-6	2-Heptadecenal	0.43	JN	0.43	JN	mg/kg	R2-17B	1 / 1		0.43			N	NV
6137-06-0	2-Heptanone, 4-methyl-	0.29	JN	0.39	JN	mg/kg	R2-4B	2 / 2		0.39				
591-78-6	2-Hexanone							0 / 67	0.01 - 0.091		20.9	NC	N	ND
16015-11-5	2H-Pyran, 3,4-dihydro-6-methyl-	0.38	JN	0.38	JN	mg/kg	R2-7B	1 / 1		0.38			N	NV
3256-89-1	2-Methyl-3-phenylpyridine	1.4	JN	1.4	JN	mg/kg	R2-16A	1 / 1		1.4			N	NV
1000147-35-2	2-Methylidenehydrazono-3-methyl-2,3-dihydrobenzo	0.31	JN	0.81	JN	mg/kg	R2-11B	2 / 2		0.81			N	NV
91-57-6	2-Methylnaphthalene	0.014	J	16		mg/kg	R2-16B	50 / 67	0.22 - 1.5	16	31.3	NC	N	BSL
95-48-7	2-Methylphenol	0.013	J	0.7	J	mg/kg	R2-16B	9 / 67	0.22 - 11	0.7	306	NC	N	BSL
1000137-60-4	2-Naphthalenol, 6,7-epoxy-5,6,7,8-tetrahydro-5-i	6	JN	6	JN	mg/kg	R2-12A	1 / 1		6			N	NV
88-74-4	2-Nitroaniline							0 / 67	0.43 - 21		60.6	NC	N	ND
88-75-5	2-Nitrophenol							0 / 67	0.22 - 11				N	ND

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
629-66-3	2-Nonadecanone	0.34	JN	0.34	JN	mg/kg	R2-6B	1 / 1		0.34		N	NV
4057-42-5	2-Octene, 2,6-dimethyl-	0.41	JN	0.41	JN	mg/kg	R2-7B	1 / 1		0.41		N	NV
17432-82-5	2-Oxo-6-phenyl-4-(2-hydroxyphenyl)-1,2-dihydropy	0.75	JN	0.75	JN	mg/kg	R2-14A	1 / 1		0.75		N	NV
2345-28-0	2-Pentadecanone	0.78	JN	0.78	JN	mg/kg	R2-7B	1 / 1		0.78		N	NV
502-69-2	2-Pentadecanone, 6,10,14-trimethyl-	0.23	JN	0.46	JN	mg/kg	R2-5B	2 / 2		0.46		N	NV
1000148-27-3	2-Phenyl-3-amino-4,7-dimethyl-4,5(3H)dihydroimid	3.9	JN	3.9	JN	mg/kg	R2-12A	1 / 1		3.9		N	NV
35465-71-5	2-Phenylnaphthalene	0.14	JN	1.5	JN	mg/kg	R2-16A	4 / 4		1.5		N	NV
513-88-2	2-Propanone, 1,1-dichloro-	0.13	JN	0.13	JN	mg/kg	R2-13B	1 / 1		0.13		N	NV
28202-31-5	2-Tetrafluoroethoxynitrobenzene	0.27	JN	0.27	JN	mg/kg	R2-17B	1 / 1		0.27		N	NV
879-52-7	2-Thiazolemethanol, .alpha.-phenyl-	0.78	JN	0.78	JN	mg/kg	SS-08	1 / 1		0.78		N	NV
1604-34-8	2-Undecanone, 6,10-dimethyl-	0.17	JN	0.17	JN	mg/kg	R2-9A	1 / 1		0.17		N	NV
1000193-17-2	3-(1-Acetyl-2,2-dimethyl-5-oxocyclopentyl)acrylic	0.37	JN	0.37	JN	mg/kg	SS-08	1 / 1		0.37		N	NV
1000224-77-7	3-(3,4-Dichlorophenyl)-1-(5-methyl-2-thiazolin-2	1.6	JN	1.6	JN	mg/kg	R3-9A	1 / 1		1.6		N	NV
14571-19-8	3,3'-Diamino-4'-hydroxydiphenylsulphone	0.49	JN	0.49	JN	mg/kg	R2-6B	1 / 1		0.49		N	NV
91-94-1	3,3'-Dichlorobenzidine							0 / 67	0.22 - 11		1.08 C	N	ND
1000190-23-9	3,3-Dimethyl-hepta-4,5-dien-2-ol	0.43	JN	0.43	JN	mg/kg	R2-10B	1 / 1		0.43		N	NV
1000225-02-8	3,4-Biphenyldicarbonitrile	1.1	JN	1.1	JN	mg/kg	R3-1A	1 / 1		1.1		N	NV
1000213-92-1	3,4-Dichlorophenylsuccinic acid	3	JN	3	JN	mg/kg	R3-11B	1 / 1		3		N	NV
25732-74-5	3,4-Dihydrocyclopenta(cd)pyrene (acepyrene)	0.1	JN	6.8	JN	mg/kg	R3-3A	35 / 35		6.8		Y	FD/NV
80249-75-8	3,4-Epoxy-4a-ethyl-2,3,4,4a,5,6-hexahydro-1H-pyr	0.6	JN	1.1	JN	mg/kg	R3-5B	3 / 3		1.1		N	NV
14035-33-7	3,5-di-tert-Butyl-4-hydroxyacetophenone	0.31	JN	0.31	JN	mg/kg	R2-4B	1 / 1		0.31		N	NV
1000185-61-6	3,9-Dimethyltricyclo[4.2.1.1(2,5)]decan-9-ol	1.7	JN	1.7	JN	mg/kg	R3-9B	1 / 1		1.7		N	NV
39746-31-1	3a,7a-Epoxy-1H-inden-4(5H)one, tetrahydro-	0.077	JN	0.077	JN	mg/kg	R3-3B	1 / 1		0.077		N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
97371-44-3	3-Buten-2-one, 3-methyl-4-(1,3,3-trimethyl-7-oxa	0.14	JN	1.1	JN	mg/kg	R3-7A	2 / 2		1.1			N	NV
1000192-75-9	3-Butyl-4-phenyl-hept-1-en-5yn-4-ol	4.4	JN	4.4	JN	mg/kg	R2-12B	1 / 1		4.4			N	NV
1000212-59-4	3-Chloro-11H-pyrido[3',2'-4,5]pyrrolo[3,2-c]quin	0.99	JN	0.99	JN	mg/kg	R3-7A	1 / 1		0.99			N	NV
1000212-32-8	3-Chloro-11-methyl-11H-indolo[3,2-c]quinoline	0.13	JN	0.13	JN	mg/kg	SS-04	1 / 1		0.13			N	NV
1000212-76-7	3-Chloro-6-methyl-11H-indolo[3,2-c]quinoline, 5-	0.1	JN	0.1	JN	mg/kg	SS-04	1 / 1		0.1			N	NV
40702-26-9	3-Cyclohexene-1-carboxaldehyde, 1,3,4-trimethyl-	0.73	JN	0.73	JN	mg/kg	R2-10B	1 / 1		0.73			N	NV
61886-66-6	3-Eicosyne	0.35	JN	0.35	JN	mg/kg	R2-10B	1 / 1		0.35			N	NV
71221-49-3	3-Methyl-1-(phenylthio)butan-2-one	0.37	JN	2.4	JN	mg/kg	R2-11B	2 / 2		2.4			N	NV
56-49-5	3-Methylcholanthrene	1.5	JN	5.7	JN	mg/kg	R2-16B	3 / 3		5.7	0.0221	C	Y	ASL
99-09-2	3-Nitroaniline							0 / 67	0.43 - 21				N	NV
14919-01-8	3-Octene, (E)-	0.57	JN	0.57	JN	mg/kg	R2-6B	1 / 1		0.57			N	NV
41446-68-8	3-Tetradecene, (E)-	0.36	JN	0.36	JN	mg/kg	SS-10	1 / 1		0.36			N	NV
74630-50-5	3-Undecene, 9-methyl-, (Z)-	1.3	JN	1.3	JN	mg/kg	R2-14A	1 / 1		1.3			N	NV
42310-08-7	4(1H)-Pteridinone, 6-acetyl-2amino-7,8-dihydro-	0.97	JN	0.97	JN	mg/kg	R3-7B	1 / 1		0.97			N	NV
1000224-63-9	4-(4-Methoxybenzylideneamino)benzenesulfonamide	0.24	JN	0.24	JN	mg/kg	R2-2B	1 / 1		0.24			N	NV
1000137-91-1	4-(4-Oxo-1,2,3,4,6,7,12,12b-octahydropyrido[2,1-	0.9	JN	0.9	JN	mg/kg	R2-5B	1 / 1		0.9			N	NV
1000194-62-4	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a,5,6,6a,	0.33	JN	0.33	JN	mg/kg	R2-11A	1 / 1		0.33			N	NV
72-54-8	4,4'-DDD	0.011	JN	0.011	JN	mg/kg	R3-10A	1 / 63	0.0041 - 0.016	0.011	2.02	C	N	BSL
72-55-9	4,4'-DDE	0.0043	J	0.046	JN	mg/kg	R3-11B	15 / 62	0.0041 - 0.016	0.046	1.43	C	N	BSL
50-29-3	4,4'-DDT	0.0043	J	0.14		mg/kg	R3-11B	29 / 64	0.0041 - 0.016	0.14	1.72	C	N	BSL
5181-10-2	4,4'-Dichlorodiphenylsulphide	0.6	JN	0.6	JN	mg/kg	R2-2A	1 / 1		0.6			N	NV
520-29-6	4',5-Dihydroxy-7-methoxyflavanone	0.72	JN	0.72	JN	mg/kg	SS-07	1 / 1		0.72			N	NV
94154-49-1	4,6'-Biazulenyl	1.3	JN	1.3	JN	mg/kg	R3-2A	1 / 1		1.3			N	NV
534-52-1	4,6-Dinitro-2-methylphenol							0 / 66	0.43 - 21		0.611	NC	N	ND
20478-88-0	4,7-Methanoazulene, decahydro-1,4,9,9-tetramethy	0.33	JN	0.33	JN	mg/kg	R2-5B	1 / 1		0.33			N	NV
1000189-11-4	4,8a-Dimethyl-6-(2-methyl-oxiran-2-yl)-4a,5,6,7,	0.59	JN	0.59	JN	mg/kg	R2-1A	1 / 1		0.59			N	NV
116206-69-0	4,8-Dimethyl-4Z,8E-tetracosadienal	1.3	JN	1.3	JN	mg/kg	R3-11A	1 / 1		1.3			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
23680-84-4	4-Amino-2-chloro-6,7-dimethoxyquinazoline	0.53	JN	0.53	JN	mg/kg	R2-16A	1 / 1		0.53			N	NV
101-55-3	4-Bromophenyl-phenylether							0 / 66	0.22 - 11				N	ND
59-50-7	4-Chloro-3-methylphenol	0.03	J	0.03	J	mg/kg	R2-7A	1 / 67	0.22 - 11	0.03	611	NC	N	BSL
106-47-8	4-Chloroaniline							0 / 67	0.22 - 11		2.43	C	N	ND
7005-72-3	4-Chlorophenyl-phenylether							0 / 67	0.22 - 11				N	ND
203-65-6	4H-Benzo[def]carbazole	0.34	JN	0.34	JN	mg/kg	R2-10B	1 / 1		0.34			N	NV
203-64-5	4H-Cyclopenta[def]phenanthrene	0.21	JN	24	JN	mg/kg	R3-3A	33 / 33		24			Y	FD/NV
7198-87-0	4H-Dibenz[a,kl]anthracene, 5,6-dihydro-	4.4	JN	4.4	JN	mg/kg	R2-12B	1 / 1		4.4			N	NV
4846-19-9	4H-Dibenzo[de,g]quinoline, 5,6,6a,7-tetrahydro-1	1.1	JN	1.1	JN	mg/kg	R3-7A	1 / 1		1.1			N	NV
6228-86-0	4-Heptanone, 2,3:5,6-diepoxy-2,6-dimethyl-	0.45	JN	0.45	JN	mg/kg	R2-5B	1 / 1		0.45			N	NV
108-10-1	4-Methyl-2-Pentanone							0 / 67	0.01 - 0.091		532	NC	N	ND
1000192-41-0	4-Methyl-dodec-3-en-1-ol	0.13	JN	0.13	JN	mg/kg	R1-4A	1 / 1		0.13			N	NV
1000130-87-1	4-Methyl-E-9-octadecene	0.76	JN	0.76	JN	mg/kg	R2-11B	1 / 1		0.76			N	NV
106-44-5	4-Methylphenol	0.011	J	2	J	mg/kg	R2-16B	43 / 67	0.22 - 11	2	30.6	NC	N	BSL
64608-60-2	4-Methylpyrrolo[1,2-a]pyrazine	0.58	JN	0.58	JN	mg/kg	R2-1A	1 / 1		0.58			N	NV
100-01-6	4-Nitroaniline							0 / 67	0.43 - 21		24.3	C	N	ND
100-02-7	4-Nitrophenol							0 / 67	0.43 - 21				N	ND
123-18-2	4-Nonanone, 2,6,8-trimethyl-	0.03	JN	0.03	JN	mg/kg	R2-14B	1 / 1		0.03			N	NV
104-40-5	4-Nonylphenol	2.5	JN	2.5	JN	mg/kg	R3-1A	1 / 1		2.5			N	NV
1000148-28-2	4-Phenyl-acridine	0.42	JN	0.42	JN	mg/kg	R3-8B	1 / 1		0.42			N	NV
129384-12-9	4-Pyridinamine, N,N,2,6-tetramethyl-	0.46	JN	0.46	JN	mg/kg	R2-7A	1 / 1		0.46			N	NV
1000195-69-8	5-(1-Isopropenyl-4,5-dimethylbicyclo[4.3.0]nonan	4.8	JN	4.8	JN	mg/kg	R2-12B	1 / 1		4.8			N	NV
107729-05-5	5-(1-Naphthyl)tricyclo[4.1.0.0]hept-3-ene	0.34	JN	0.34	JN	mg/kg	R2-7A	1 / 1		0.34			N	NV
2091-92-1	5,6-Dihydrochrysene	0.7	JN	1.3	JN	mg/kg	R3-11A	2 / 2		1.3			N	NV
94639-18-6	5,6-Dimethyl-4-phenyl-3-cyanopyridine-2(1H)-thio	1.2	JN	8.5	JN	mg/kg	R2-12B	2 / 2		8.5			N	NV
62163-09-1	5-Chloroquinoxaline	1.4	JN	1.4	JN	mg/kg	R2-7A	1 / 1		1.4			N	NV
74685-30-6	5-Eicosene, (E)-	0.51	JN	0.51	JN	mg/kg	R2-6B	1 / 1		0.51			N	NV
1153-34-0	5H-3,5a-Epoxynaphth[2,1-c]oxepin, dodecahydro-3,	0.3	JN	0.3	JN	mg/kg	R2-11A	1 / 1		0.3			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
1210-34-0	5H-Dibenzo[a,d]cyclohepten-5-ol, 10,11-dihydro-	0.66	JN	2.8	JN	mg/kg	SS-11	3 / 3		2.8		N	NV
2975-79-3	5H-Dibenzo[a,d]cycloheptene, 5-methylene-	0.55	JN	0.55	JN	mg/kg	R2-15B	1 / 1		0.55		N	NV
23665-17-0	5-Methyl-2,6-diphenyl-5,6-dihydro-4H-1,3-oxazine	6.8	JN	6.8	JN	mg/kg	R2-12A	1 / 1		6.8		N	NV
1000195-85-9	6.beta.Bicyclo[4.3.0]nonane, 5.beta.-iodomethyl-	0.34	JN	0.34	JN	mg/kg	R2-4B	1 / 1		0.34		N	NV
641-38-3	6H-Dibenzo[b,d]pyran-6-one, 3,7,9-trihydroxy-1-m	0.2	JN	0.2	JN	mg/kg	R2-10A	1 / 1		0.2		N	NV
1000185-17-3	6-Hydroxy-7-methyl-9-oxabicyclo[3.3.1]nonan-2-on	2.8	JN	2.8	JN	mg/kg	R2-1B	1 / 1		2.8		N	NV
1000194-72-8	6-Methyl-5-oxo-12,13-dioxa-tricyclo[7.3.1.0(1,6)	0.28	JN	0.28	JN	mg/kg	R2-17B	1 / 1		0.28		N	NV
24949-42-6	6-Tridecene, 7-methyl-	0.064	JN	0.064	JN	mg/kg	R3-11A	1 / 1		0.064		N	NV
1000195-41-2	7-(6-Methylpyridin-2-yl)-hept-6-en-1-ol	4.4	JN	4.4	JN	mg/kg	R2-12B	1 / 1		4.4		N	NV
1000192-14-7	7a-Isopropenyl-4,5-dimethyloctahydroindene-4-car	1.2	JN	1.2	JN	mg/kg	R2-6B	1 / 1		1.2		N	NV
82-05-3	7H-Benz[de]anthracen-7-one	0.15	JN	1.8	JN	mg/kg	R3-9A	5 / 5		1.8		N	NV
205-25-4	7H-Benzo[c]carbazole	0.16	JN	1.2	JN	mg/kg	R3-9A	3 / 3		1.2		N	NV
205-12-9	7H-Benzo[c]fluorene	0.51	JN	2.5	JN	mg/kg	R3-4A	4 / 4		2.5		N	NV
27582-45-2	7H-Indeno[2,1-a]anthracen-7-one	0.81	JN	0.81	JN	mg/kg	R3-5B	1 / 1		0.81		N	NV
1000079-53-9	7-Ketooctanoic acid oxime, bis(trimethylsilyl)	4.5	JN	4.5	JN	mg/kg	R2-12A	1 / 1		4.5		N	NV
162239-52-3	7-Oxabicyclo[4.1.0]heptane, 1,5-dimethyl-	0.19	JN	0.19	JN	mg/kg	R2-17B	1 / 1		0.19		N	NV
1000194-36-6	8-Dimethylaminonaphthalene 1-carbonitrile	0.9	JN	0.9	JN	mg/kg	R2-1B	1 / 1		0.9		N	NV
241-28-1	8H-Indeno[2,1-b]phenanthrene	2.9	JN	2.9	JN	mg/kg	R2-16B	1 / 1		2.9		N	NV
84-65-1	9,10-Anthracenedione	0.33	JN	24	JN	mg/kg	R3-3A	20 / 20		24		Y	FD/NV
24094-45-9	9,10-Anthracenedione, 1-hydroxy-2-(hydroxymethy	0.16	JN	0.16	JN	mg/kg	R2-10A	1 / 1		0.16		N	NV
10387-13-0	9,10-di(Chloromethyl)anthracene	1.1	JN	11	JN	mg/kg	R2-12A	2 / 2		11		N	NV
781-43-1	9,10-Dimethylanthracene	0.17	JN	3.4	JN	mg/kg	R3-11B	4 / 4		3.4		N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
1210-12-4	9-Anthracenecarbonitrile	9.5	JN	9.5	JN	mg/kg	R2-12B	1 / 1		9.5			N	NV
18766-52-4	9-Chloro-9-phenyl-9-silafluorene	0.79	JN	0.79	JN	mg/kg	R3-7A	1 / 1		0.79			N	NV
486-25-9	9H-Fluoren-9-one	0.89	JN	9.2	JN	mg/kg	R3-3A	3 / 3		9.2			N	NV
1730-37-6	9H-Fluorene, 1-methyl-	0.17	JN	0.37	JN	mg/kg	R2-14B	3 / 3		0.37			N	NV
4612-63-9	9H-Fluorene, 2,3-dimethyl-	0.26	JN	0.55	JN	mg/kg	SS-08	3 / 3		0.55			N	NV
1430-97-3	9H-Fluorene, 2-methyl-	0.21	JN	6.3	JN	mg/kg	R3-3A	2 / 2		6.3			N	NV
1556-99-6	9H-Fluorene, 4-methyl-	0.14	JN	1.2	JN	mg/kg	R2-1B	2 / 2		1.2			N	NV
1836-87-9	9H-Fluorene, 9-(phenylmethylene)-	2	JN	4.1	JN	mg/kg	R2-16B	2 / 2		4.1			N	NV
4569-45-3	9H-Fluorene, 9,9-dimethyl-	0.17	JN	0.17	JN	mg/kg	R2-9B	1 / 1		0.17			N	NV
2523-48-0	9H-Fluorene-2-carbonitrile	0.58	JN	0.58	JN	mg/kg	R2-1A	1 / 1		0.58			N	NV
301-02-0	9-Octadecenamide, (Z)-	0.24	JN	0.24	JN	mg/kg	R2-4B	1 / 1		0.24			N	NV
17673-49-3	9-Octadecenoic acid (Z)-, octadecyl ester	0.32	JN	0.32	JN	mg/kg	R2-9A	1 / 1		0.32			N	NV
27519-02-4	9-Tricosene, (Z)-	0.84	JN	0.84	JN	mg/kg	R2-11B	1 / 1		0.84			N	NV
1000131-86-0	9-Undecenol, 2,10-dimethyl-	0.54	JN	0.77	JN	mg/kg	R2-5B	2 / 2		0.77			N	NV
83-32-9	Acenaphthene	0.011	J	16		mg/kg	R3-3A	53 / 67	0.22 - 0.83	16	344	NC	N	BSL
208-96-8	Acenaphthylene	0.012	J	0.63	J	mg/kg	R3-11B	46 / 67	0.22 - 11	0.63	170	NC[e]	N	BSL
822-23-1	Acetic acid, octadecyl ester	0.26	JN	0.26	JN	mg/kg	R2-7B	1 / 1		0.26				
67-64-1	Acetone	0.0073	J	0.52	J	mg/kg	R2-7B	64 / 67	0.02 - 0.022	0.52	6130	NC	N	BSL
98-86-2	Acetophenone							0 / 67	0.22 - 11		782	NC	N	ND
260-94-6	Acridine	0.11	JN	0.11	JN	mg/kg	SS-04	1 / 1		0.11			N	NV
702-79-4	Adamantane, 1,3-dimethyl-	0.017	JN	0.018	JN	mg/kg	R3-11B	2 / 2		0.018			N	NV
136860-48-5	Adamantane, 1-isothiocyanato-3-methyl-	0.034	JN	0.034	JN	mg/kg	R2-12B	1 / 1		0.034			N	NV
309-00-2	Aldrin	0.041	J	0.041	J	mg/kg	R2-12B	1 / 66	0.0021 - 0.0084	0.041	0.0286	C	Y	ASL
319-84-6	alpha-BHC	0.00061	J	0.0042	J	mg/kg	R3-7B	5 / 66	0.0021 - 0.0084	0.0042	0.0771	C	N	BSL
5103-71-9	alpha-Chlordane	0.00027	J	0.00027	J	mg/kg	R2-7B	1 / 65	0.0021 - 0.0084	0.00027			N	NV
7429-90-5	ALUMINUM	930		15100	J	mg/kg	R2-3A	68 / 68		15100	7740	NC	Y	ASL
34315-85-0	Amorphane	0.29	JN	0.59	JN	mg/kg	R2-10B	2 / 2		0.59			N	NV
60719-84-8	Amrinone	0.42	JN	0.42	JN	mg/kg	R2-10B	1 / 1		0.42			N	NV
571-31-3	Androstan-17-one, 3-hydroxy-, (3.beta.,5.beta.)-	0.5	JN	0.5	JN	mg/kg	R2-16A	1 / 1		0.5			N	NV
120-12-7	Anthracene	0.015	J	30		mg/kg	R3-3A	55 / 67	0.22 - 0.83	30	1720	NC	N	BSL
781-92-0	Anthracene, 1,4-dimethyl-	0.12	JN	3.4	JN	mg/kg	SS-11	5 / 5		3.4			N	NV
610-48-0	Anthracene, 1-methyl-	0.28	JN	7.8	JN	mg/kg	R2-13A	11 / 11		7.8			N	NV
613-12-7	Anthracene, 2-methyl-	0.12	JN	13	JN	mg/kg	R3-3A	30 / 30		13			N	NV
23707-65-5	Anthracene, 9-(2-propenyl)-	0.11	JN	0.78	JN	mg/kg	R2-6B	2 / 2		0.78			N	NV
1000154-36-9	Anthracene, 9-(4-methoxybutyl)-	1	JN	1	JN	mg/kg	R3-5B	1 / 1		1			N	NV
55133-89-6	Anthracene, 9-butyltetradecahydro-	0.27	JN	1	JN	mg/kg	R2-11B	2 / 2		1			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
55401-75-7	Anthracene, 9-dodecyltetradecahydro-	0.17	JN	0.17	JN	mg/kg	R2-10A	1 / 1		0.17			N	NV
779-02-2	Anthracene, 9-methyl-	0.18	JN	1.9	JN	mg/kg	R2-1B	11 / 11		1.9			N	NV
602-55-1	Anthracene, 9-phenyl-	0.17	JN	0.57	JN	mg/kg	R2-16A	2 / 2		0.57			N	NV
7440-36-0	ANTIMONY	1.3		3		mg/kg	R2-2A	7 / 68	0.86 - 4.4	3	3.13	NC	N	BSL
12674-11-2	Aroclor-1016							0 / 67	0.041 - 0.16		0.393	NC	N	ND
11104-28-2	Aroclor-1221							0 / 67	0.041 - 0.16		0.141	C	N	ND
11141-16-5	Aroclor-1232							0 / 67	0.041 - 0.16		0.141	C	N	ND
53469-21-9	Aroclor-1242	0.061	JN	43		mg/kg	R3-11B	47 / 67	0.041 - 0.16	43	0.221	C	Y	ASL
12672-29-6	Aroclor-1248							0 / 67	0.041 - 0.16		0.221	C	N	ND
11097-69-1	Aroclor-1254							0 / 67	0.041 - 0.16		0.112	NC	N	ND
11096-82-5	Aroclor-1260	18		18		mg/kg	R2-15A	1 / 67	0.041 - 0.16	18	0.221	C	Y	ASL
37324-23-5	Aroclor-1262							0 / 67	0.041 - 0.16		0.221	C[b]	N	ND
11100-14-4	Aroclor-1268							0 / 67	0.041 - 0.16		0.221	C[b]	N	ND
7440-38-2	ARSENIC	0.95		23.6	J	mg/kg	R2-2B	68 / 68		23.6	0.389	C	Y	ASL
1912-24-9	Atrazine							0 / 66	0.22 - 11		2.11	C	N	ND
67370-86-9	Azacyclotridecan-2-one, 1-[3-(methylamino)propyl	0.28	JN	0.28	JN	mg/kg	R2-7B	1 / 1		0.28			N	NV
3691-11-0	Azulene, 1,2,3,5,6,7,8,8a-octahydro-1,4-dimethyl	0.37	JN	0.37	JN	mg/kg	R2-3B	1 / 1		0.37			N	NV
42758-88-3	Azulene, 4,8-dimethyl-6-phenyl-	0.23	JN	0.23	JN	mg/kg	R2-2B	1 / 1		0.23			N	NV
529-05-5	Azulene, 7-ethyl-1,4-dimethyl-	0.45	JN	4.8	JN	mg/kg	R2-12A	2 / 2		4.8			N	NV
5090-67-5	Azuleno[4,5-b]furan-2(3H)-one, decahydro-8,9-dih	0.17	JN	0.17	JN	mg/kg	R2-8A	1 / 1		0.17			N	NV
36441-74-4	Baccharane	0.27	JN	0.27	JN	mg/kg	R2-2A	1 / 1		0.27			N	NV
7440-39-3	BARIUM	14.7		210		mg/kg	R2-2A	68 / 68		210	1530	NC	N	BSL
313-74-6	Benz[a]anthracene, 1,12-dimethyl-	0.67	JN	0.67	JN	mg/kg	R3-10B	1 / 1		0.67			N	NV
2422-79-9	Benz[a]anthracene, 12-methyl-	2	JN	2	JN	mg/kg	R2-16B	1 / 1		2			N	NV
2541-69-7	Benz[a]anthracene, 7-methyl-	0.3	JN	0.3	JN	mg/kg	SS-04	1 / 1		0.3			N	NV
2381-31-9	Benz[a]anthracene, 8-methyl-	0.92	JN	0.92	JN	mg/kg	R3-11A	1 / 1		0.92			N	NV
3343-10-0	Benz[j]aceanthrylene, 3-methyl-	0.29	JN	1.3	JN	mg/kg	R3-5A	6 / 6		1.3			N	NV
100-52-7	Benzaldehyde	0.042	J	0.27	J	mg/kg	R2-5B	58 / 67	1.1 - 11	0.27	782	NC	N	BSL
90-60-8	Benzaldehyde, 3,5-dichloro-2-hydroxy-	0.33	JN	0.33	JN	mg/kg	R2-2A	1 / 1		0.33			N	NV
1160-78-7	Benzaldehyde, 4-hydroxy-, (2,4-dinitrophenyl)hyd	0.23	JN	0.23	JN	mg/kg	SS-05	1 / 1		0.23			N	NV
1817-73-8	Benzenamine, 2-bromo-4,6-dinitro-	0.24	JN	0.46	JN	mg/kg	R2-2A	2 / 2		0.46			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
29202-16-2	Benzenamine, 3-chloro-N-(2-pyridinylmethylene)-	5.9	JN	5.9	JN	mg/kg	R2-12A	1 / 1		5.9			N	NV
71-43-2	Benzene	0.0032	J	0.05		mg/kg	R3-7A	4 / 67	0.0051 - 0.045	0.05	1.08	C	Y	TOX
2320-32-3	Benzene, [1-(2,4-cyclopentadien-1-ylidene)ethyl]	0.66	JN	0.66	JN	mg/kg	R3-5A	1 / 1		0.66			N	NV
5396-38-3	Benzene, 1-(1,1-dimethylethyl)-4-methoxy-	1.1	JN	1.1	JN	mg/kg	R3-1A	1 / 1		1.1			N	NV
895-37-4	Benzene, 1,1'-(1,2-dimethyl-1,2-ethenediyl)bis[4	1.8	JN	1.8	JN	mg/kg	R3-7A	1 / 1		1.8			N	NV
3282-18-6	Benzene, 1,1'-cyclopropylidenebis-	1	JN	1	JN	mg/kg	SS-11	1 / 1		1			N	NV
488-23-3	Benzene, 1,2,3,4-tetramethyl-	0.084	JN	0.084	JN	mg/kg	R2-12A	1 / 1		0.084			N	NV
527-53-7	Benzene, 1,2,3,5-tetramethyl-	0.12	JN	0.12	JN	mg/kg	R2-12B	1 / 1		0.12			N	NV
526-73-8	Benzene, 1,2,3-trimethyl-	0.033	JN	0.065	JN	mg/kg	R2-14B	2 / 2		0.065			N	NV
95-93-2	Benzene, 1,2,4,5-tetramethyl-	0.026	JN	0.076	JN	mg/kg	R2-14B	5 / 5		0.076			N	NV
95-63-6	Benzene, 1,2,4-trimethyl-	0.013	JN	0.013	JN	mg/kg	SS-07	1 / 1		0.013	6.22	NC	N	BSL/IFD
1460-02-2	Benzene, 1,3,5-tri-tert-butyl-	0.43	JN	0.43	JN	mg/kg	R2-6B	1 / 1		0.43			N	NV
7379-62-6	Benzene, 1-chloro-3-(2-cyano-2-phenylethenyl)	1.5	JN	1.5	JN	mg/kg	R3-5B	1 / 1		1.5			N	NV
874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	0.081	JN	0.15	JN	mg/kg	R2-10B	2 / 2		0.15			N	NV
4218-48-8	Benzene, 1-ethyl-4-(1-methylethyl)-	0.011	JN	0.011	JN	mg/kg	R3-9A	1 / 1		0.011			N	NV
17404-69-2	Benzene, 1-fluoro-4-(2-phenylethenyl)-	0.25	JN	0.25	JN	mg/kg	R2-2A	1 / 1		0.25			N	NV
527-84-4	Benzene, 1-methyl-2-(1-methylethyl)-	0.017	JN	0.25	JN	mg/kg	R2-10B	7 / 7		0.25			N	NV
535-77-3	Benzene, 1-methyl-3-(1-methylethyl)-	0.008	JN	0.14	JN	mg/kg	R2-12B	4 / 4		0.14			N	NV
99-87-6	Benzene, 1-methyl-4-(1-methylethyl)-	0.023	JN	0.1	JN	mg/kg	R2-12A	2 / 2		0.1			N	NV
1595-16-0	Benzene, 1-methyl-4-(1-methylpropyl)-	0.02	JN	0.02	JN	mg/kg	R2-12B	1 / 1		0.02			N	NV
4706-89-2	Benzene, 2,4-dimethyl-1-(1-methylethyl)-	0.014	JN	0.014	JN	mg/kg	R2-12A	1 / 1		0.014			N	NV
2870-04-4	Benzene, 2-ethyl-1,3-dimethyl-	0.053	JN	0.053	JN	mg/kg	R2-14B	1 / 1		0.053			N	NV
700-12-9	Benzene, pentamethyl-	0.019	JN	0.019	JN	mg/kg	R2-10B	1 / 1		0.019			N	NV
876-31-3	Benzeneacetonitrile, 4-cyano-	0.14	JN	0.14	JN	mg/kg	R2-8A	1 / 1		0.14			N	NV
56-55-3	Benzo(a)anthracene	0.01	J	47		mg/kg	R3-3A	64 / 67	0.24 - 0.28	47	0.148	C	Y	ASL
50-32-8	Benzo(a)pyrene	0.014	J	32		mg/kg	R2-12B	61 / 67	0.26 - 1.5	32	0.0148	C	Y	ASL

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
205-99-2	Benzo(b)fluoranthene	0.011	J	42		mg/kg	R3-3A	63 / 67	0.26 - 0.32	42	0.148	C	Y	ASL
191-24-2	Benzo(g,h,i)perylene	0.012	J	22		mg/kg	R2-12B	61 / 67	0.26 - 0.33	22	170	NC[e]	N	BSL
207-08-9	Benzo(k)fluoranthene	0.013	J	25		mg/kg	R2-16B	50 / 67	0.24 - 1.5	25	1.48	C	Y	ASL
16587-58-9	Benzo[1,2-b:4,3-b']dithiophene, 1-phenyl-	0.8	JN	1.1	JN	mg/kg	R3-5B	2 / 2		1.1			N	NV
57652-66-1	Benzo[a]pyrene, 4,5-dihydro-	4.7	JN	4.7	JN	mg/kg	R2-12B	1 / 1		4.7			N	NV
214-17-5	Benzo[b]chrysene	1.7	JN	1.7	JN	mg/kg	R3-7A	1 / 1		1.7			N	NV
239-35-0	Benzo[b]naphtho[2,1-d]thiophene	0.24	JN	4.4	JN	mg/kg	R3-3A	8 / 8		4.4			N	NV
243-42-5	Benzo[b]naphtho[2,3-d]furan	0.8	JN	4.2	JN	mg/kg	R2-12A	2 / 2		4.2			N	NV
243-46-9	Benzo[b]naphtho[2,3-d]thiophene	0.71	JN	0.79	JN	mg/kg	R3-2A	2 / 2		0.79			N	NV
24360-63-2	Benzo[b]naphtho[2,3-d]thiophene, 6-methyl-	0.96	JN	0.96	JN	mg/kg	R3-11A	1 / 1		0.96			N	NV
522-75-8	Benzo[b]thiophen-3(2H)-one, 2-(3-oxobenzo[b]thie	0.13	JN	0.61	JN	mg/kg	SS-08	3 / 3		0.61			N	NV
215-58-7	Benzo[b]triphenylene	0.11	JN	4.2	JN	mg/kg	R3-3A	15 / 15		4.2			N	NV
195-19-7	Benzo[c]phenanthrene	0.16	JN	1.7	JN	mg/kg	R3-10B	5 / 5		1.7			N	NV
54986-63-9	Benzo[c]phenanthrene, 5,8-dimethyl-	0.56	JN	3.1	JN	mg/kg	R2-16B	2 / 2		3.1			N	NV
23667-32-5	Benzo[c]thiophen-1(3H)-one, 3-(3-oxobenzo[c]thie	0.43	JN	0.43	JN	mg/kg	R2-5B	1 / 1		0.43			N	NV
192-97-2	Benzo[e]pyrene	0.12	JN	19	JN	mg/kg	R3-3A	32 / 32		19			Y	FD/NV
203-12-3	Benzo[ghi]fluoranthene	0.36	JN	5.3	JN	mg/kg	R2-12B	2 / 2		5.3			N	NV
205-82-3	Benzo[j]fluoranthene	0.28	JN	13	JN	mg/kg	R3-1B	12 / 12		13	0.532	C	Y	NV
200-23-7	Benzo[kl]xanthene	0.1	JN	0.1	JN	mg/kg	SS-04	1 / 1		0.1			N	NV
6110-37-8	Benzoic acid, 2,4-dimethoxy-6-methyl-, methyl es	0.17	JN	0.17	JN	mg/kg	R2-11A	1 / 1		0.17			N	NV
611-01-8	Benzoic acid, 2,4-dimethyl-	0.17	JN	0.98	JN	mg/kg	R2-7B	3 / 3		0.98			N	NV
619-17-0	Benzoic acid, 2-amino-4-nitro-	0.28	JN	6.4	JN	mg/kg	R2-6B	10 / 10		6.4			N	NV
1000130-25-0	Benzonitrile, 3,5-di-t-butyl-4-methoxy-	2.3	JN	2.3	JN	mg/kg	R2-16B	1 / 1		2.3			N	NV
7440-41-7	BERYLLIUM	0.11	J	0.96	J	mg/kg	R2-5A	25 / 68	0.21 - 1.1	0.96	15.6	NC	N	BSL
319-85-7	beta-BHC	0.0065		0.0065		mg/kg	R1-2B	1 / 65	0.0021 - 0.0084	0.0065	0.27	C	N	BSL
N/A	Bicyclo Hydrocarbon	0.021	J	0.021	J	mg/kg	R2-8B	1 / 1		0.021			N	NV
N/A	Bicyclo Hydrocarbon	0.021	J	0.021	J	mg/kg	R2-10B	1 / 1		0.021			N	NV
N/A	Bicyclo Hydrocarbon	0.021	J	0.021	J	mg/kg	R3-9A	1 / 1		0.021			N	NV
16022-08-5	Bicyclo[3.1.1]heptan-2-one, 3,6,6-trimethyl-	1.1	JN	1.1	JN	mg/kg	R2-11B	1 / 1		1.1			N	NV
1000163-97-9	Bicyclo[3.1.1]heptan-3-one, 6,6-dimethyl-2-(2-me	0.51	JN	0.51	JN	mg/kg	R2-10B	1 / 1		0.51			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
1000196-98-1	Bicyclo[4.3.0]nonane, 2,2,6,7-tetramethyl-7-hydr	4.9	JN	4.9	JN	mg/kg	R2-12B	1 / 1		4.9			N	NV
111-91-1	Bis(2-chloroethoxy)methane							0 / 67	0.22 - 11			NC	N	ND
111-44-4	Bis(2-chloroethyl)ether							0 / 67	0.22 - 11		18.3 0.214	C	N	ND
142-16-5	Bis(2-ethylhexyl) maleate	0.34	JN	0.34	JN	mg/kg	R2-6B	1 / 1		0.34			N	NV
117-81-7	Bis(2-ethylhexyl)phthalate	0.34		4.9		mg/kg	R2-12A	5 / 67	0.22 - 11	4.9	34.7	C	N	NV
74-97-5	Bromochloromethane							0 / 67	0.0051 - 0.045					ND
75-27-4	Bromodichloromethane							0 / 67	0.0051 - 0.045		0.273	C	N	ND
75-25-2	Bromoform							0 / 61	0.0051 - 0.037		61.5	C	N	ND
74-83-9	Bromomethane							0 / 67	0.0051 - 0.045		0.732	NC	N	ND
3405-32-1	Butane, 1,2,3,4-tetrachloro-	0.26	JN	0.26	JN	mg/kg	SS-05	1 / 1		0.26				NV
85-68-7	Butylbenzylphthalate	0.0094	J	0.54	J	mg/kg	R3-5B	19 / 67	0.23 - 11	0.54	256	C	N	BSL
7440-43-9	CADMIUM	0.44		220		mg/kg	R2-12B	59 / 61	0.31 - 0.33	220	7	NC	Y	ASL
7440-70-2	CALCIUM	22000	J	329000		mg/kg	R1-1B	68 / 68		329000			N	EN
474-62-4	Campesterol	1	JN	1	JN	mg/kg	R2-7A	1 / 1		1			N	NV
79-92-5	Camphene	0.032	JN	0.032	JN	mg/kg	R2-14A	1 / 1		0.032			N	NV
105-60-2	Caprolactam	0.039	J	0.11	J	mg/kg	R2-7A	4 / 67	0.22 - 11	0.11	3060	NC	N	BSL
1000192-98-9	Carbamic acid, N-phenyl-, 1,5-dimethyl-1-vinyl-4	0.33	JN	0.33	JN	mg/kg	R2-7B	1 / 1		0.33			N	NV
86-74-8	Carbazole	0.014	J	21		mg/kg	R3-3A	53 / 67	0.22 - 0.83	21				
75-15-0	Carbon disulfide	0.0045	J	0.011		mg/kg	R1-4B	8 / 67	0.0051 - 0.018	0.011	82.1	NC	N	BSL
56-23-5	Carbon tetrachloride	0.005	J	0.005	J	mg/kg	R3-1A	1 / 67	0.0051 - 0.045	0.005	0.248	C	N	BSL
108-90-7	Chlorobenzene	0.00053	J	0.0031	J	mg/kg	R3-11A	7 / 67	0.0051 - 0.045	0.0031	29.4	NC	N	BSL
75-00-3	Chloroethane	0.014		0.42	J	mg/kg	R3-7A	3 / 67	0.0051 - 0.045	0.42	1450	NC	N	BSL
67-66-3	Chloroform							0 / 67	0.0051 - 0.045		0.295	C	N	BSL
74-87-3	Chloromethane	0.00063	J	0.015	J	mg/kg	R2-10B	27 / 67	0.0051 - 0.037	0.015	11.9	NC	N	BSL
88-04-0	Chloroxylenol	0.13	JN	0.7	JN	mg/kg	R2-6B	19 / 19		0.7			N	NV
57597-14-5	Chola-5,22-dien-3-ol, (3.beta.,22Z)-	0.25	JN	0.25	JN	mg/kg	R2-17B	1 / 1		0.25			N	NV
6079-19-2	Cholestane, 4,5-epoxy-, (4.alpha.,5.alpha.)-	0.22	JN	0.22	JN	mg/kg	R2-17B	1 / 1		0.22			N	NV
80-97-7	Cholestanol	0.33	JN	0.33	JN	mg/kg	SS-05	1 / 1		0.33			N	NV
7440-47-3	CHROMIUM	2.2	J	1090	J	mg/kg	R3-9A	67 / 68	3.1 - 3.1	1090	0.29	C[c]	Y	ASL
218-01-9	Chrysene	0.0087	J	43		mg/kg	R3-3A	63 / 67	0.24 - 0.39	43	14.8	C	Y	ASL
3351-28-8	Chrysene, 1-methyl-	0.36	JN	1.6	JN	mg/kg	R2-16B	4 / 4		1.6			N	NV
1705-85-7	Chrysene, 6-methyl-	3.3	JN	3.3	JN	mg/kg	R3-11B	1 / 1		3.3			N	NV
156-59-2	cis-1,2-Dichloroethene	0.0003	J	0.018	J	mg/kg	R2-7A	15 / 67	0.0051 - 0.037	0.018	78.2	NC	N	BSL
10061-01-5	cis-1,3-Dichloropropene							0 / 67	0.0051 - 0.045				N	NV
120-32-1	Clorophene	0.47	JN	0.47	JN	mg/kg	R2-16A	1 / 1		0.47			N	NV
7440-48-4	COBALT	0.96	J	12	J	mg/kg	R2-2B	63 / 68	0.61 - 1.6	12	2.34	NC	Y	ASL
3856-25-5	Copaene	5.8	JN	5.8	JN	mg/kg	R2-13A	1 / 1		5.8			N	NV
7440-50-8	COPPER	1.9	J	525	J	mg/kg	R3-11B	68 / 68		525	313	NC	Y	ASL
110-82-7	Cyclohexane	0.0003	J	0.0021	J	mg/kg	R3-9B	5 / 67	0.0051 - 0.045	0.0021	702	NC	N	BSL

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
141033-65-0	Cyclohexanone, 2,2-dimethyl-5-(3-methyloxiranyl)	0.95	JN	0.95	JN	mg/kg	R2-11B	1 / 1		0.95		N	NV
15932-80-6	Cyclohexanone, 5-methyl-2-(1-methylethylidene)-	0.03	JN	0.03	JN	mg/kg	R3-9A	1 / 1		0.03		N	NV
17384-72-4	Cyclopent[a]indene, 3,8-dihydro-1,2,3,3,8,8-hexa	6.8	JN	6.8	JN	mg/kg	R2-12B	1 / 1		6.8		N	NV
5737-13-3	Cyclopenta(def)phenanthrenone	0.15	JN	5.6	JN	mg/kg	R3-3A	6 / 6		5.6		N	NV
27208-37-3	Cyclopenta[cd]pyrene	0.29	JN	0.63	JN	mg/kg	R2-16A	3 / 3		0.63		N	NV
98678-70-7	Cyclopropanemethanol, 2-methyl-2-(4-methyl-3-per	0.1	JN	0.1	JN	mg/kg	R1-2A	1 / 1		0.1		N	NV
18671-57-3	D:A-Friedooleanan-7-ol, (7.alpha.)-	0.91	JN	0.91	JN	mg/kg	R3-7A	1 / 1		0.91		N	NV
5945-53-9	D:C-Friedooleanan-3-one	0.81	JN	17	JN	mg/kg	R2-13A	2 / 2		17		N	NV
80655-44-3	Decahydro-4,4,8,9,10-pentamethylnaphthalene	0.011	JN	5.5	JN	mg/kg	R2-12B	17 / 17		5.5		N	NV
319-86-8	delta-BHC	0.058	NJ	0.058	NJ	mg/kg	R2-12B	1 / 66	0.0021 - 0.0084	0.058		N	NV
514-07-8	D-Friedoolean-14-en-3-one	0.22	JN	0.36	JN	mg/kg	R2-13B	2 / 2		0.36		N	NV
54833-57-7	D-Homoestra-1,3,5(10),14-tetraen-17-one, 3-metho	0.22	JN	0.22	JN	mg/kg	R2-9A	1 / 1		0.22		N	NV
53-70-3	Dibenzo(a,h)anthracene	0.0092	J	4.9	J	mg/kg	R3-3A	30 / 67	0.22 - 8.4	4.9	0.0148	C	Y	ASL
191-26-4	Dibenzo[def,mno]chrysene	0.15	JN	4.5	JN	mg/kg	R3-4A	17 / 17		4.5		N	NV
132-64-9	Dibenzofuran	0.0099	J	15		mg/kg	R2-16B	50 / 67	0.22 - 0.83	15	7.82	NC	Y	ASL
7320-53-8	Dibenzofuran, 4-methyl-	0.63	JN	6.8	JN	mg/kg	R3-3A	7 / 7		6.8		N	NV
132-65-0	Dibenzothiophene	0.11	JN	11	JN	mg/kg	R3-3A	7 / 7		11		N	NV
16587-52-3	Dibenzothiophene, 3-methyl-	0.32	JN	0.32	JN	mg/kg	R2-11A	1 / 1		0.32		N	NV
1000159-49-7	Diboron(.mu.-selenium)diethylbis[.mu.-(1H pyrazo	0.58	JN	3.4	JN	mg/kg	R2-16B	4 / 4		3.4		N	NV
124-48-1	Dibromochloromethane							0 / 67	0.0051 - 0.045		0.68	C	N	ND
75-71-8	Dichlorodifluoromethane							0 / 67	0.0051 - 0.045		18.4	NC	N	ND
60-57-1	Dieldrin	0.017	J	0.11	JN	mg/kg	R2-15A	2 / 64	0.0041 - 0.016	0.11	0.0303	C	Y	ASL
352-93-2	Diethyl sulfide	0.019	JN	0.022	JN	mg/kg	R3-7A	2 / 2		0.022		N	NV
84-66-2	Diethylphthalate	0.0089	J	0.023	J	mg/kg	SS-11	12 / 67	0.22 - 11	0.023	4890	NC	N	BSL
131-11-3	Dimethylphthalate							0 / 67	0.22 - 11				N	ND
207-93-2	Dinaphtho[1,2-b:1',2'-d]furan	2.2	JN	2.2	JN	mg/kg	R3-5B	1 / 1		2.2			N	NV
194-63-8	Dinaphtho[2,1-b:1',2'-d]furan	0.12	JN	0.12	JN	mg/kg	R2-8A	1 / 1		0.12			N	NV
84-74-2	Di-n-butylphthalate							0 / 66	0.22 - 11		611	NC	N	ND
117-84-0	Di-n-octylphthalate	0.01	J	0.01	J	mg/kg	R2-17B	1 / 67	0.22 - 11	0.01			N	NV
5989-27-5	D-Limonene	0.18	JN	0.18	JN	mg/kg	SS-05	1 / 1		0.18			N	NV
1000131-11-4	E,E,Z-1,3,12-Nonadecatriene-5,14-diol	0.42	JN	0.42	JN	mg/kg	R2-9B	1 / 1		0.42			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
1000130-80-8	E-10,13,13-Trimethyl-11-tetradecen-1-ol acetate	4.8	JN	4.8	JN	mg/kg	SS-11	1 / 1		4.8			N	NV
1000130-81-0	E-11,13-Dimethyl-12-tetradecen-1-ol acetate	0.77	JN	0.77	JN	mg/kg	SS-11	1 / 1		0.77			N	NV
1000130-98-1	E-15-Heptadecenoic acid	0.3	JN	0.3	JN	mg/kg	R2-7B	1 / 1		0.3			N	NV
1000130-81-4	E-8-Methyl-9-tetradecen-1-ol acetate	0.98	JN	0.98	JN	mg/kg	SS-08	1 / 1		0.98			N	NV
1000131-35-6	E-9-Methyl-8-tridecen-2-ol, acetate	2.6	JN	2.6	JN	mg/kg	R2-11B	1 / 1		2.6			N	NV
959-98-8	Endosulfan I	0.003	NJ	0.031	JN	mg/kg	R3-11B	5 / 64	0.0021 - 0.0084	0.031	37	NC[d]	N	BSL
33213-65-9	Endosulfan II	0.0031	J	0.011		mg/kg	R2-14A	4 / 60	0.0041 - 0.016	0.011	37	NC[d]	N	BSL
1031-07-8	Endosulfan sulfate	0.00074	J	0.00074	J	mg/kg	R2-2A	1 / 65	0.0041 - 0.016	0.00074			N	NV
72-20-8	Endrin	0.008	J	0.032		mg/kg	R3-11B	10 / 63	0.0041 - 0.016	0.032	1.83	NC	N	BSL
7421-93-4	Endrin aldehyde	0.0053	J	0.25	J	mg/kg	R2-15A	8 / 61	0.0041 - 0.016	0.25	1.83	NC[h]	N	BSL
53494-70-5	Endrin ketone	0.00065	J	0.024	J	mg/kg	R3-2B	3 / 64	0.0041 - 0.016	0.024	1.83	NC[h]	N	BSL
517-09-9	Equilenin	0.15	JN	0.49	JN	mg/kg	R2-14B	2 / 2		0.49			N	NV
6538-05-2	Ergost-4,7,22-trien-3.alpha.-ol	0.47	JN	0.47	JN	mg/kg	SS-05	1 / 1		0.47			N	NV
17608-76-3	Ergosta-7,22-dien-3-ol, (3.beta.,22E)-	0.49	JN	0.49	JN	mg/kg	SS-05	1 / 1		0.49			N	NV
56588-53-5	Estra-1,3,5,7,9,15-hexaen-17-one, 3-methoxy-	0.91	JN	0.91	JN	mg/kg	R3-4B	1 / 1		0.91			N	NV
1534-08-3	Ethanethioic acid, S-methyl ester	0.28	JN	0.28	JN	mg/kg	R2-14B	1 / 1		0.28			N	NV
2136-70-1	Ethanol, 2-(tetradecyloxy)-	1.2	JN	1.2	JN	mg/kg	R2-6A	1 / 1		1.2			N	NV
80114-28-9	Ethanone, 1-[3-[2-methyl-2-(5-methyl-2-furanyl)p	7	JN	7	JN	mg/kg	R2-12B	1 / 1		7			N	NV
22469-70-1	Ethyl (+)-camphorcarboxylate	0.13	JN	0.13	JN	mg/kg	R2-8B	1 / 1		0.13			N	NV
100-41-4	Ethylbenzene	0.00018	J	0.0087	J	mg/kg	R2-12B	18 / 67	0.0051 - 0.045	0.0087	5.39	C	N	BSL
52-85-7	Famophos	4.3	JN	4.3	JN	mg/kg	R2-12A	1 / 1		4.3			N	NV
1000108-92-4	Farnesol isomer a	0.18	JN	0.18	JN	mg/kg	R1-2A	1 / 1		0.18			N	NV
55-38-9	Fenthion	0.22	JN	0.22	JN	mg/kg	R2-9A	1 / 1		0.22			N	NV
206-44-0	Fluoranthene	0.0081	J	130		mg/kg	R3-3A	65 / 67	0.27 - 0.28	130	229	NC	N	BSL
33543-31-6	Fluoranthene, 2-methyl-	0.11	JN	2.4	JN	mg/kg	R2-16B	18 / 18		2.4			N	NV
86-73-7	Fluorene	0.017	J	22		mg/kg	R2-16B	53 / 67	0.22 - 0.83	22	229	NC	N	BSL
2157-52-0	Fluorenone oxime	0.23	JN	0.23	JN	mg/kg	R2-2A	1 / 1		0.23			N	NV
559-74-0	Friedelin	3.1	JN	4.2	JN	mg/kg	R2-6A	2 / 2		4.2			N	NV
58-89-9	gamma-BHC (Lindane)	0.000093	J	0.29	J	mg/kg	R3-9A	7 / 58	0.0011 - 0.0084	0.29	0.516	C	N	BSL
5103-74-2	gamma-Chlordane	0.011	J	0.032	NJ	mg/kg	R2-12B	9 / 65	0.0021 - 0.0084	0.032	1.6	C	N	BSL
76-44-8	Heptachlor	0.0002	J	0.42	J	mg/kg	R3-11B	25 / 59	0.0023 - 0.0084	0.42	0.108	C	Y	ASL
1024-57-3	Heptachlor epoxide	0.0034		0.026	J	mg/kg	R2-12B	4 / 47	0.0021 - 0.0084	0.026	0.0533	C	N	BSL
1000216-79-5	Heptafluorobutyric acid, n-octadecyl ester	1.2	JN	1.2	JN	mg/kg	R2-5A	1 / 1		1.2			N	NV
13475-78-0	Heptane, 5-ethyl-2-methyl-	0.63	JN	0.63	JN	mg/kg	R2-4A	1 / 1		0.63			N	NV
118-74-1	Hexachlorobenzene							0 / 66	0.22 - 11		0.303	C	N	ND

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
87-68-3	Hexachlorobutadiene							0 / 67	0.22 - 11		6.11	NC	N	ND
77-47-4	Hexachlorocyclopentadiene							0 / 67	0.22 - 11		36.6	NC	N	ND
67-72-1	Hexachloroethane							0 / 67	0.22 - 11		6.11	NC	N	ND
55019-46-0	Hexadecanal, 2-methyl-	0.38	JN	0.47	JN	mg/kg	R2-2A	2 / 2		0.47			N	NV
629-54-9	Hexadecanamide	0.7	JN	0.7	JN	mg/kg	R2-5B	1 / 1		0.7			N	NV
16742-51-1	Hexadecanoic acid, 2-hydroxy-, methyl ester	0.17	JN	0.17	JN	mg/kg	R2-11A	1 / 1		0.17			N	NV
16725-36-3	Hexadecanoic acid, 2-methoxy-, methyl ester	0.48	JN	0.48	JN	mg/kg	R2-10B	1 / 1		0.48			N	NV
1492-30-4	Hexadecanoic acid, 4-nitrophenyl ester	0.34	JN	0.64	JN	mg/kg	R2-9A	3 / 3		0.64			N	NV
2416-20-8	Hexadecenoic acid, Z-11-	0.43	JN	0.43	JN	mg/kg	R2-7A	1 / 1		0.43			N	NV
1000131-02-3	Hexahydroindole	0.21	JN	0.21	JN	mg/kg	R2-5A	1 / 1		0.21			N	NV
193-39-5	Indeno(1,2,3-cd)pyrene	0.012	J	23		mg/kg	R2-12B	62 / 67	0.26 - 0.32	23	0.148	C	Y	ASL
193-43-1	Indeno[1,2,3-cd]fluoranthene	0.16	JN	3.7	JN	mg/kg	R3-11B	20 / 20		3.7			N	NV
7439-89-6	IRON	2450		31000	J	mg/kg	R2-2B	68 / 68		31000	5480	NC	Y	ASL
78-59-1	Isophorone							0 / 67	0.22 - 11		511	C	N	ND
98-82-8	Isopropylbenzene	0.00014	J	0.0038	J	mg/kg	R2-12B	15 / 67	0.0051 - 0.045	0.0038	205	NC	N	BSL
36646-87-4	Isoquinoline, 1,2,3,4-tetrahydro-7-methoxy-2-met	0.26	JN	0.26	JN	mg/kg	R2-9A	1 / 1		0.26			N	NV
1000146-40-5	Isoquinolinium methoxycarbonyl-ethoxycarbonyl-me	1.1	JN	1.1	JN	mg/kg	R3-4B	1 / 1		1.1			N	NV
7439-92-1	LEAD	1	J	509	J	mg/kg	R2-12B	67 / 68	1.6 - 1.6	509	40	NC	Y	ASL
577-27-5	Ledol	0.16	JN	0.63	JN	mg/kg	R2-6A	2 / 2		0.63			N	NV
179601-23-1	m,p-Xylene	0.00017	J	0.029		mg/kg	R3-7B	29 / 67	0.0051 - 0.045	0.029	63	NC	N	BSL
7439-95-4	MAGNESIUM	2570	J	15500		mg/kg	R3-11A	68 / 68		15500			N	EN
7439-96-5	MANGANESE	86.8		1280		mg/kg	R2-12B	60 / 60		1280	183	NC	Y	ASL
7439-97-6	MERCURY	0.028	J	2.1	J	mg/kg	R2-2B	58 / 68	0.043 - 0.051	2.1	0.56	NC	Y	ASL
72-43-5	Methoxychlor	0.037		0.037		mg/kg	R2-12A	1 / 60	0.021 - 0.084	0.037	30.6	NC	N	BSL
41261-35-2	Methyl (7-hydroxy-1H-benzimidazol-2-yl)carbamate	0.35	JN	0.35	JN	mg/kg	R2-6B	1 / 1		0.35			N	NV
1000136-84-8	Methyl 3-methoxy-4-methylbenzoate	0.21	JN	0.21	JN	mg/kg	R2-17B	1 / 1		0.21			N	NV
54527-10-5	Methyl 8-oxohexadecanoate	0.2	JN	0.2	JN	mg/kg	R2-17B	1 / 1		0.2			N	NV
79-20-9	Methyl acetate							0 / 67	0.0051 - 0.045		7820	NC	N	ND
1634-04-4	Methyl tert-butyl ether	0.00017	J	0.0002	J	mg/kg	R3-7A	2 / 67	0.0051 - 0.045	0.0002	43.3	C	N	BSL/IFD
108-87-2	Methylcyclohexane	0.00093	J	0.021	J	mg/kg	R2-12B	9 / 67	0.0051 - 0.045	0.021			N	NV
75-09-2	Methylene chloride	0.0011	J	0.013	J	mg/kg	R2-6B	11 / 67	0.0051 - 0.018	0.013	10.7	C	N	BSL
1000224-58-2	N,N'-Bis(5-chloro-2-pyridyl)isophthalamide	0.42	JN	0.42	JN	mg/kg	SS-05	1 / 1		0.42			N	NV
92-24-0	Naphthacene	0.16	JN	0.16	JN	mg/kg	R2-11A	1 / 1		0.16			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
91-20-3	Naphthalene	0.0088	J	53		mg/kg	R2-16B	60 / 67	0.24 - 1.5	53	3.57	C	Y	ASL
4175-54-6	Naphthalene, 1,2,3,4-tetrahydro-1,4-dimethyl-	0.028	JN	0.028	JN	mg/kg	SS-08	1 / 1		0.028			N	NV
3031-15-0	Naphthalene, 1,2,3,4-tetramethyl-	0.3	JN	1.5	JN	mg/kg	SS-11	3 / 3		1.5			N	NV
4630-07-3	Naphthalene, 1,2,3,5,6,7,8,8a-octahydro-1,8a-dim	0.82	JN	0.82	JN	mg/kg	R2-15B	1 / 1		0.82			N	NV
7469-40-1	Naphthalene, 1,2-dihydro-4-phenyl-	0.83	JN	0.83	JN	mg/kg	SS-08	1 / 1		0.83			N	NV
1000156-71-8	Naphthalene, 1,4-dihydro-1-(diphenylmethylene)-5	0.62	JN	0.62	JN	mg/kg	R3-3B	1 / 1		0.62			N	NV
571-61-9	Naphthalene, 1,5-dimethyl-	0.86	JN	3.2	JN	mg/kg	R2-16B	2 / 2		3.2			N	NV
2245-38-7	Naphthalene, 1,6,7-trimethyl-	1.4	JN	1.4	JN	mg/kg	R3-9A	1 / 1		1.4			N	NV
575-43-9	Naphthalene, 1,6-dimethyl-	0.0073	JN	0.73	JN	mg/kg	R3-5A	4 / 4		0.73			N	NV
483-78-3	Naphthalene, 1,6-dimethyl-4-(1-methylethyl)-	0.82	JN	5.4	JN	mg/kg	R2-12A	3 / 3		5.4			N	NV
575-37-1	Naphthalene, 1,7-dimethyl-	3.9	JN	3.9	JN	mg/kg	R2-16B	1 / 1		3.9			N	NV
90-12-0	Naphthalene, 1-methyl-	0.57	JN	0.57	JN	mg/kg	R3-5A	1 / 1		0.57	22	C	N	NV
605-02-7	Naphthalene, 1-phenyl-	0.6	JN	0.6	JN	mg/kg	R2-16A	1 / 1		0.6			N	NV
613-59-2	Naphthalene, 2-(phenylmethyl)-	0.48	JN	0.89	JN	mg/kg	R3-3B	2 / 2		0.89			N	NV
829-26-5	Naphthalene, 2,3,6-trimethyl-	1.5	JN	1.5	JN	mg/kg	R3-11A	1 / 1		1.5			N	NV
581-40-8	Naphthalene, 2,3-dimethyl-	0.57	JN	4.4	JN	mg/kg	R3-11B	3 / 3		4.4			N	NV
581-42-0	Naphthalene, 2,6-dimethyl-	0.018	JN	0.018	JN	mg/kg	SS-08	1 / 1		0.018			N	NV
582-16-1	Naphthalene, 2,7-dimethyl-	0.022	JN	0.026	JN	mg/kg	R3-9A	2 / 2		0.026			N	NV
612-94-2	Naphthalene, 2-phenyl-	0.32	JN	1.7	JN	mg/kg	R3-7A	5 / 5		1.7			N	NV
91-17-8	Naphthalene, decahydro-	0.049	JN	0.1	JN	mg/kg	SS-08	3 / 3		0.1			N	NV
493-02-7	Naphthalene, decahydro-, trans-	0.016	JN	0.21	JN	mg/kg	R2-10B	8 / 8		0.21			N	NV
1618-22-0	Naphthalene, decahydro-2,6-dimethyl-	0.015	JN	0.076	JN	mg/kg	R3-3B	7 / 7		0.076			N	NV
2958-76-1	Naphthalene, decahydro-2-methyl-	0.013	JN	0.2	JN	mg/kg	R2-10B	10 / 10		0.2			N	NV
564-20-5	Naphtho[2,1-b]furan-2(1H)-one, decahydro-3a,6,6,	0.36	JN	0.36	JN	mg/kg	SS-08	1 / 1		0.36			N	NV
1000210-52-3	Naphtho[2,3-b]norbornadiene	1	JN	1	JN	mg/kg	R2-11B	1 / 1		1			N	NV
57-10-3	n-Hexadecanoic acid	0.31	JN	0.53	JN	mg/kg	R2-7A	2 / 2		0.53			N	NV
7440-02-0	NICKEL	5.7	J	447	J	mg/kg	R3-9A	68 / 68		447	155	NC	Y	NV
98-95-3	Nitrobenzene							0 / 67	0.22 - 11		4.79	C	N	ND
621-64-7	N-Nitroso-di-n-propylamine							0 / 67	0.22 - 11		0.0694	C	N	ND
86-30-6	N-Nitrosodiphenylamine							0 / 66	0.22 - 11		99.1	C	N	ND
1120-07-6	Nonanamide	2.2	JN	2.2	JN	mg/kg	R2-1B	1 / 1		2.2			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]	COPC Flag	Rationale for Selection[g]
3268-87-9	OCDD	0.000034	J	0.034	J	mg/kg	R2-12A	11 / 11		0.034		Y	TEQ
39001-02-0	OCDF	0.0000033	J	0.0007	J	mg/kg	R2-12A	11 / 11		0.0007		Y	TEQ
638-66-4	Octadecanal	0.29	JN	1	JN	mg/kg	R2-7A	3 / 3		1		N	NV
111-63-7	Octadecanoic acid, ethenyl ester	0.12	JN	0.36	JN	mg/kg	R2-11A	10 / 10		0.36		N	NV
1726-77-8	Octanal, (2,4-dinitrophenyl)hydrazone	0.4	JN	0.4	JN	mg/kg	R2-5B	1 / 1		0.4		N	NV
7664-80-4	Octyl thioglycolate	1.2	JN	1.2	JN	mg/kg	R2-5A	1 / 1		1.2		N	NV
14021-26-2	Olean-12-ene, 3-methoxy-, (3.beta.)-	1.6	JN	1.6	JN	mg/kg	R2-7A	1 / 1		1.6		N	NV
84-15-1	o-Terphenyl	0.24	JN	1.2	JN	mg/kg	R3-1A	8 / 8		1.2		N	NV
1000309-34-4	Oxalic acid, 6-ethyloct-3-yl hexyl ester	0.035	JN	0.035	JN	mg/kg	R2-14B	1 / 1		0.035		N	NV
1000309-34-1	Oxalic acid, 6-ethyloct-3-yl isobutyl ester	0.033	JN	0.062	JN	mg/kg	R3-3B	2 / 2		0.062		N	NV
1000309-68-1	Oxalic acid, cyclohexylmethyl propyl ester	0.038	JN	0.038	JN	mg/kg	R3-11A	1 / 1		0.038		N	NV
1000309-37-4	Oxalic acid, isobutyl nonyl ester	0.27	JN	0.27	JN	mg/kg	R2-10B	1 / 1		0.27		N	NV
67860-04-2	Oxirane, heptadecyl-	0.42	JN	0.42	JN	mg/kg	R2-7A	1 / 1		0.42		N	NV
5076-20-0	Oxirane, tetramethyl-	0.45	JN	0.67	JN	mg/kg	R2-6B	3 / 3		0.67		N	NV
95-47-6	o-Xylene	0.00028	J	0.016		mg/kg	R2-12B	29 / 67	0.0051 - 0.045	0.016	383 NC	N	BSL
87-86-5	Pentachlorophenol	0.3	J	0.3	J	mg/kg	R2-13A	1 / 66	0.43 - 21	0.3	2.97 C	N	BSL/IFD
4792-15-8	Pentaethylene glycol	0.37	JN	0.37	JN	mg/kg	R2-5B	1 / 1		0.37		N	NV
198-55-0	Perylene	0.12	JN	17	JN	mg/kg	R2-12B	35 / 35		17		Y	FD/NV
24471-47-4	Perylene, 3-methyl-	1.3	JN	1.7	JN	mg/kg	R3-5B	2 / 2		1.7		N	NV
85-01-8	Phenanthrene	0.0084	J	160		mg/kg	R3-3A	64 / 67	0.26 - 0.82	160	172 NC	N	BSL
832-69-9	Phenanthrene, 1-methyl-	0.18	JN	6.2	JN	mg/kg	R2-12A	7 / 7		6.2		N	NV
483-65-8	Phenanthrene, 1-methyl-7-(1-methylethyl)-	0.81	JN	0.81	JN	mg/kg	R2-1B	1 / 1		0.81		N	NV
3674-73-5	Phenanthrene, 2,3,5-trimethyl	1.9	JN	1.9	JN	mg/kg	R3-9B	1 / 1		1.9		N	NV
3674-65-5	Phenanthrene, 2,3-dimethyl-	0.16	JN	7	JN	mg/kg	R3-3A	10 / 10		7		N	NV
3674-66-6	Phenanthrene, 2,5-dimethyl-	0.15	JN	10	JN	mg/kg	R2-12A	16 / 16		10		N	NV
1576-69-8	Phenanthrene, 2,7-dimethyl-	0.32	JN	0.32	JN	mg/kg	R2-9B	1 / 1		0.32		N	NV
2531-84-2	Phenanthrene, 2-methyl-	0.21	JN	19	JN	mg/kg	R3-3A	6 / 6		19		N	NV
1576-67-6	Phenanthrene, 3,6-dimethyl-	0.22	JN	1.6	JN	mg/kg	R2-11B	9 / 9		1.6		N	NV
832-71-3	Phenanthrene, 3-methyl-	0.6	JN	0.6	JN	mg/kg	R2-15B	1 / 1		0.6		N	NV
3674-69-9	Phenanthrene, 4,5-dimethyl-	0.54	JN	0.54	JN	mg/kg	SS-10	1 / 1		0.54		N	NV
832-64-4	Phenanthrene, 4-methyl-	0.45	JN	3.5	JN	mg/kg	R2-13A	3 / 3		3.5		N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
22550-15-8	Phenanthro[3,2-b]furan-7,11-dione, 1,2,3,4,8,9-h	0.5	JN	0.5	JN	mg/kg	R2-15B	1 / 1		0.5			N	NV
127-35-5	Phenazocine	0.34	JN	0.34	JN	mg/kg	R2-2B	1 / 1		0.34			N	NV
108-95-2	Phenol	0.0075	J	1	J	mg/kg	R2-16B	54 / 67	1 - 11	1	1830	NC	N	BSL
119-47-1	Phenol, 2,2'-methylenebis[6-(1,1-dimethylethyl)-	0.13	JN	0.32	JN	mg/kg	R1-4A	4 / 4		0.32			N	NV
2219-84-3	Phenol, 2-methyl-4-(1,1,3,3-tetramethylbutyl)-	0.19	JN	0.19	JN	mg/kg	R2-11A	1 / 1		0.19			N	NV
140-66-9	Phenol, 4-(1,1,3,3-tetramethylbutyl)-	1.2	JN	2.5	JN	mg/kg	R3-1A	3 / 3		2.5			N	NV
98-27-1	Phenol, 4-(1,1-dimethylethyl) 2-methyl-	1.9	JN	1.9	JN	mg/kg	R3-1A	1 / 1		1.9			N	NV
80-05-7	Phenol, 4,4'-(1-methylethylidene)bis-	1	JN	1	JN	mg/kg	R3-1A	1 / 1		1	306	NC	N	NV
25154-52-3	Phenol, nonyl-	1.8	JN	1.8	JN	mg/kg	R3-1A	1 / 1		1.8			N	NV
18593-18-5	Phosphinic acid, (2-methylphenyl)phenyl-	0.36	JN	0.36	JN	mg/kg	R2-7B	1 / 1		0.36			N	NV
1641-57-2	Phosphonic acid, ethyl-, bis(trimethylsilyl) est	0.41	JN	0.41	JN	mg/kg	R2-8B	1 / 1		0.41			N	NV
150-86-7	Phytol	0.45	JN	0.45	JN	mg/kg	R2-7A	1 / 1		0.45			N	NV
120-57-0	Piperonal	0.2	JN	0.2	JN	mg/kg	R2-4A	1 / 1		0.2			N	NV
1000148-20-4	Podocarp-12-en-14a-ol	1.5	JN	1.5	JN	mg/kg	R3-9A	1 / 1		1.5			N	NV
7440-09-7	POTASSIUM	190	J	1860		mg/kg	R2-2A	68 / 68		1860			N	EN
438-07-3	Pregn-4-ene-3,20-dione, 16-hydroxy-, (16.alpha.)	0.5	JN	0.5	JN	mg/kg	R2-5B	1 / 1		0.5			N	NV
479-92-5	Propyphenazone	6.1	JN	6.1	JN	mg/kg	R2-12A	1 / 1		6.1			N	NV
92-94-4	p-Terphenyl	0.12	JN	0.71	JN	mg/kg	R2-1A	7 / 7		0.71			N	NV
129-00-0	Pyrene	0.0081	J	100		mg/kg	R3-3A	65 / 67	0.27 - 0.32	100	172	NC	N	BSL
64401-21-4	Pyrene, 1,3-dimethyl-	0.23	JN	1.6	JN	mg/kg	R3-9B	3 / 3		1.6			N	NV
2381-21-7	Pyrene, 1-methyl-	0.13	JN	9.7	JN	mg/kg	R3-3A	21 / 21		9.7			N	NV
5101-27-9	Pyrene, 1-phenyl-	0.14	JN	1	JN	mg/kg	R3-5A	2 / 2		1			N	NV
3442-78-2	Pyrene, 2-methyl-	0.2	JN	0.93	JN	mg/kg	R3-5A	8 / 8		0.93			N	NV
781-17-9	Pyrene, 4,5,9,10-tetrahydro-	0.17	JN	0.17	JN	mg/kg	R2-3A	1 / 1		0.17			N	NV
6628-98-4	Pyrene, 4,5-dihydro-	0.32	JN	0.48	JN	mg/kg	SS-10	2 / 2		0.48			N	NV
21211-63-2	Pyrrole-2-carboxaldehyde, 5-[(3,4-dimethylpyrrol	6.8	JN	6.8	JN	mg/kg	R2-12B	1 / 1		6.8			N	NV
22516-41-2	Pyrrolidine, 1-(9-borabicyclo[3.3.1]non-9-yl)-	0.56	JN	0.56	JN	mg/kg	SS-08	1 / 1		0.56			N	NV
46479-70-3	Pyrrolo[2,3-b]indole, 1,2,3,3a,8,8a-hexahydro-5-	0.84	JN	0.84	JN	mg/kg	R3-5B	1 / 1		0.84			N	NV
7782-49-2	SELENIUM	0.2	J	4.5	J	mg/kg	R2-5B, R2-5A	68 / 68		4.5	39.1	NC	N	BSL
39007-93-7	Sesquirosefuran	0.19	JN	7.9	JN	mg/kg	R2-5A	2 / 2		7.9			N	NV
72259-77-9	Silane, 1,2-ethanediylbis[triethenyl-	0.19	JN	0.19	JN	mg/kg	R2-10A	1 / 1		0.19			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
18053-74-2	Silane, dimethyldi(2,4-cyclopentadien-1-yl)-	4.1	JN	4.1	JN	mg/kg	R2-12A	1 / 1		4.1			N	NV
7440-22-4	SILVER	0.3		22.2	J	mg/kg	R2-2B	53 / 68	0.21 - 1.1	22.2	39.1	NC	N	BSL
7440-23-5	SODIUM	1050	J	11900	J	mg/kg	R2-11B	29 / 68	406 - 2240	11900			N	EN
1000197-25-2	Spiro[4.5]decan-7-one, 1,8-dimethyl-8,9-epoxy-4-	1.3	JN	1.3	JN	mg/kg	R3-7A	1 / 1		1.3			N	NV
124571-33-1	Spiro[cyclopropane-1,4'(6'H)-[6,10]ethenonaphtho	1.6	JN	1.6	JN	mg/kg	R3-7A	1 / 1		1.6			N	NV
7683-64-9	Squalene	0.54	JN	0.85	JN	mg/kg	R2-7A	2 / 2		0.85			N	NV
4130-54-5	Stearic acid hydrazide	0.18	JN	0.21	JN	mg/kg	R1-1B	2 / 2		0.21			N	NV
100-42-5	Styrene	0.00055	J	0.00058	J	mg/kg	R2-8B	2 / 67	0.0051 - 0.045	0.00058	628	NC	N	BSL/IFD
13798-23-7	Sulfur	0.2	JN	0.58	JN	mg/kg	R3-7B	4 / 4		0.58				
127-18-4	Tetrachloroethene	0.032		0.032		mg/kg	R3-8B	1 / 67	0.0051 - 0.045	0.032	0.554	C	N	BSL/IFD
7440-28-0	THALLIUM							0 / 68	0.43 - 2.2					
23564-05-8	Thiophanate methyl	1	JN	1	JN	mg/kg	R3-7A	1 / 1		1	489	NC	N	NV
726-25-0	Thiourea, N-phenyl-N'-(phenylmethyl)-	0.49	JN	0.49	JN	mg/kg	R3-7B	1 / 1		0.49			N	NV
1000130-68-4	threo-7,8-Bromochlorodisparlure	1.4	JN	1.4	JN	mg/kg	R3-11A	1 / 1		1.4			N	NV
108-88-3	Toluene	0.00032	J	0.0027	J	mg/kg	R3-7A	10 / 67	0.0051 - 0.045	0.0027	497	NC	N	BSL
37871-00-4	Total HpCDD	0.0000081	J	0.018	J	mg/kg	R2-12A	11 / 11		0.018			N	No TEF[f]
38998-75-3	Total HpCDF	0.0000044	J	0.0016	J	mg/kg	R2-12A	11 / 11		0.0016			N	No TEF[f]
34465-46-8	Total HxCDD	0.000004	J	0.01	J	mg/kg	R2-12A	11 / 11		0.01	9.40E-05	C	Y	ASL/TEQ
55684-94-1	Total HxCDF	0.0000054	J	0.0013	J	mg/kg	R2-12A	11 / 11		0.0013			N	No TEF[f]
36088-22-9	Total PeCDD	0.0000013	J	0.0024	J	mg/kg	R2-12A	11 / 11		0.0024			N	No TEF[f]
30402-15-4	Total PeCDF	0.0000054	J	0.0007	J	mg/kg	R2-12A	11 / 11		0.0007			N	No TEF[f]
41903-57-5	Total TCDD	0.0000011	J	0.00097	J	mg/kg	R2-12A	11 / 11		0.00097			N	No TEF[f]
55722-27-5	Total TCDF	0.0000061	J	0.00074	J	mg/kg	R2-12A	11 / 11		0.00074			N	No TEF[f]
8001-35-2	Toxaphene							0 / 65	0.21 - 0.84		0.441	C	N	BSL
1000111-72-8	trans,trans-1,8-Dimethylspiro[4.5]decane	0.015	JN	0.015	JN	mg/kg	R2-14A	1 / 1		0.015			N	NV
156-60-5	trans-1,2-Dichloroethene	0.00095	J	0.0012	J	mg/kg	R3-7A	3 / 67	0.0051 - 0.045	0.0012	15.3	NC	N	NV
10061-02-6	trans-1,3-Dichloropropene							0 / 67	0.0051 - 0.045				N	ND
1000152-47-3	trans-Decalin, 2-methyl-	0.015	JN	0.04	JN	mg/kg	R3-9B	6 / 6		0.04			N	NV
126-73-8	Tributyl phosphate	0.35	JN	0.35	JN	mg/kg	R2-9B	1 / 1		0.35	52.8	C	N	BSL
79-01-6	Trichloroethene	0.0015	J	0.0015	J	mg/kg	R3-4A	1 / 67	0.0051 - 0.045	0.0015	2.82	C	N	BSL
75-69-4	Trichlorofluoromethane	0.0016	J	0.0016	J	mg/kg	R2-6A	1 / 67	0.0051 - 0.045	0.0016	78.7	NC	N	BSL
32456-49-8	Tricyclo[3.3.1.13,7]decanone, 4-bromo-, (1.alpha	0.28	JN	0.28	JN	mg/kg	R2-10B	1 / 1		0.28			N	NV
6572-60-7	Tricyclo[8.2.2.2(4,7)]hexadeca-2,4,6,8,10,12,13,	0.39	JN	0.39	JN	mg/kg	SS-05	1 / 1		0.39			N	NV
1000216-79-4	Trifluoroacetic acid, n-octadecyl ester	0.71	JN	4.6	JN	mg/kg	R2-5B	2 / 2		4.6			N	NV
217-59-4	Triphenylene	0.2	JN	6.3	JN	mg/kg	R3-1B	5 / 5		6.3			N	NV

Table 2.3
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment at 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[i]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil Exposure[a]		COPC Flag	Rationale for Selection[g]
1705-84-6	Triphenylene, 2-methyl-	0.83	JN	0.83	JN	mg/kg	SS-07	1 / 1		0.83			N	NV
	Valeric acid, 3,5-dihydroxy-2,4-dimethyl-, .delt	0.2	JN	0.2	JN	mg/kg		1 / 1		0.2			N	NV
7440-62-2	VANADIUM	2	J	31.8	J	mg/kg	R1-1A R2-5A	60 / 60		31.8	0.548	NC	Y	ASL
126948-97-8	Vanadium, (.eta.5-2,4-cyclopentadien-1-yl)[(1,2.	0.12	JN	0.12	JN	mg/kg		1 / 1		0.12			N	NV
75-01-4	Vinyl chloride	0.0005	J	0.0041	J	mg/kg	R1-2A R2-12B	5 / 67	0.0051 - 0.045	0.0041	0.0597	C	Y	TOX
1000131-33-2	Z-11(13,14-Epoxy)tetradecen-1-ol acetate	0.96	JN	0.96	JN	mg/kg		1 / 1		0.96			N	NV
1000130-78-8	Z-8-Methyl-9-tetradecen-1-ol formate	3.8	JN	3.8	JN	mg/kg	SS-11	1 / 1		3.8			N	NV
7440-66-6	ZINC	5.6		2340	J	mg/kg	R2-12A R2-12B	68 / 68		2340	2350	NC	N	BSL

[a] Screening toxicity values for sediment are USEPA Regional Screening Levels (RSLs) for soil exposure by oral, dermal and inhalation routes (December, 2009). RSLs correspond to 1E-06 cancer risk or a hazard quotient of 0.1, whichever is lower.

[b] The default screening value is for higher-chlorinated PCBs.

[c] The default screening value is for hexavalent chromium.

[d] The default screening value is for endosulfan.

[e] The default screening value is for pyrene.

[f] There is no TEF for this PCB/PCDD/PCDF compound; all detected PCB/PCDD/PCDF congeners that have TEF values are selected as COPCs and included in the TEQ calculation.

[g] Selection Rationale Codes:

ASL = Above screening level
BSL = Below screening level
IFD = Infrequent detection; i.e. < 5% detection frequency with a minimum of 20 samples
FD = Frequent Detection, but no toxicity value; this chemical cannot be evaluated quantitatively in the risk assessment
ND = Not detected
EN = Essential nutrient
NV = No toxicity value or RSL; this chemical cannot be evaluated quantitatively in the risk assessment
TEQ = Compound is included because it is a contributor to TEQ for 2,3,7,8-TCDD per WHO (2005)
TOX = Compound is a Class A (known human) Carcinogen

[h] The default screening value is for endrin.

[i] Certain tentatively identified compounds (TICs) were reported in the SCRIBE database and are included in this table for the sake of completeness; the listed detection frequencies (1/1, 2/2, etc.) indicate the number of samples in which these TICs were reported. Due to lack of RSLs, these TICs are generally not selected as COPCs.

Other Notes:

blank space = Not applicable

Table 2.4
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Tap Water Exposure[a]		COPC Flag	Rationale for Selection[b]
71-55-6	1,1,1-Trichloroethane							0 / 11	5 - 5		913	NC	N	ND
79-34-5	1,1,2,2-Tetrachloroethane							0 / 11	5 - 5		0.0671	C	N	ND
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane							0 / 11	5 - 5		5920	NC	N	ND
79-00-5	1,1,2-Trichloroethane							0 / 11	5 - 5		0.242	C	N	ND
92-52-4	1,1'-Biphenyl							0 / 11	5 - 5		183	NC	N	ND
75-34-3	1,1-Dichloroethane	0.24	J	0.4	J	ug/L	R3-2	10 / 11	5 - 5	0.4	2.42	C	N	ND
75-35-4	1,1-Dichloroethene							0 / 11	5 - 5		34	NC	N	ND
87-61-6	1,2,3-Trichlorobenzene							0 / 11	5 - 5		2.92	NC	N	ND
95-94-3	1,2,4,5-Tetrachlorobenzene							0 / 11	5 - 5		1.1	NC	N	ND
120-82-1	1,2,4-Trichlorobenzene							0 / 11	5 - 5		0.412	NC	N	ND
96-12-8	1,2-Dibromo-3-chloropropane							0 / 11	5 - 5		0.000316	C	N	ND
106-93-4	1,2-Dibromoethane							0 / 11	5 - 5		0.00653	C	N	ND
95-50-1	1,2-Dichlorobenzene							0 / 11	5 - 5		37	NC	N	ND
107-06-2	1,2-Dichloroethane							0 / 11	5 - 5		0.149	C	N	ND
78-87-5	1,2-Dichloropropane							0 / 11	5 - 5		0.386	C	N	ND
541-73-1	1,3-Dichlorobenzene							0 / 11	5 - 5				N	ND
106-46-7	1,4-Dichlorobenzene							0 / 11	5 - 5		0.427	C	N	ND
108-60-1	2,2'-Oxybis(1-chloropropane)							0 / 11	5 - 5		0.323	C	N	ND
1000113-52-1	2,3,3-Trimethyl-1-hexene	13	JNB	17	JNB	ug/L	R3-7	2 / 2		17			N	NV
58-90-2	2,3,4,6-Tetrachlorophenol	0.18	J	0.18	J	ug/L	R1-4	1 / 11	5 - 5	0.18	110	NC	N	BSL
95-95-4	2,4,5-Trichlorophenol	0.23	J	0.23	J	ug/L	R2-11	1 / 11	5 - 5	0.23	365	NC	N	BSL
88-06-2	2,4,6-Trichlorophenol							0 / 11	5 - 5		3.65	NC	N	ND
120-83-2	2,4-Dichlorophenol							0 / 11	5 - 5		11	NC	N	ND
105-67-9	2,4-Dimethylphenol	0.35	J	0.35	J	ug/L	R1-4	1 / 11	5 - 5	0.35	73	NC	N	BSL
51-28-5	2,4-Dinitrophenol							0 / 11	10 - 10		7.3	NC	N	ND
121-14-2	2,4-Dinitrotoluene							0 / 11	5 - 5		0.217	C	N	ND
606-20-2	2,6-Dinitrotoluene							0 / 11	5 - 5		3.65	NC	N	ND
78-93-3	2-Butanone							0 / 11	10 - 10		706	NC	N	ND
91-58-7	2-Chloronaphthalene							0 / 11	5 - 5		292	NC	N	ND
95-57-8	2-Chlorophenol							0 / 11	5 - 5		18.3	NC	N	ND
591-78-6	2-Hexanone							0 / 11	10 - 10		4.66	NC	N	ND
91-57-6	2-Methylnaphthalene							0 / 11	5 - 5		14.6	NC	N	ND
95-48-7	2-Methylphenol							0 / 11	5 - 5		183	NC	N	ND
88-74-4	2-Nitroaniline							0 / 11	10 - 10		36.5	NC	N	ND
88-75-5	2-Nitrophenol							0 / 11	5 - 5				N	ND
91-94-1	3,3'-Dichlorobenzidine							0 / 11	5 - 5		0.149	C	N	ND
99-09-2	3-Nitroaniline							0 / 11	10 - 10				N	ND
534-52-1	4,6-Dinitro-2-methylphenol							0 / 11	10 - 10		0.365	NC	N	ND
101-55-3	4-Bromophenyl-phenylether							0 / 11	5 - 5				N	ND
59-50-7	4-Chloro-3-methylphenol	0.19	J	0.19	J	ug/L	R2-11	1 / 11	5 - 5	0.19	365	NC	N	BSL
106-47-8	4-Chloroaniline							0 / 11	5 - 5		0.336	C	N	ND
7005-72-3	4-Chlorophenyl-phenylether	0.28	J	0.28	J	ug/L	R2-11	1 / 11	5 - 5	0.28				

Table 2.4
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Tap Water Exposure[a]		COPC Flag	Rationale for Selection[b]
108-10-1	4-Methyl-2-Pentanone							0 / 11	10 - 10		199	NC	N	ND
106-44-5	4-Methylphenol	0.16	J	0.16	J	ug/L	R1-4	1 / 11	5 - 5	0.16	18.3	NC	N	BSL
100-01-6	4-Nitroaniline							0 / 11	10 - 10		3.36	C	N	ND
100-02-7	4-Nitrophenol							0 / 11	10 - 10					
83-32-9	Acenaphthene	0.16	J	0.16	J	ug/L	R2-11	1 / 11	5 - 5	0.16	219	NC	N	BSL
208-96-8	Acenaphthylene							0 / 11	5 - 5		110	NC[c]	N	ND
67-64-1	Acetone							0 / 11	10 - 10		2180	NC	N	ND
98-86-2	Acetophenone							0 / 11	5 - 5		365	NC	N	ND
120-12-7	Anthracene							0 / 11	5 - 5		1100	NC	N	ND
7440-36-0	ANTIMONY							0 / 22	0.33 - 2		1.46	NC	N	ND
7440-38-2	ARSENIC	0.95	J	1.8		ug/L	R3-2	22 / 22		1.8	0.0448	C	Y	ASL
1912-24-9	Atrazine							0 / 11	5 - 5		0.292	C	N	ND
7440-39-3	BARIUM	93.4		113		ug/L	R1-4	22 / 22		113	730	NC	N	BSL
100-52-7	Benzaldehyde							0 / 11	5 - 5		365	NC	N	ND
71-43-2	Benzene							0 / 11	5 - 5		0.413	C	N	ND
56-55-3	Benzo(a)anthracene							0 / 11	5 - 5		0.0295	C	N	ND
50-32-8	Benzo(a)pyrene							0 / 11	5 - 5		0.00295	C	N	ND
205-99-2	Benzo(b)fluoranthene	0.16	J	0.16	J	ug/L	R3-2	1 / 11	5 - 5	0.16	0.0295	C	Y	ASL
191-24-2	Benzo(g,h,i)perylene							0 / 11	5 - 5		110	NC[c]	N	ND
207-08-9	Benzo(k)fluoranthene							0 / 11	5 - 5		0.295	C	N	ND
7440-41-7	BERYLLIUM							0 / 22	1 - 1		7.3	NC	N	ND
111-91-1	Bis(2-chloroethoxy)methane							0 / 11	5 - 5		11	NC	N	ND
111-44-4	Bis(2-chloroethyl)ether							0 / 11	5 - 5		0.0119	C	N	ND
117-81-7	Bis(2-ethylhexyl)phthalate							0 / 11	5 - 5		4.8	C	N	ND
74-97-5	Bromochloromethane							0 / 11	5 - 5				N	ND
75-27-4	Bromodichloromethane							0 / 11	5 - 5		0.117	C	N	ND
75-25-2	Bromoform							0 / 11	5 - 5		8.51	C	N	ND
74-83-9	Bromomethane							0 / 11	5 - 5		0.866	NC	N	ND
85-68-7	Butylbenzylphthalate							0 / 11	5 - 5		35.4	C	N	ND
7440-43-9	CADMIUM							0 / 22	1 - 1		1.83	NC	N	ND
105-60-2	Caprolactam							0 / 11	5 - 5		1830	NC	N	ND
86-74-8	Carbazole							0 / 11	5 - 5				N	ND
75-15-0	Carbon disulfide							0 / 11	5 - 5		104	NC	N	ND
56-23-5	Carbon tetrachloride							0 / 11	5 - 5		0.199	C	N	ND
2050-94-4	Carbonic acid, dipentyl ester	3.1	JN	3.1	JN	ug/L	R3-2	1 / 1		3.1			N	NV
108-90-7	Chlorobenzene							0 / 11	5 - 5		9.13	NC	N	ND
75-00-3	Chloroethane							0 / 11	5 - 5		2090	NC	N	ND
67-66-3	Chloroform							0 / 11	5 - 5		0.193	C	N	ND
74-87-3	Chloromethane							0 / 11	5 - 5		18.8	NC	N	ND
7440-47-3	CHROMIUM	3.7		8.4		ug/L	R3-7	2 / 22	0.91 - 2	8.4	0.043	C[e]	Y	ASL
218-01-9	Chrysene							0 / 11	5 - 5		2.95	C	N	ND
156-59-2	cis-1,2-Dichloroethene	2.4	J	4.2	J	ug/L	R3-2	11 / 11		4.2	36.5	NC	N	BSL
10061-01-5	cis-1,3-Dichloropropene							0 / 11	5 - 5				N	ND
7440-50-8	COPPER	2.2		6.6		ug/L	R3-2	18 / 22	2 - 2	6.6	146	NC	N	BSL

Table 2.4
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Tap Water Exposure[a]		COPC Flag	Rationale for Selection[b]
110-82-7	Cyclohexane							0 / 11	5 - 5		1250	NC	N	ND
53-70-3	Dibenzo(a,h)anthracene							0 / 11	5 - 5		0.00295	C	N	ND
132-64-9	Dibenzofuran	0.3	J	0.3	J	ug/L	R2-11	1 / 11	5 - 5	0.3	3.65	NC	N	BSL
124-48-1	Dibromochloromethane							0 / 11	5 - 5		0.147	C	N	ND
75-71-8	Dichlorodifluoromethane							0 / 11	5 - 5		39.5	NC	N	ND
84-66-2	Diethylphthalate							0 / 11	5 - 5		2920	NC	N	ND
131-11-3	Dimethylphthalate							0 / 11	5 - 5				N	ND
84-74-2	Di-n-butylphthalate							0 / 11	5 - 5		365	NC	N	ND
117-84-0	Di-n-octylphthalate							0 / 11	5 - 5				N	ND
3664-75-3	Ethanone, 1-(2,2-dimethylcyclopentyl)-	2.6	JN	2.6	JN	ug/L	R3-5	1 / 1		2.6			N	NV
100-41-4	Ethylbenzene							0 / 11	5 - 5		1.48	C	N	ND
206-44-0	Fluoranthene	0.17	J	0.24	J	ug/L	R3-2	3 / 11	5 - 5	0.24	146	NC	N	BSL
86-73-7	Fluorene	0.28	J	0.28	J	ug/L	R2-11	1 / 11	5 - 5	0.28	146	NC	N	BSL
118-74-1	Hexachlorobenzene							0 / 11	5 - 5		0.042	C	N	ND
87-68-3	Hexachlorobutadiene							0 / 11	5 - 5		0.862	C	N	ND
77-47-4	Hexachlorocyclopentadiene							0 / 11	5 - 5		21.9	NC	N	ND
67-72-1	Hexachloroethane							0 / 11	5 - 5		3.65	NC	N	ND
584-94-1	Hexane, 2,3-dimethyl-	14	JN	14	JN	ug/L	R3-5	1 / 1		14			N	NV
193-39-5	Indeno(1,2,3-cd)pyrene							0 / 11	5 - 5		0.0295	C	N	ND
120-72-9	Indole	3.2	JN	3.2	JN	ug/L	R1-4	1 / 1		3.2			N	NV
78-59-1	Isophorone							0 / 11	5 - 5		70.8	C	N	ND
98-82-8	Isopropylbenzene							0 / 11	5 - 5		67.9	NC	N	ND
7439-92-1	LEAD	0.18	J	9.9		ug/L	R2-1	11 / 22	1 - 1	9.9	15	MCL[d]	N	BSL
179601-23-1	m,p-Xylene							0 / 11	5 - 5				N	ND
7439-96-5	MANGANESE	88.7		120		ug/L	R3-2	22 / 22		120	87.6	NC	Y	ASL
7439-97-6	MERCURY							0 / 22	0.2 - 0.2		0.0565	NC	N	ND
79-20-9	Methyl acetate							0 / 11	5 - 5		3650	NC	N	ND
1634-04-4	Methyl tert-butyl ether							0 / 11	5 - 5		12.5	C	N	ND
108-87-2	Methylcyclohexane							0 / 11	5 - 5				N	ND
75-09-2	Methylene chloride							0 / 11	5 - 5		4.8	C	N	ND
91-20-3	Naphthalene	0.17	J	0.41	J	ug/L	R1-4	8 / 11	5 - 5	0.41	0.143	C	Y	ASL
7440-02-0	NICKEL	2.7		6.2		ug/L	R3-7	22 / 22		6.2	73	NC	N	BSL
98-95-3	Nitrobenzene							0 / 11	5 - 5		0.122	C	N	ND
621-64-7	N-Nitroso-di-n-propylamine							0 / 11	5 - 5		0.00961	C	N	ND
86-30-6	N-Nitrosodiphenylamine							0 / 11	5 - 5		13.7	C	N	ND
95-47-6	o-Xylene							0 / 11	5 - 5		122	NC	N	NV
87-86-5	Pentachlorophenol	0.67	J	0.67	J	ug/L	R1-4	1 / 11	10 - 10	0.67	0.56	C	Y	ASL
85-01-8	Phenanthrene	0.17	J	0.17	J	ug/L	R3-7	1 / 11	5 - 5	0.17	110	NC[c]	N	BSL
108-95-2	Phenol							0 / 11	5 - 5		1100	NC	N	ND
129-00-0	Pyrene	0.19	J	0.25	J	ug/L	R3-2	2 / 11	5 - 5	0.25	110	NC	N	BSL
7782-49-2	SELENIUM							0 / 22	5 - 5		18.3	NC	N	ND
7440-22-4	SILVER							0 / 22	0.053 - 1		18.3	NC	N	ND
100-42-5	Styrene							0 / 11	5 - 5		162	NC	N	ND

Table 2.4
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency[f]	Range of Detection Limits	Screening Concentration	EPA RSL Residential Tap Water Exposure[a]		COPC Flag	Rationale for Selection[b]
127-18-4	Tetrachloroethene							0 / 11	5 - 5		0.108	C	N	ND
7440-28-0	THALLIUM							0 / 22	1 - 1				N	ND
108-88-3	Toluene	0.39	J	0.94	J	ug/L	R3-7	11 / 11		0.94	228	NC	N	BSL
156-60-5	trans-1,2-Dichloroethene							0 / 11	5 - 5		10.7	NC	N	ND
10061-02-6	trans-1,3-Dichloropropene							0 / 11	5 - 5				N	ND
79-01-6	Trichloroethene	0.31	J	0.69	J	ug/L	R3-5	11 / 11		0.69	2.01	C	N	BSL
75-69-4	Trichlorofluoromethane							0 / 11	5 - 5		129	NC	N	ND
7440-62-2	VANADIUM	0.64	J	1.5	J	ug/L	R3-5, R3-2	10 / 18	5 - 5	1.5	0.256	NC	Y	ASL
75-01-4	Vinyl chloride	0.45	J	1.1	J	ug/L	R3-2	11 / 11		1.1	0.0162	C	Y	ASL
7440-66-6	ZINC	3.9		18.1		ug/L	R3-2	22 / 22		18.1	1100	NC	N	BSL

[a] Screening toxicity values for sediment are USEPA Regional Screening Levels (RSLs) for tap water exposure (December, 2009). RSLs correspond to 1E-06 cancer risk or a hazard quotient of 0.1, whichever is lower.

[b] Selection Rationale Codes:

ASL = Above screening level
BSL = Below screening level
IFD = Infrequent detection; i.e., < 5% detection frequency with a minimum of 20 sample
FD = Frequent Detection, but no toxicity value; this chemical cannot be evaluated quantitatively in the risk assessmen
ND = Not detected
EN = Essential nutrient
NV = No toxicity value or RSL; this chemical cannot be evaluated quantitatively in the risk assessmen
TEQ = Compound is included because it is a contributor to TEQ for 2,3,7,8-TCDD
Hist = Historically present due to known contamination sources

[c] Default screening value is for pyrene.

[d] Default screening value for lead is one-tenth the Maximum Contaminant Level (MCL).

[e] Default screening value is for hexavalent chromium.

[f] Certain tentatively identified compounds (TICs) were reported in the SCRIBE database and are included in this table for the sake of completeness; the listed detection frequencies (1/1, 2/2, etc.) indicate the number of samples in which these TICs were reported. Due to lask of RSLs these TICs are generally not selected as COPCs.

Other Notes:

blank space = Not applicable ND = Not detected Y = Yes N = No

8.3 Series 3 Tables

Table 3.1
Medium-Specific Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Fish Fillets
Exposure Medium: Fish Fillets
Exposure Point: Fillets from Lower Ley Creek

							Selected Exposure Point Concentration For Both RME and CT risks		
Chemical of Potential Concer	**Maximum Detected Concentration (mg/kg)**	**Qualifier**	**Arithmetic Mean Detected Concentration[a] (mg/kg)**	**Standard Deviation[b] (mg/kg)**	**95% UCL [c] (mg/kg)**	**UCL Statistic[c]**	**Value**	**Units**	**Rationale[c]**
alpha-Chlordane	0.0096	J	5.30E-03	3.09E-03	5.96E-03	95% KM (t)	5.96E-03	mg/kg	UCL-NP
Aroclor-1254	2		0.635	0.54	1.179	95%H-UCL	1.179	mg/kg	UCL-P
Aroclor-1260	0.86		0.297	0.243	0.58	95%Cheb(MSD)	0.58	mg/kg	UCL-NP
Total Aroclors[f]	2.8		0.893	0.752	1.348	95% Apx Gamma	1.348	mg/kg	UCL-P
ARSENIC	1.9	J	1.277	0.278	1.419	95% KM (t)	1.419	mg/kg	UCL-NP
CHROMIUM	61.7	J	33.66	39.74	43.68	95% KM (Chebyshev)	43.68	mg/kg	UCL-NP
Dieldrin	1.80E-02	NJ	1.27E-02	7.57E-03	1.67E-02	95% KM (t)	1.67E-02	mg/kg	UCL-NP
Dioxins/Furans TEQ[d]	3.47E-06		NA	NA	NA	NA	3.47E-06	mg/kg	Max
gamma-Chlordane	4.90E-02	J	0.0152	0.0127	0.023	95% Apx Gamma	2.30E-02	mg/kg	UCL-P
Heptachlor epoxide	7.20E-03	NJ	NA[e]	NA	NA	NA	7.20E-03	mg/kg	Max
IRON	370	J	71.84	87.49	173.8	95%Cheb(MSD)	173.8	mg/kg	UCL-NP
MERCURY	0.74	J	0.44	0.159	0.478	95% KM (t)	0.478	mg/kg	UCL-NP
SELENIUM	3.3	J	2.764	0.298	2.905	95%Student's t	2.905	mg/kg	UCL-P
ZINC	99.4	J	65.19	21.04	76.13	95% Apx Gamma	76.13	mg/kg	UCL-P

[a]Toxicity Equivalency Factor (TEF) from WHO, 2005.

[b]Provided for historical reasons: please note that the arithmetic mean of the detected values is not the best indicator of central tendency when the underlying dataset is not normally distributed.

[c]Based on recommendations from ProUCL, version 4.00.04 software (Singh et al., 2009); includes non-detects treated per recommendations for each statistical method:
UCL = Upper confidence limit; UCL-P = parametric UCL; UCL=NP = nonparametric UCL
95% KM (t) = UCL based on Kaplan-Meier Method using the t-distribution cutoff value
95% H-UCL = UCL based on Lands H-statistic
95% KM (Cheb) = UCL based on Kaplan-Meier Method using the Chebyshev inequality
95% Cheb(MSD) = UCL based on Chebyshev (Mean, Standard Deviation)
95% Apx Gamma = UCL based on approximate gamma distribution
Max = Dataset is too small to yield reliable and meaningful statistics: maximum detected values are used in quantitative risk assessment
95% Student's t = UCL based on Student's t-distribution

[d]Chemicals of potential concern that contribute to Toxicity Equivalency (TEQ) of 2,3,7,8-TCDD per WHO (2005); See Table 5-1.

[e]Chemical was detected in only one of two samples.

[f]Multiple PCB Aroclors were reported in fish samples, and therefore a total Aroclor concentration is also provided to evaluate potential carcinogenic risks using the total PCB slope factor.
NA = Not applicable

Table 3.2
Medium-Specific Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment, 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

Chemical of Potential Concern	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration[a] (mg/kg)	Standard Deviation[a] (mg/kg)	95% UCL [b] (mg/kg)	UCL Statistic[b]	Selected Exposure Point Concentration For Both RME and CT risks		
							Value	Units	Rationale[b]
ALUMINUM	12700	J	8083	2048	9144	95% Student's-t	9144	mg/kg	UCL-P
ANTIMONY	4.1	J	2.8	1.153	2.513	95% KM (t)	2.513	mg/kg	UCL-NP[d]
Aroclor-1242	0.71	JN	0.468	0.167	0.448	95% KM (t)	0.448	mg/kg	UCL-NP[d]
Aroclor-1248	1.7		1.024	0.58	1.011	95% KM (t)	1.011	mg/kg	UCL-NP[d]
ARSENIC	11.9	J	8.342	1.382	9.058	95% Student's-t	9.058	mg/kg	UCL-P
Benzo(a)anthracene	2.8		0.702	0.739	1.132	95% Apx Gamma	1.132	mg/kg	UCL-P
Benzo(a)pyrene	3.2		0.8	0.855	1.309	95% Apx Gamma	1.309	mg/kg	UCL-P
Benzo(b)fluoranthene	4.5		1.189	1.192	1.893	95% Apx Gamma	1.893	mg/kg	UCL-P
Benzo(k)fluoranthene	2		0.469	0.552	0.972	95% H-UCL	0.972	mg/kg	UCL-P
Benzo[j]fluoranthene	0.86	JN	0.468	0.284	0.739	95% Student's-t	0.739	mg/kg	UCL-P[d]
CADMIUM	15.2	J	6.208	4.553	9.329	95% Apx Gamma	9.329	mg/kg	UCL-P
Carbazole	0.34	J	0.0979	0.0878	0.147	95% Apx Gamma	0.147	mg/kg	UCL-P
Chloroxylenol	0.67	JN	0.342	0.224	0.526	95% Student's-t	0.526	mg/kg	UCL-P[d]
CHROMIUM	379	J	152.8	108.7	221.5	95% Apx Gamma	221.5	mg/kg	UCL-P
COBALT	8.9	J	7.067	0.791	7.477	95% Student's-t	7.477	mg/kg	UCL-P
Dibenzo(a,h)anthracene	0.14	J	0.087	0.0483	0.126	95% KM (t)	0.126	mg/kg	UCL-NP[d]
Dioxins/Furans TEQ[c]									
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	0.52	JN	0.343	0.175	NA	NA	5.20E-01	mg/kg	Max
Indeno(1,2,3-cd)pyrene	1.9		0.606	0.47	1.173	95% KM (Chebyshev)	1.173	mg/kg	UCL-NP
IRON	24400	J	18500	3633	20383	95% KM (t)	20383	mg/kg	UCL-NP
LEAD	252	J	144.6	54.08	172.7	95% Student's-t	172.7	mg/kg	UCL-P
MANGANESE	465		320.8	96.67	385.5	95% Student's-t	385.5	mg/kg	UCL-P[d]
MERCURY	0.91	J	0.365	0.23	0.503	95% Apx Gamma	0.503	mg/kg	UCL-P
Perylene	2.7	JN	0.942	0.975	2.677	95%Cheb(MSD)	2.677	mg/kg	UCL-NP[d]
VANADIUM	26.7	J	22.38	2.944	24.35	95% Student's-t	2.44E+01	mg/kg	UCL-P[d]

[a] Provided for historical reasons: please note that the arithmetic mean of the detected values is not the best indicator of central tendency when the underlying dataset is not normally distributed.

[b] Based on recommendations from ProUCL, version 4.00.04 software (Singh et al., 2009); includes non-detects treated per recommendations for each statistical method:
UCL = Upper confidence limit; UCL-P = parametric UCL; UCL=NP = nonparametric UCL
95% KM (t) UCL = UCL based on Kaplan-Meier Method using the t-distribution cutoff values
95% KM (Cheb)UCL = UCL based on Kaplan-Meier Method using the Chebyshev inequality

Table 3.2
Medium-Specific Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment, 0-12 inch depth interval
Exposure Point: Banks of Dredge Spoils Area

Chemical of Potential Concern	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration[a] (mg/kg)	Standard Deviation[a] (mg/kg)	95% UCL [b] (mg/kg)	UCL Statistic[b]	Selected Exposure Point Concentration For Both RME and CT risks		
							Value	Units	Rationale[b]

95% H-UCL = UCL based on Lands H-statistic
95% Cheb(MSD)UCL = UCL based on Chebyshev (Mean, Standard Deviation)
95% Apx Gamma = UCL based on approximate gamma distribution
Max = Dataset is too small to yield reliable and meaningful statistics: maximum detected values are used in quantitative risk assessment
95% Student's t UCL = UCL based on Student's t-distribution
no dist = no discernible distribution
N = Normal distribution; LN = Lognormal distribution

[c] Chemicals of potential concern that contribute to Toxicity Equivalency (TEQ) of 2,3,7,8-TCDD; TEQ per WHO (2005)

[d] ProUCL warns that results based on less than 4 to 9 distinct detected observations, as in this case, may be unreliable; however, the recommended UCL is less than the maximum detected value and is used as the exposure point concentration

Table 3.3
Medium-Specific Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment, 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

Chemical of Potential Concern	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration[a] (mg/kg)	Standard Deviation[a] (mg/kg)	≥95% UCL [b] (mg/kg)	UCL Statistic[c]	Selected Exposure Point Concentration For Both RME and CT risks		
							Value	Units	Rationale[b,d]
3,4-Dihydrocyclopenta(cd)pyrene (acepyrene)	6.8	JN	1.512	1.825	2.566	95% H-UCL	2.566	mg/kg	UCL-P
3-Methylcholanthrene	5.7	JN	4.133	2.294	NV	NV	5.7	mg/kg	Max
4H-Cyclopenta[def]phenanthrene	24	JN	3.105	4.723	5.235	95% H-UCL	5.235	mg/kg	UCL-P
9,10-Anthracenedione	24	JN	3.375	5.516	15.65	97.5% Chebyshev(mean, SD)	15.65	mg/kg	UCL-NP
Aldrin	0.041	J	0.041	NA	NV	NV	0.041	mg/kg	Max
ALUMINUM	15100	J	5683	3634	6528	95% Approximate gamma	6528	mg/kg	UCL-P
Aroclor-1242	43		3.178	7.104	5.508	95% KM (Cheybshev)	5.508	mg/kg	UCL-NP
Aroclor-1260	18		18	NA	NV	NV	18	mg/kg	Max
ARSENIC	23.6	J	7.249	4.788	8.331	95% Approximate gamma	8.331	mg/kg	UCL-P
Benzene	0.05		0.002	0.003	NV	NV	0.05	mg/kg	Max
Benzo(a)anthracene	47		5.099	9.774	12.21	97.5% KM (Cheybshev)	12.21	mg/kg	UCL-NP
Benzo(a)pyrene	32		3.992	7.103	8.888	97.5% KM (Cheybshev)	8.888	mg/kg	UCL-NP
Benzo(b)fluoranthene	42		5.463	9.453	12.2	97.5% KM (Cheybshev)	12.2	mg/kg	UCL-NP
Benzo(k)fluoranthene	25		2.805	5.126	5.63	97.5% KM (Cheybshev)	5.63	mg/kg	UCL-NP
Benzo[e]pyrene	19	JN	3.669	4.591	8.708	95% H-UCL	8.708	mg/kg	UCL-P
Benzo[j]fluoranthene	13	JN	2.104	3.554	4.106	95% Chebyshev (MVUE)	4.106	mg/kg	UCL-NP
CADMIUM	220		10.73	32.54	28.28	95% KM (Cheybshev)	28.28	mg/kg	UCL-NP
CHROMIUM	1090	J	101	197.2	203.2	95% KM (Cheybshev)	203.2	mg/kg	UCL-NP
Chrysene	43		5.126	9.145	11.65	97.5% KM (Cheybshev)	11.65	mg/kg	UCL-NP
COBALT	12	J	5.337	2.152	5.521	95% KM (BCA)	5.521	mg/kg	UCL-NP
COPPER	525	J	94.68	105.5	174.6	97.5% Chebyshev(mean, SD)	174.6	mg/kg	UCL-NP
Dibenzo(a,h)anthracene	4.9	J	0.96	1.194	0.73	95% KM (t)	0.73	mg/kg	UCL-NP
Dibenzofuran	15		1.233	2.927	2.911	97.5% KM (Cheybshev)	2.911	mg/kg	UCL-NP
Dieldrin	0.11	JN	6.35E-02	6.58E-02	0.11	95% KM (BCA)	0.11	mg/kg	UCL-NP; n<10
Dioxin TEQ[d]	7.26E-04		6.73E-05	1.91E-04	2.35E-04	95% Approximate gamma	2.35E-04	mg/kg	UCL-P
Heptachlor	0.42	J	3.74E-02	8.96E-02	5.13E-02	95% KM (Cheybshev)	5.13E-02	mg/kg	UCL-NP
Indeno(1,2,3-cd)pyrene	23		3.037	4.971	5.397	95% KM (Cheybshev)	5.397	mg/kg	UCL-NP
IRON	31000	J	13773	6270	15041	95% Student's-t	15041	mg/kg	UCL-P
LEAD	509	J	101	94.88	149.7	95% KM (Cheybshev)	149.7	mg/kg	UCL-NP
MANGANESE	1280		316.2	176	348.9	95% Approximate gamma	348.9	mg/kg	UCL-P

Table 3.3
Medium-Specific Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediment
Exposure Medium: Sediment, 0-12 inch depth interval
Exposure Point: Lower Ley Creek in-stream sediment

Chemical of Potential Concern	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration[a] (mg/kg)	Standard Deviation[a] (mg/kg)	≥95% UCL [b] (mg/kg)	UCL Statistic[c]	Selected Exposure Point Concentration For Both RME and CT risks		
							Value	Units	Rationale[b,d]
MERCURY	2.1	J	0.295	0.392	0.454	95% KM (Cheybshev)	0.454	mg/kg	UCL-NP
Naphthalene	53		1.61	6.979	6.505	97.5% KM (Cheybshev)	6.505	mg/kg	UCL-NP
NICKEL	447	J	39.35	73.78	78.35	95% Chebyshev (mean, SD)	78.35	mg/kg	UCL-NP
Perylene	17	JN	2.322	3.199	3.256	Approximate gamma	3.256	mg/kg	UCL-P
VANADIUM	31.8	J	14.46	7.911	16.17	95% Student's-t	16.17	mg/kg	UCL-P
Vinyl Chloride	0.0041	J	0.002	0.002	NV	NV	0.0041	mg/kg	Max

[a] Provided for historical reasons: please note that the arithmetic mean of the detected values is not the best indicator of central tendency when the underlying dataset is not normally distributed.

[b] Based on recommendations from ProUCL, version 4.00.04 software (Singh et al., 2009); includes non-detects treated per recommendations for each statistical method:

UCL = Upper confidence limit; UCL-P = parametric UCL; UCL=NP = nonparametric UCL
KM (t) = UCL based on Kaplan-Meier Method using the t-distribution cutoff values
KM (Chebyshev) = UCL based on Kaplan-Meier Method using the Chebyshev inequality
KM (BCA) = UCL based on the Kaplan-Meier Method using the bias-corrected accelerated bootstrap method
H-UCL = UCL based on Lands H-statistic
Chebyshev (mean, SD) = UCL based on Chebyshev (Mean, Standard Deviation)
Chebyshev (MVUE) = UCL based on the Chebyshev inequality using minimum variance unbiased estimate
Approximate Gamma = UCL based on approximate gamma distribution
Adusted Gamma = UCL based on an adjusted gamma distribution
Max = Dataset is too small to yield reliable and meaningful statistics, and either there is no UCL or the recommended potential UCL exceeds the maximum detected value.
Student's t UCL = UCL based on Student's t-distribution
NV = No values were generated by ProUCL due to insufficient samples

[c] n < 10 = There are less than 10 values in this dataset; >10 observations are recommended to compute reliable test statistics; however, the recommended UCL is < the maximum detected value and is used as the exposure point concentration.

[d] Chemicals of potential concern that contribute to Toxicity Equivalency (TEQ) of 2,3,7,8-TCDD per WHO (2005). All dioxin, dibenzofuran, and dioxin-like PCB congeners listed in Table 2.3 which had TEF values were carried forward as COPCs but are only listed as "Dioxin TEQ" rather than as individual compounds.

Table 3.4
Medium-Specific Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Lower Ley Creek

Chemical of Potential Concern	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration[a] (ug/L)	Standard Deviation[a] (ug/L)	≥95% UCL [b] (ug/L)	UCL Statistic[b]	Selected Exposure Point Concentration For Both RME and CT risks		
							Value	Units	Rationale[b]
ARSENIC	1.8		1.251	0.216	1.33	95% Students-t	1.33	µg/L	UCL-P
Benzo(b)fluoranthene	0.16	J	NV[c]	NV[c]	NV[c]	NV[c]	0.16	µg/L	Max[c]
CHROMIUM	8.4		6.05	3.323	4.422	95% KM (t)	4.422	µg/L	UCL-NP; n<10
MANGANESE	120		97.47	7.645	100.3	95% Students-t	100.3	µg/L	UCL-P
Naphthalene	0.41	J	0.266	0.101	0.331	95% KM (t)	0.331	µg/L	UCL-NP; n<10
Pentachlorophenol	0.67	J	NV[c]	NV[c]	NV[c]	NV[c]	0.67	µg/L	Max[c]
VANADIUM	1.5	J	1.181	0.272	1.33	95% KM (t)	1.33	µg/L	UCL-NP
Vinyl chloride	1.1	J	0.64	0.202	0.75	95% Students-t	0.75	µg/L	UCL-P

[a] Provided for historical reasons: please note that the arithmetic mean of the detected values is not the best indicator of central tendency when the underlying dataset is not normally distributed.

[b] Based on recommendations from ProUCL, version 4.00.04 software (Singh et al., 2009); includes non-detects treated per recommendations for each statistical method:

UCL = Upper confidence limit; UCL-P = parametric UCL; UCL=NP = nonparametric UCL

KM (t) = UCL based on Kaplan-Meier Method using the t-distribution cutoff values

Student's t UCL = UCL based on Student's t-distribution

Max = Dataset is too small to yield reliable and meaningful statistics, and either there is no UCL or the maximum detected value exceeds the recommended potential UCL

NV = No values were generated by ProUCL due to insufficient samples

n < 10 = There are less than 10 detected values in this datset; >10 distinct observations are recommended to compute reliable test statistics; however, the recommended UCL is < the maximum detected value and is used as the exposure point concentration

[c] Two compounds (benzo[b]fluoranthene and pentachlorophenol) were only detected ine one (of 11) samples, and thus summary statistics were not calculated. The maximum value (only detected concentration) is used as the EPC.

8.4 Series 4 Tables

Table 4.1
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Edible Fish Tissue
Exposure Medium: Edible Fish Tissue
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic Daily Intake (CDI) (mg/kg-day)=
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 1989	3,285	USEPA, 1989	C x CF x IR x FI x EF x ED / (BW x AT)
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	C	Chemical concentration in fish	mg/kg (wet)	See Table 3.1	NA	See Table 3.1	NA	
	CF	Conversion factor	kg/g	0.001	unit conversion	0.001	unit conversion	Chronic Daily Intake for PCBs and PCDD/PCDFs[2] (CDI) (mg/kg-
	CL	Cooking loss (PCBs and PCDD/PCDFs only)[a]	unitless	NA	assume no loss for RME	0.33	USEPA, 1997	(C x (1-CL)) x CF x IR x FI x EF x ED / (BW x AT)
	ED	Exposure duration	years	30	USEPA, 1989	9	USEPA, 1989	
	EF	Exposure frequency	days/year	365	USEPA, 1989	365	USEPA, 1989	
	FI	Fraction ingested from contaminated source	-	1	NYSDEC and NYSDOL, 1998a	1	NYSDEC and NYSDOL, 1998a	
	IR	Ingestion rate	g fish/day	25	USEPA, 1997, Sec 10.10.3	8	USEPA, 1997, Sec 10.10.3	

NA = not applicable

[a]Used to adjust exposure point concentration (EPC) for PCBs and PCDD/PCDFs ingested for central tendency (CT) only.

Table 4.2
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Edible Fish Tissue
Exposure Medium: Edible Fish Tissue
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Young Child (<6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic Daily Intake (CDI) (mg/kg-day)=
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 1989	2,190	USEPA, 1989	C x CF x IR x FI x EF x ED / (BW x AT)
	BW	Body weight	kg	15	USEPA, 1997. Table 7-3	15	USEPA, 1997. Table 7-3	
	C	Chemical concentration in fish	mg/kg (wet)	See Table 3.1	NA	See Table 3.1	NA	
	CF	Conversion factor	kg/g	0.001	unit conversion	0.001	unit conversion	Chronic Daily Intake for PCBs and PCDD/PCDFs[2] (CDI) (mg/kg-day)=
	CL	Cooking loss (PCBs and PCDD/PCDFs only)[a]	unitless	NA	assume no loss for RME	0.33	USEPA, 1997	(C x (1-CL)) x CF x IR x FI x EF x ED / (BW x AT)
	ED	Exposure duration	years	6	USEPA, 1991a	6	USEPA, 1991a	
	EF	Exposure frequency	days/year	365	USEPA, 1997	365	USEPA, 1997	
	FI	Fraction ingested from contaminated source	-	1	NYSDEC and NYSDOL,	1	NYSDEC and NYSDOL, 1998a	
	IR	Ingestion rate	g fish/day	8.3	1/3 adult value (Table 4.1)	2.7	1/3 adult value (Table 4.1)	

NA = not applicable

[a]Used to adjust exposure point concentration (EPC) for PCBs and PCDD/PCDFs ingested for central tendency only.

Table 4.3
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic Daily Intake (CDI) (mg/kg-day)=
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 1989	2,920	USEPA, 1989	C x CF x IR x FI x EF x ED / (BW x AT)
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	C	Chemical concentration in fish	mg/kg (wet)	See Table 3.1	NA	See Table 3.1	NA	
	CF	Conversion factor	kg/g	0.001	unit conversion	0.001	unit cnversion	Chronic Daily Intake for PCBs and PCDD/PCDFs[a] (CDI) (mg/kg-day)=
	CL	Cooking loss (PCBs and PCDD/PCDFs only)[a]	unitless	NA	assume no loss for RME	0.33	USEPA, 1997	(C x (1-CL)) x CF x IR x FI x EF x ED / (BW x AT)
	ED	Exposure duration[b]	years	10	USEPA, 1991a; USEPA, 2005	8	USEPA, 1991a; USEPA, 2005	
	EF	Exposure frequency	days/year	365	USEPA, 1997	365	USEPA, 1997	
	FI	Fraction ingested from contaminated source	-	1	NYSDEC and NYSDOL, 1998a	1	NYSDEC and NYSDOL, 1998a	
	IR	Ingestion rate	g fish/day	16.7	2/3 adult value (Table 4.1)	5.3	2/3 adult value (Table 4.1)	

NA = not applicable

[a]Used to adjust exposure point concentration (EPC) for PCBs and PCDD/PCDFs ingested for central tendency only.

[b]The receptor age and exposure durations are modified from earlier EPA (1991a) guidance, based age categories for age-dependent adjustment factors (ADAFs) that are required from EPA (2005) supplemental guidance for assessing susceptibility from early-life exposure to carcinogens; CT for ED is approximately 75% of the RME value in parallel with EPA, 1991 recommendations of 12 and 9 years for RME and CT, respectively.

Table 4.4
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediments
Exposure Medium: Sediment
Exposure Points: Lower Ley Creek, Dredge Spoils Are
Receptor Population: Recreational Visitor
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic Daily Intake (CDI) (mg/kg-day)=
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 1989	3,285	USEPA, 1989	CS x CF x IR x FI x EF x ED / (BW x AT)
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	30	USEPA, 1991a	9	USEPA, 1991a	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	FI	Fraction ingested	-	1	NYSDEC and NYSDOL,	1	NYSDEC and NYSDOL,	
	IR	Ingestion rate	mg soil/day	100	USEPA, 1991a	50	USEPA, 1991a	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic Daily Intake (CDI) (mg/kg-day)=
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	SA	Skin surface area available for contact	cm^2/event	5,700	USEPA, 2004	5,700	USEPA, 2004	
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	0.3	Agency consensus	0.15	Agency consensus	
	EF	Exposure frequency	events/year	143	BPJ[a]	72	BPJ[a]	
	ED	Exposure duration	years	30	USEPA, 2004	9	USEPA, 2004	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 2004	3,285	USEPA, 2004	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific; see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific; see Chapter 4, Table 4-1	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CT assumes half of RME

Table 4.5
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek Dredge Spoils Area
Receptor Population: Recreational Visitor
Receptor Age: Younger Child (<6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 1989	2,190	USEPA, 1989	See Supplemental Table B4.5A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	15	USEPA, 1997. Table 7-3	15	USEPA, 1997. Table 7-3	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	6	USEPA, 1991a	6	USEPA, 1991a	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	FI	Fraction ingested	-	1	NYSDEC, 1998a	1	NYSDEC, 1998a	
	IR	Ingestion rate	mg soil/day	200	USEPA, 1991a	100	USEPA, 1991a	
Dermal	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	2.8	TAMS, 2002b	0.2	USEPA, 2004, Exhibit C-3	See Supplemental Table B4.5A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 2004	2,190	USEPA, 2004	
	BW	Body weight	kg	15	USEPA, 1997	15	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	6	USEPA, 2004	6	USEPA, 2004	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	SA	Skin surface area available for contact	cm^2/event	2,800	USEPA, 2004	2,800	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CT assumes half of RME

Table 4.5a
Values Used for Chronic Daily Intake Calculation (Carcinogens with a Mutagenic Mode of Action)
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek Dredge Spoils Area
Receptor Population: Recreational Visitor
Receptor Age: Young Child (<6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Oral	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic daily intake (CDI) (mg/kg-day) = $\{[IR\text{-}S\text{-}Adj_{(0<2)} \times 10] + [IR\text{-}S\text{-}Adj_{(2<6)} \times 3]\} \times CS \times EF \times CF \times 1/AT$
	IR-S-Adj	Age Adjusted Ingestion Rate of Soil	mg-yr/day-kg	39.7 (0<2 yrs); 49.8 (2 <6 yrs)	calculated from values in Table 4.16	19.8 (0<2 yrs); 24.9 (2 <6 yrs)	calculated from values in Table 4.17	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Dermally Absorbed Dose (DAD, mg/kg-day) = $\{[SSAF\text{-}Adj_{(0<2)} \times 10] + [SSAF\text{-}adj_{(2<6)} \times 3]\} \times ABS \times CS \times CF \times EF \times 1/AT$
	SSAF-Adj (<6)	Age Adjusted Soil to Skin Adherence Factor	mg-yr/day-kg	1702.7 (0<2 yrs); 2375.3 (2 <6 yrs)	calculated from values in Table 4.16	103.2 (0<2 yrs); 144.0 (2 <6 yrs)	calculated from values in Table 4.17	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CT assumes half of RME

Table 4.6
Values Used for Daily Intake Calculation
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek Dredge Spoils Area
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16 yrs)[a]

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 1989	2,920	USEPA, 1989	See Supplemental Table B4.6A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration[a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	EF	Exposure frequency	days/year	143	BPJ[b]	72	BPJ[b]	
	FI	Fraction ingested	-	1	NYSDEC, 1998a	1	NYSDEC, 1998a	
	IR	Ingestion rate	mg soil/day	100	USEPA, 1991a	50	USEPA, 1991a	
Dermal	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	3.3	USEPA, 2004, Exhibit C-3	0.2	USEPA, 2004, Exhibit C-3	See Supplemental Table B4.6A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 2004	2,920	USEPA, 2004	
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration [a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	EF	Exposure frequency	days/year	143	BPJ[b]	72	BPJ[b]	
	SA	Skin surface area available for contact	cm^2/event	5,400	USEPA, 1997, 2004	5,400	USEPA, 1997,	

NA = not applicable

[a]The receptor age and exposure durations are modified from earlier EPA (1997a) guidance, based age categories for age-dependent adjustment factors (ADAFs) that are required from EPA (2005) supplemental guidance for assessing susceptibility from early-life exposure to carcinogens; CT for ED is approximately 75% of the RME value in parallel with EPA, 1991 recommendations of 12 and 9 years for RME and CT, respectively.

[b]Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CT assumes half of RME

Table 4.6a
Values Used for Chronic Daily Intake Calculation (Carcinogens with a Mutagenic Mode of Action)
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek Dredge Spoils Area
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Oral	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic daily intake (CDI) (mg/kg-day) = CS x IR-S-Adj$_{(6\text{-}16)}$ x 3 x EF x CF x 1/AT
	IR-S-Adj	Age Adjusted Ingestion Rate of Soil	mg-yr/day-kg	28.1	calculated from values in Table 4.16	14	calculated from values in Table 4.17	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Dermally Absorbed Dose (DAD, mg/kg-day) = CS x SSAF-Adj$_{(6\text{-}16)}$ x 3 x ABS x CF x EF x 1/AT
	SSAF-Adj	Age Adjusted Soil to Skin Adherence Factor	mg-yr/day-kg	3574.9	calculated from values in Table 4.16	216.7	calculated from values in Table 4.17	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CT assumes half of RME

Table 4.7
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Timeframe: Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek Dredge Spoils Area
Receptor Population: Construction worker
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	730	USEPA, 1989	730	USEPA, 1989	
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.3	NA	See Table 3.3	NA	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	EF	Exposure frequency	days/year	25	BPJ[a]	10	BPJ[a]	
	FI	Fraction ingested	-	1	BPJ[a]	1	BPJ[a]	
	IR	Ingestion rate	mg soil/day	330	USEPA, 2001b	330	USEPA, 2001b	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.3	NA	See Table 3.3	NA	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	SA	Skin surface area available for contact	cm^2/event	5,700	USEPA, 2004	5,700	USEPA, 2004	
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	0.9[b]	USEPA, 2004	0.2[b]	USEPA, 2004	
	EF	Exposure frequency	days/year	25	BPJ[a]	10	BPJ[a]	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	730	USEPA, 2004	730	USEPA, 2004	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgment (BPJ)

[b]AF for construction worker based on 95th percentile (for RME) and geometric mean (CT) for utility workers (USEPA, 2004, Exhibit 3-3)

Table 4.8
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Sediments
Exposure Medium: Sediment
Exposure Points: Lower Ley Creek, Instream Sediment
Receptor Population: Recreational Visitor
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic Daily Intake (CDI) (mg/kg-day)=
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 1989	3,285	USEPA, 1989	CS x CF x IR x FI x EF x ED / (BW x AT)
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	30	USEPA, 1991a	9	USEPA, 1991a	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	FI	Fraction ingested	-	1	NYSDEC and NYSDOL,	1	NYSDEC and NYSDOL,	
	IR	Ingestion rate	mg soil/day	100	USEPA, 1991a	50	USEPA, 1991a	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic Daily Intake (CDI) (mg/kg-day)=
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	SA	Skin surface area available for contact	cm^2/event	5,700	USEPA, 2004	5,700	USEPA, 2004	
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	0.3	Agency consensus	0.15	Agency consensus	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	ED	Exposure duration	years	30	USEPA, 2004	9	USEPA, 2004	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 2004	3,285	USEPA, 2004	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific; see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific; see Chapter 4, Table 4-1	USEPA, 2004	

NA = not applicable
[a]Based on best professional judgement (BPJ)

Table 4.9
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Points: Lower Ley Creek, Instream Sediment
Receptor Population: Recreational Visitor
Receptor Age: Young Child (<6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 1989	2,190	USEPA, 1989	See Supplemental Table B4.9A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	15	USEPA, 1997. Table 7-3	15	USEPA, 1997. Table 7-3	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	6	USEPA, 1991a	6	USEPA, 1991a	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	FI	Fraction ingested	-	1	NYSDEC, 1998a	1	NYSDEC, 1998a	
	IR	Ingestion rate	mg soil/day	200	USEPA, 1991a	100	USEPA, 1991a	
Dermal	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	2.8	TAMS, 2002b	0.2	USEPA, 2004, Exhibit C-3	See Supplemental Table B4.9A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 2004	2,190	USEPA, 2004	
	BW	Body weight	kg	15	USEPA, 1997a,b	15	USEPA, 1997a,b	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	6	USEPA, 2004	6	USEPA, 2004	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	SA	Skin surface area available for contact	cm^2/event	2,800	USEPA, 2004	2,800	USEPA, 2004	

NA = not applicable
[a]Based on best professional judgement (BPJ)

Table 4.9a
Values Used for Chronic Daily Intake Calculation (Carcinogens with a Mutagenic Mode of Action)
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek, Instream Sediment
Receptor Population: Recreational Visitor
Receptor Age: Young Child (<6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Oral	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic daily intake (CDI) (mg/kg-day) =
	IR-S-Adj	Age Adjusted Ingestion Rate of Soil	mg-yr/day-kg	39.7 (0<2 yrs); 49.8 (2 <6 yrs)	calculated from values in Table 4.16	19.8 (0<2 yrs); 24.9 (2 <6 yrs)	calculated from values in Table 4.17	$\{[\text{IR-S-Adj}_{(0<2)} \times 10] + [\text{IR-S-Adj}_{(2<6)} \times 3]\} \times \text{CS} \times \text{EF} \times \text{CF} \times 1/\text{AT}$
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Dermally Absorbed Dose (DAD, mg/kg-day) =
	SSAF-Adj	Age Adjusted Soil to Skin Adherence Factor	mg-yr/day-kg	1702.7 (0<2 yrs); 2375.3 (2 <6 yrs)	calculated from values in Table 4.16	103.2 (0<2 yrs); 144.0 (2 <6 yrs)	calculated from values in Table 4.17	$\{[\text{SSAF-Adj}_{(0<2)} \times 10] + [\text{SSAF-adj}_{(2<6)} \times 3]\} \times \text{ABS} \times \text{CS} \times \text{CF} \times \text{EF} \times 1/\text{AT}$
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	

NA = not applicable
[a]Based on best professional judgement (BPJ)

Table 4.10
Values Used for Daily Intake Calculation
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Points: Lower Ley Creek, Instream Sediment
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16 yrs)[a]

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 1989	2,920	USEPA, 1989	See Supplemental Table B4.10A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration [a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	EF	Exposure frequency	days/year	44	BPJ[b]	32	BPJ[b]	
	FI	Fraction ingested	-	1	NYSDEC, 1998a	1	NYSDEC, 1998a	
	IR	Ingestion rate	mg soil/day	100	USEPA, 1991a	50	USEPA, 1991a	
Dermal	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	3.3	USEPA, 2004, Exhibit C-3	0.2	USEPA, 2004, Exhibit C-3	See Supplemental Table B4.10A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 2004	2,920	USEPA, 2004	
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration [a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	EF	Exposure frequency	days/year	44	BPJ[b]	32	BPJ[b]	
	SA	Skin surface area available for contact	cm^2/event	5,400	USEPA, 1997, 2004	5,400	USEPA, 1997,	

NA = not applicable

[a]The receptor age and exposure durations are modified from earlier EPA (1997a) guidance, based age categories for age-dependent adjustment factors (ADAFs) that are required from EPA (2005) supplemental guidance for assessing susceptibility from early-life exposure to carcinogens; CT for ED is approximately 75% of the RME value in parallel with EPA, 1991 recommendations of 12 and 9 years for RME and CT, respectively.

[b]Based on best professional judgement (BPJ)

Table 4.10a
Values Used for Chronic Daily Intake Calculation (Carcinogens with a Mutagenic Mode of Action)
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Point: Lower Ley Creek, Instream Sediment
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Oral	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic daily intake (CDI) (mg/kg-day) = CS x IR-S-Adj$_{(6-16)}$ x 3 x EF x CF x 1/AT
	IR-S-Adj	Age Adjusted Ingestion Rate of Soil	mg-yr/day-kg	28.1	calculated from values in Table 4.16	14	calculated from values in Table 4.17	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Dermally Absorbed Dose (DAD, mg/kg-day) = CS x SSAF-Adj$_{(6-16)}$ x 3 x ABS x CF x EF x 1/AT
	SSAF-Adj	Age Adjusted Soil to Skin Adherence Factor	mg-yr/day-kg	3574.9	calculated from values in Table 4.16	216.7	calculated from values in Table 4.17	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	

NA = not applicable
[a]Based on best professional judgement (BPJ)

Table 4.11
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Timeframe: Future
Medium: Surface Sediments
Exposure Medium: Sediment
Exposure Points: Lower Ley Creek, Instream Sediment
Receptor Population: Construction worker
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989b	25,550	USEPA, 1989b	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	730	USEPA, 1989b	730	USEPA, 1989b	
	BW	Body weight	kg	70	USEPA, 1991a	70	USEPA, 1991a	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in sediment	mg/kg	See Table 3.3	NA	See Table 3.3	NA	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	EF	Exposure frequency	days/year	25	BPJ[a]	10	BPJ[a]	
	FI	Fraction ingested	-	1	BPJ[a]	1	BPJ[a]	
	IR	Ingestion rate	mg soil/day	330	USEPA, 2001b	330	USEPA, 2001b	
Dermal	CS	Chemical concentration in sediment	mg/kg	See Table 3.3	NA	See Table 3.3	NA	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	SA	Skin surface area available for contact	cm^2/event	5,700	USEPA, 2004	5,700	USEPA, 2004	
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	0.9[b]	USEPA, 2004	0.2[b]	USEPA, 2004	
	EF	Exposure frequency	days/year	25	BPJ[a]	10	BPJ[a]	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	730	USEPA, 2004	730	USEPA, 2004	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	Chemical-specific, see Chapter 4, Table 4-1	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgment (BPJ)

[b]AF for construction worker based on 95th percentile (for RME) and geometric mean (CT) for utility workers (USEPA, 2004, Exhibit 3-3)

Table 4.12
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time frame: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Lower Ley Creek
Receptor Population: Recreational
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CW x CF x IR x EF x ED x ET / (BW x AT)
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 1989	3,285	USEPA, 1989	
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	Please note that it is not necessary to cons
	CF	Conversion factor	L/mL	0.001	unit conversion	0.001	unit conversion	
	CW	Chemical concentration in surface water	mg/L	See Table 3.4	NA	See Table 3.4	NA	
	ED	Exposure duration	years	30	USEPA, 1989	9	USEPA, 1989	
	EF	Exposure frequency	events/year	44	BPJ[a]	32	BPJ[a]	
	ET	Exposure time[b]	hours/event	2.6	USEPA, 1997	1	USEPA, 1989	
	IR	Ingestion rate	mL/hour	50	USEPA, 1989	50	USEPA, 1989	
Dermal	CW	Chemical concentration in surface water	mg/kg	See Table 3.4	NA	See Table 3.4	NA	Chronic daily intake (CDI) (mg/kg-day) = DA(event) x SA x EF x ED x EV / (BW x AT)
	DA(event)	Absorbed dose per event	mg/cm^2-event	calculated	USEPA, 2004	calculated	USEPA, 2004	See Table 4-2 for equations and variables
	SA	Skin surface area available for contact	cm^2	18,000	USEPA, 2004	18,000	USEPA, 2004	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	ED	Exposure duration	years	30	USEPA, 1989	9	USEPA, 1989	
	ET	Exposure time[b]	hours/day	2.6	USEPA, 1997	1	USEPA, 1989	
	EV	Event frequency	events/day	1	USEPA, 2004	1	USEPA, 2004	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 2004	3,285	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgment (BPJ)

[b]Exposure time for RME is 2.6 hours based on swimming, average value, presented in RAGS Part A (USEPA, 1989). CT value from USEPA, 1997a, Table 15-176.

Table 4.13
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time frame: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Lower Ley Creek
Receptor Population: Recreational
Receptor Age: Younger Child (<6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CW x CF x IR x EF x ED x ET / (BW x AT)
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 1989	2,190	USEPA, 1989	
	BW	Body weight	kg	15	USEPA, 1997	15	USEPA, 1997	
	CF	Conversion factor	L/mL	0.001	unit conversion	0.001	unit conversion	
	CW	Chemical concentration in surface water	mg/L	See Table 3.4	NA	See Table 3.4	NA	
	ED	Exposure duration	years	6	USEPA, 1989	6	USEPA, 1989	
	EF	Exposure frequency	events/year	44	BPJa	32	BPJ[a]	
	ET	Exposure time[b]	hours/event	2.6	USEPA, 1997	1	USEPA, 1989	
	IR	Ingestion rate	mL/hour	50	USEPA, 1989	50	USEPA, 1989	
Dermal	CW	Chemical concentration in surface water	mg/kg	See Table 3.4	NA	See Table 3.4	NA	Chronic daily intake (CDI) (mg/kg-day) = DA(event) x SA x EF x ED x EV / (BW x AT)
	DA(event)	Absorbed dose per event	mg/cm^2-event	calculated	USEPA, 2004	calculated	USEPA, 2004	See Table 4-2 for equations and variables
	SA	Skin surface area available for contact	cm^2	6,600	USEPA, 2004	6,600	USEPA, 2004	
	EF	Exposure frequency	days/year	44	BPJ[a]	32	BPJ[a]	
	ED	Exposure duration	years	6	USEPA, 1989	6	USEPA, 1989	
	ET	Exposure time[b]	hours/day	2.6	USEPA, 1997	1	USEPA, 1997	
	EV	Event frequency	events/day	1	USEPA, 2004	1	USEPA, 2004	
	BW	Body weight	kg	15	USEPA, 2004	15	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 2004	2,190	USEPA, 2004	

NA = not applicable

[a]Based on best professional judgment (BPJ)

[b]Exposure time for RME is 2.6 hours based on swimming, average value, presented in RAGS Part A (USEPA, 1989). CT value from USEPA, 1997a, Table 15-176.

Table 4.14
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time frame: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Lower Ley Creek
Receptor Population: Recreational
Receptor Age: Older Child (6 to <16 yrs)[a]

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CW x CF x IR x EF x ED x ET / (BW x AT)
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 1989	2,920	USEPA, 1989	See Supplemental Table B4.13A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	L/mL	0.001	unit conversion	0.001	unit conversion	
	CW	Chemical concentration in surface water	mg/L	See Table 3.4	NA	See Table 3.4	NA	
	ED	Exposure duration[a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997a; USEPA, 2005	
	EF	Exposure frequency	events/year	44	BPJ[b]	32	BPJ[b]	
	ET	Exposure time[c]	hours/event	2.6	USEPA, 1997	1	USEPA, 1989	
	IR	Ingestion rate	mL/hour	50	USEPA, 1989	50	USEPA, 1989	
Dermal	CW	Chemical concentration in surface water	mg/kg	See Table 3.4	NA	See Table 3.4	NA	Chronic daily intake (CDI) (mg/kg-day) = DA(event) x SA x EF x ED x EV / (BW x AT)
	DA(event)	Absorbed dose per event	mg/cm^2-event	calculated	USEPA, 2004	calculated	USEPA, 2004	See Table 4-2 for equations and variables
	SA	Skin surface area available for contact	cm^2	13,000	USEPA, 2004	13,000	USEPA, 2004	See Supplemental Table B4.13A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	EF	Exposure frequency	days/year	44	BPJ[b]	32	BPJ[b]	
	ED	Exposure duration[a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	ET	Exposure time[c]	hours/day	2.6	USEPA, 1997	1	USEPA, 1989	
	EV	Event frequency	events/day	1	USEPA, 2004	1	USEPA, 2004	
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 2004	2,920	USEPA, 2004	

NA = not applicable

[a]The receptor age and exposure durations are modified from earlier EPA (1997a) guidance, based age categories for age-dependent adjustment factors (ADAFs) that are required from EPA (2005) supplemental guidance for assessing susceptibility from early-life exposure to carcinogens; CT is approximately 75% of the RME value in parallel with EPA, 1991 recommendations of 12 and 9 years for RME and CT, respectively.

[b]Based on best professional judgment (BPJ)

[c]Exposure time for RME is 2.6 hours based on swimming, average value, presented in RAGS Part A (USEPA, 1989). CT value from USEPA, 1997a, Table 15-176.

Table 4.15
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time frame: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Lower Ley Creek
Receptor Population: Construction Worker
Receptor Age: Adult (>16 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CW x CF x IR x EF x ED x ET / (BW x AT)
	AT	Averaging time - non-carcinogens	days	730	USEPA, 1989	730	USEPA, 1989	
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	CF	Conversion factor	L/mL	0.001	unit conversion	0.001	unit conversion	
	CW	Chemical concentration in surface water	mg/L	See Table 3.4	NA	See Table 3.4	NA	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	EF	Exposure frequency	events/year	25	BPJ[a]	10	BPJ[a]	
	ET	Exposure time	hours/event	1	BPJ[a]	0.5	BPJ[a]	
	IR	Ingestion rate	mL/hour	12	BPJ[a]	12	BPJ[a]	
Dermal	CW	Chemical concentration in surface water	mg/kg	See Table 3.4	NA	See Table 3.4	NA	Chronic daily intake (CDI) (mg/kg-day) = DA(event) x SA x EF x ED x EV / (BW x AT)
	DA(event)	Absorbed dose per event	mg/cm^2-event	calculated	USEPA, 2004	calculated	USEPA, 2004	See Table 4-3 for equations and variables
	SA	Skin surface area available for contact	cm^2	5,700	USEPA, 2004	5,700	USEPA, 2004	
	EF	Exposure frequency	days/year	25	BPJ[a]	10	BPJ[a]	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	ET	Exposure time	hours/day	1	BPJ[a]	0.5	BPJ[a]	
	EV	Event frequency	events/day	1	USEPA, 2004	1	USEPA, 2004	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	730	USEPA, 2004	730	USEPA, 2004	

NA = not applicable
[a]Based on best professional judgment (BPJ)

Table 4.16
Age-Adjusted Exposure Factors for Sediment Exposures (RME)
Lower Ley Creek

				Dermal		Age-Adjusted Exposure Factors			
Age (year)	ED (year)	BW [1] (kg)	Soil IR-S [2] (mg/day)	Soil SSAF [3] (mg/cm2-event)	Exposed SA [4] (cm2)	Total SA [5] (cm2)	Age Group	Sediment IR-S-Adj (mg-yr/day-kg)	Sediment SSAF-Adj (mg-yr/day-kg)
0	1	9.1	200	3.3	2625	5910	0-< 2 yrs	39.7	1702.7
1	1	11.3	200	3.3	2571	5910			
2	1	13.3	200	3.3	2434	5910	2-< 6 yrs	49.8	2375.3
3	1	15.3	200	3.3	2893	6565			
4	1	17.4	200	3.3	3175	7185			
5	1	19.7	200	3.3	3255	7860			
6	1	22.6	100	3.3	2949	8545	6-<16 yrs	28.1	3574.9
7	1	24.9	100	3.3	3182	9265			
8	1	28.1	100	3.3	3434	10000			
9	1	31.5	100	3.3	3657	10650			
10	1	36.3	100	3.3	3819	11750			
11	1	41.1	100	3.3	4111	12650			
12	1	45.3	100	3.3	4453	13700			
13	1	50.4	100	3.3	4916	14750			
14	1	56	100	3.3	5205	15800			
15	1	58.1	100	3.3	5386	16350			
16	1	62.6	100	0.3	5534	16800	>16 yrs	20.7	352.3
17	1	63.2	100	0.3	5641	17150			
18	1	65.1	100	0.3	5700	18000			
19	1	66	100	0.3	5700	18000			
20	1	67.2	100	0.3	5700	18000			
21	1	67.2	100	0.3	5700	18000			
22	1	67.2	100	0.3	5700	18000			
23	1	67.2	100	0.3	5700	18000			
24	1	67.2	100	0.3	5700	18000			
25	1	71.5	100	0.3	5700	18000			
26	1	71.5	100	0.3	5700	18000			
27	1	71.5	100	0.3	5700	18000			
28	1	71.5	100	0.3	5700	18000			
29	1	71.5	100	0.3	5700	18000			

Equations and Definitions:

IR-S-Adj (mg-yr/day-kg) = Σ [(ED * IR-S)/BW] SSAF-Adj (mg-yr/day-kg) = Σ [(ED * EV * SSAF * SA)/BW]

ED = Exposure duration BW = Body Weight IR-S = Ingestion rate for soil

SA = Skin surface area EV = Event frequency = 1/day SSAF = Soil-to-skin adherence factor

References

[1] EPA 1997. Exposure factors handbook. Tables 7-2 (adults) and 7-3 (children), mean. Values are man of male and female. Source National Center of Health Statistics (NCHS).

[2] EPA 1991. Standard default exposure factors. Default for resident child and adult.

[3]As assumed in previous tables.

[4] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Calculated from Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6, 6-7 and 6-8. Surface area of head, forearms, hands, lower legs and feet (for child < 6 years); feet excluded from surface area calculation for > 6 years. Surface area for > 18 is recommended default for adult resident

[5] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6 and 6-7. Total body surface area (50th percentile).

Table 4.17
Age-Adjusted Exposure Factors for Sediment Exposure (CT)
Lower Ley Creek

			Oral	Dermal			Age-Adjusted Exposure Factors		
Age (year)	ED (year)	BW [1] (kg)	Soil IR-S [2] (mg/day)	Soil SSAF [3] (mg/cm2-event)	Exposed SA [4] (cm2)	Total SA [5] (cm2)	Age Group	Sediment IR-S-Adj (mg-yr/day-kg)	Sediment SSAF-Adj (mg-yr/day-kg)
0	1	9.1	100	0.2	2625	5910	0-< 2 yrs	19.8	103.2
1	1	11.3	100	0.2	2571	5910			
2	1	13.3	100	0.2	2434	5910	2-< 6 yrs	24.9	144.0
3	1	15.3	100	0.2	2893	6565			
4	1	17.4	100	0.2	3175	7185			
5	1	19.7	100	0.2	3255	7860			
6	1	22.6	50	0.2	2949	8545	6-<16 yrs	14.0	216.7
7	1	24.9	50	0.2	3182	9265			
8	1	28.1	50	0.2	3434	10000			
9	1	31.5	50	0.2	3657	10650			
10	1	36.3	50	0.2	3819	11750			
11	1	41.1	50	0.2	4111	12650			
12	1	45.3	50	0.2	4453	13700			
13	1	50.4	50	0.2	4916	14750			
14	1	56	50	0.2	5205	15800			
15	1	58.1	50	0.2	5386	16350			
16	1	62.6	50	0.15	5534	16800	>16 yrs	10.3	176.1
17	1	63.2	50	0.15	5641	17150			
18	1	65.1	50	0.15	5700	18000			
19	1	66	50	0.15	5700	18000			
20	1	67.2	50	0.15	5700	18000			
21	1	67.2	50	0.15	5700	18000			
22	1	67.2	50	0.15	5700	18000			
23	1	67.2	50	0.15	5700	18000			
24	1	67.2	50	0.15	5700	18000			
25	1	71.5	50	0.15	5700	18000			
26	1	71.5	50	0.15	5700	18000			
27	1	71.5	50	0.15	5700	18000			
28	1	71.5	50	0.15	5700	18000			
29	1	71.5	50	0.15	5700	18000			

Equations and Definitions:

IR-S-Adj (mg-yr/day-kg) = Σ [(ED * IR-S)/BW] SSAF-Adj (mg-yr/day-kg) = Σ [(ED * EV * SSAF * SA)/BW]

ED = Exposure duration BW = Body Weight IR-S = Ingestion rate for soil

SA = Skin surface area EV = Event frequency = 1/da SSAF = Soil-to-skin adherence factor

References:

[1] EPA 1997. Exposure factors handbook. Tables 7-2 (adults) and 7-3 (children), mean. Values are man of male and female. Source National Center of Health Statistics (NCHS).

[2] EPA 1991. Standard default exposure factors. Default for resident child and adult.

[3]As assumed in previous tables.

[4] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Calculated from Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6, 6-7 and 6-8. Surface area of head, forearms, hands, lower legs and feet (for child < 6 years); feet excluded from surface area calculation for > 6 years. Surface area for > 18 is recommended default for

[5] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6 and 6-7. Total body surface area (50th percentile).

Table 4.18
Dermal and Gastrointestinal Absorption Factors for Chemicals of Potential Concern in Sediments[a]

Chemical of Potential Concern	Dermal Absorption Factor (ABS)	Assess Quantitatively?
3,4-Dihydrocyclopenta(cd)pyrene (acepyrene)		No
3-Methylcholanthrene		No
4H-Cyclopenta[def]phenanthrene		No
Aldrin	0.1	Yes
ALUMINUM		No
Aroclor-1242	0.14	Yes
Aroclor-1248	0.14	Yes
Aroclor-1260	0.14	Yes
Benzene		No
ARSENIC	0.03	Yes
Benzo(a)anthracene	0.13	Yes
Benzo(a)pyrene	0.13	Yes
Benzo(b)fluoranthene	0.13	Yes
Benzo[j]fluoranthene	0.13	Yes
Benzo(k)fluoranthene	0.13	Yes
Benzo[e]pyrene	0.13	Yes
Benzo[j]fluoranthene	0.13	Yes
Carbazole		No
Chloroxylenol		No
CADMIUM	0.001	Yes
CHROMIUM		No
Chrysene	0.13	Yes
COBALT		No
COPPER		No
Dibenzo(a,h)anthracene	0.13	Yes
Dibenzofuran	0.1	Yes
Dieldrin	0.1	Yes
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	0.14	Yes
1,2,3,4,6,7,8-HpCDD	0.03	Yes
1,2,3,4,6,7,8-HpCDF	0.03	Yes
1,2,3,4,7,8,9-HpCDF	0.03	Yes
1,2,3,4,7,8-HxCDD	0.03	Yes
1,2,3,4,7,8-HxCDF	0.03	Yes
1,2,3,6,7,8-HxCDD	0.03	Yes
1,2,3,6,7,8-HxCDF	0.03	Yes
1,2,3,7,8,9-HxCDD	0.03	Yes
1,2,3,7,8,9-HxCDF	0.03	Yes
1,2,3,7,8-PeCDD	0.03	Yes
1,2,3,7,8-PeCDF	0.03	Yes
2,3,4,6,7,8-HxCDF	0.03	Yes
2,3,4,7,8-PeCDF	0.03	Yes
2,3,7,8-TCDD	0.03	Yes
2,3,7,8-TCDF	0.03	Yes
OCDD	0.03	Yes
OCDF	0.03	Yes
Total HxCDD	0.03	Yes
Heptachlor	0.1	Yes
Indeno(1,2,3-cd)pyrene	0.13	Yes
IRON		No
LEAD		No
MANGANESE		No
MERCURY		No
Naphthalene	0.13	Yes
NICKEL		No
Perylene	0.13	Yes
VANADIUM		No
Vinyl Chloride		No

[a] Source is USEPA Region III Regional Screening Values table for Residential Soils, December 2009; blank entries have no listed values; chemicals with no ABS are not evaluated quantitatively.

Table 4.19

Chemical-specific Values for Estimating Absorbed Dose per Event (DA_{event}) for Chemicals of Potential Concern in Surface Water[a] for Recreational Visitors

Chemical of Potential Concern	K_p (cm/hr)	K_p Source[b]	FA[c]	t_{event} (hr)[d]		t* (hr)[e]	τ (hr/event)[f]	B[g]	Equation for DA_{event} (mg/cm2-event)	
				CT	RME				CT	RME
ARSENIC	1.00E-03	default		1	2.6				C x K_p x t_{event}	C x K_p x t_{event}
Benzo(b)fluoranthene	NA[h]	NA[h]	NA[h]	1	2.6	NA[h]	NA[h]	NA[h]	NA[h]	NA[h]
CHROMIUM	2.00E-03	predicted		1	2.6				C x K_p x t_{event}	C x K_p x t_{event}
MANGANESE	1.00E-03	default		1	2.6				C x Kp x t_{event}	C x K_p x t_{event}
Naphthalene	4.70E-02	predicted	1	1	2.6	1.34	0.56	0.2	2FA x K_p x C(sq root of ((6τ x t_{event})/π))	FA x K_p x C x [((t_{event}/(1+B)) +2t_{event}((1+3B+3B^2)/(1+B)^2)]
Pentachlorophenol	NA[h]	NA[h]	NA[h]	1	2.6	NA[h]	NA[h]	NA[h]	NA[h]	NA[h]
VANADIUM	1.00E-03	default		1	2.6				C x K_p x t_{event}	C x K_p x t_{event}
Vinyl chloride	5.60E-03	predicted	1	1	2.6	0.57	0.24	0	FA x K_p x C x [((t_{event}/(1+B)) +2t_{event}((1+3B+3B^2)/(1+B)^2)]	FA x K_p x C x [((t_{event}/(1+B)) +2t_{event}((1+3B+3B^2)/(1+B)^2)]

[a] All equations and values are those recommendedby RAGS Part E (USEPA, 2004) and the Exposure Factors Handbook (USEPA, 1997).

[b] USEPA (2004) Exhibits 3-1 and B-2.

[c] Fraction Absorbed (dimensionless); Exhibit B-3, USEPA (2004).

[d] Event duration.

[e] Time to reach steady-state; Exhibit B-3, USEPA (2004).

[f] Lag-time per event; Exhibit B-3, USEPA (2004).

[g] Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient through a viable epidermis; Exhibit B-3, USEPA (2004).

[h] Not Applicable; USEPA (2004) recommends against quantitative assessment of dermal absorption from water because the Kp for this compound is outside of the effective prediction domain.

C = RME Concentration in Water (Table 3.4)

Table 4.20

Chemical-specific Values for Estimating Absorbed Dose per Event (DA_{event}) for Chemicals of Potential Concern in Surface Water[a] for Construction Workers

Chemical of Potential Concern	K_p (cm/hr)	K_p Source[b]	FA[c]	t_{event} (hr)[d]		t* (hr)[e]	τ (hr/event)[f]	B[g]	Equation for DA_{event} (mg/cm2-event)	
				CT	RME				CT	RME
ARSENIC	1.00E-03	default		0.5	1				C x K_p x t_{event}	C x K_p x t_{event}
Benzo(b)fluoranthene	NA[h]	NA[h]	NA[h]	0.5	1	NA[h]	NA[h]	NA[h]	NA[h]	NA[h]
CHROMIUM	2.00E-03	predicted		0.5	1				C x K_p x t_{event}	C x K_p x t_{event}
MANGANESE	1.00E-03	default		0.5	1				C x Kp x t_{event}	C x K_p x t_{event}
Naphthalene	4.70E-02	predicted	1	0.5	1	1.34	0.56	0.2	2FA x K_p x C(sq root of ((6τ x t_{event})/π))	2FA x K_p x C(sq root of ((6τ x t_{event})/π))
Pentachlorophenol	NA[h]	NA[h]	NA[h]	0.5	1	NA[h]	NA[h]	NA[h]	NA[h]	NA[h]
VANADIUM	1.00E-03	default		0.5	1				C x K_p x t_{event}	C x K_p x t_{event}
Vinyl chloride	5.60E-03	predicted	1	0.5	1	0.57	0.24	0	NA[i]	NA[i]

[a] All equations and values are those recommendedby RAGS Part E (USEPA, 2004) and the Exposure Factors Handbook (USEPA, 1997)

[b] Dermal permeability constants from USEPA (2004); a default value of 1E-03 is recommended for inorganics and ionized organics; predicted values are from Exhibit B-2

[c] Fraction Absorbed (dimensionless); Exhibit B-3, USEPA (2004)

[d] Event duration

[e] Time to reach steady-state; Exhibit B-3, USEPA (2004)

[f] Lag-time per event; Exhibit B-3, USEPA (2004)

[g] Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient through a viable epidermis; Exhibit B-3, USEPA (2004)

[h] Not Applicable; USEPA (2004) recommends against quantitative assessment of dermal absorption from water for this compound because the Kp for this compound is outside of the effective prediction domain

[i] Not Assessed quantitatively; the dose from dermal expousre is predicted to be <10% of the dose due to ingestion (USEPA, 2004, Exhibit B-3)

C = RME Concentration in Water (Appendix B, Table B3.4)

8.5 Series 5 Tables

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Ley Creek

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD : Target Organ(s)	
			Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	32598-13-3		--	--	--	--	--	--	--	--	--
3-Methylcholanthrene	56-49-5		--	--	--	--	--	--	--	--	--
Aldrin	309-00-2		3.0E-05	mg/kg-day	1	3E-05	mg/kg-day	liver	1000 / 1	I	3/1/1988
Aluminum	7429-90-5		1.0E+00	mg/kg-day	1	1E+00	mg/kg-day	CNS		P	
Antimony	7440-36-0	Chronic	4.0E-04	mg/kg-day	0.15	3E-03	mg/kg-day	blood	1000 / 1	I	2/1/1991
Aroclor-1242 [2]	53469-21-9		7.0E-05	mg/kg-day	1	7E-05	mg/kg-day	--	--	--	--
Aroclor-1248 [1]	12672-29-6		2.0E-05	mg/kg-day	1	2E-05	mg/kg-day	--	--	--	--
Aroclor-1254	11097-69-1		2.0E-05	mg/kg-day	1	2E-05	mg/kg-day		300 / 1	I	11/1/1996
Aroclor-1260 [1]	11096-82-5		2.0E-05	mg/kg-day	1	2E-05	mg/kg-day	--	--	--	--
Arsenic	7440-38-2	Chronic	3.0E-04	mg/kg-day	1	3E-04	mg/kg-day	skin	3 / 1	I	2/1/1993
Benzene	71-43-2	Chronic	4.0E-03	mg/kg-day	1	4E-03	mg/kg-day	blood	300 / 1	I	4/17/2003
Benzo(a)anthracene	56-55-3		--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8		--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2		--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9		--	--	--	--	--	--	--	--	--
Benzo[j]fluoranthene	205-82-3		--	--	--	--	--	--	--	--	--
Cadmium (Water)	7440-43-9	Chronic	5.0E-04	mg/kg-day	0.05	1E-02	mg/kg-day	kidney	10 / 1	I	2/1/1994
Chromium IV	18540-29-9		3.0E-03	mg/kg-day	0.025	1E-01	mg/kg-day	GI	300 / 3	I	9/3/1998
Chrysene	218-01-9		--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4		3.0E-04	mg/kg-day	1	3E-04	mg/kg-day	thyroid		P	
Copper	7440-50-8	Chronic	4.0E-02	mg/kg-day	1	4E-02	mg/kg-day	GI		H	
Dibenzo(a,h)anthracene	53-70-3	Chronic	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9		1.0E-03	mg/kg-day	1	1E-03	mg/kg-day			X	
Dieldrin	60-57-1	Chronic	5.0E-05	mg/kg-day	1	5E-05	mg/kg-day	liver	100 / 1	I	9/1/1990
Total D/F, as TEQ	1746-01-6		1.0E-09	mg/kg-day	1	1E-09	mg/kg-day			A	
Heptachlor	76-44-8		5.0E-04	mg/kg-day	1	5E-04	mg/kg-day	liver	300 / 1	I	3/1/1991
Heptachlor epoxide	1024-57-3		1.3E-05	mg/kg-day	1	1E-05	mg/kg-day	liver	1000 / 1	I	3/1/1991
Indeno(1,2,3-cd)pyrene	193-39-5	Chronic	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	Chronic	7.0E-01	mg/kg-day	1	7E-01	mg/kg-day	GI	1.5	P	11/11/2007
Lead	7439-92-1	Chronic	--	--	--	--	--	--	--	--	--
Manganese (Water)	7439-96-5	Chronic	2.4E-02	mg/kg-day	0.04	6E-01	mg/kg-day	CNS	1 / 1	I	5/1/1996
Mercuric Chloride	7487-94-7	Chronic	3.0E-04	mg/kg-day	0.07	4E-03	mg/kg-day	developmental	1000 / 1	I	5/1/1995
Methyl Mercury	22967-92-6		1.0E-04	mg/kg-day	1	1E-04	mg/kg-day	developmental	10 / 1	I	7/27/2001
Naphthalene	91-20-3		2.0E-02	mg/kg-day	1	2E-02	mg/kg-day		3000 / 1	I	9/17/1998
Nickel	7440-02-0	Chronic	2.0E-02	mg/kg-day	0.04	5E-01	mg/kg-day	whole body	300 / 1	I	12/1/1996

Pentachlorophenol	87-86-5		3.0E-02	mg/kg-day	1	3E-02	mg/kg-day	liver/kidney	100 / 1	I	2/1/1993
Selenium	7782-49-2		5.0E-03	mg/kg-day	1	5E-03	mg/kg-day		3 / 1	I	9/1/1991
Vanadium	7440-62-2	Chronic	7.0E-05	mg/kg-day	0.026	3E-03	mg/kg-day	kidney		P	
Vinyl chloride	75-01-4		3.0E-03	mg/kg-day	1	3E-03	mg/kg-day	liver	30 / 1	I	8/7/2000
Zinc	7440-66-6		3.0E-01	mg/kg-day	1	3E-01	mg/kg-day	blood	3	I	8/3/2005

Sources: A = ATSDR; H = HEAST; I = IRIS; P = PPRTV; X = PPRTV Appendix

[1]Reference doses were not available for Aroclors 1248 or 1260. RfD based on Aroclor 1254 was used as a surrogate, representative of higher chlorinated Aroclors.

[2]A reference dose was not available for Aroclor 1242. An RfD based on Aroclor 1016 was used as a surrogate, representative of lower chlorinated Aroclors.

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

Site Name

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
			Value	Units	Value	Units			Source(s)	Date(s)
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	32598-13-3		--							
3-Methylcholanthrene	56-49-5		--							
Aldrin	309-00-2		--							
ALUMINUM	7429-90-5	Chronic	5E-03		1E-03	mg/kg-day	CNS	3E+02	PPRTV	10/2004
ANTIMONY	7440-36-0		--							
Aroclor-1242	53469-21-9		--							
Aroclor-1248	12672-29-6		--							
Aroclor-1254	11097-69-1		--							
Aroclor-1260	11096-82-5		--							
ARSENIC	7440-38-2		2E-05							
Benzo(a)anthracene	56-55-3		--							
Benzo(a)pyrene	50-32-8		--							
Benzo(b)fluoranthene	205-99-2		--							
Benzo(k)fluoranthene	207-08-9		--							
Benzo[j]fluoranthene	205-82-3		--							
CADMIUM	7440-43-9		1E-05		6E-05	mg/kg-day			NCEA	11/11/2007

Table 5.3
Toxicity equivalence factors (TEF) for dioxins and dioxin-like compounds

Compound	WHO 2005 TEF
Chlorinated dibenzo-p-dioxins	
2,3,7,8-TCDD	1
1,2,3,7,8-peCDD	1
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.0003
Chlorinated dibenzofurans	
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.03
2,3,4,7,8-PeCDF	0.3
1,2,3,4,7,8-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.0003
Non-ortho substituted PCBs	
PCB 77	0.0001
PCB 81	0.0003
PCB 126	0.1
PCB 169	0.03
Mono-ortho substituted PCBs	
105	0.00003
114	0.00003
118	0.00003
123	0.00003
156	0.00003
157	0.00003
167	0.00003
189	0.00003

Source: Van den Berg et al. (2005).

8.6 Series 6 Tables

Table 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Ley Creek

Chemical of Potential Concern	CAS #	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
1,1'-Biphenyl, 3,3',4,4'-tetrachloro-	32598-13-3	1.3E+01	(mg/kg-day)-1	1	1.3E+01	(mg/kg-day)-1		C	
3-Methylcholanthrene	56-49-5	2.2E+01	(mg/kg-day)-1	1	2.2E+01	(mg/kg-day)-1	NC	C	
Aldrin	309-00-2	1.7E+01	(mg/kg-day)-1	1	1.7E+01	(mg/kg-day)-1	B2	I	7/1/1993
Aluminum	7429-90-5	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--
Aroclor-1242	53469-21-9	2.0E+00	(mg/kg-day)-1	1	2.0E+00	(mg/kg-day)-1	B2	I	6/1/1997
Aroclor-1248	12672-29-6	2.0E+00	(mg/kg-day)-1	1	2.0E+00	(mg/kg-day)-1		I	
Aroclor-1254	11097-69-1	2.0E+00	(mg/kg-day)-1	1	2.0E+00	(mg/kg-day)-1	B2	I	6/1/1997
Aroclor-1260	11096-82-5	2.0E+00	(mg/kg-day)-1	1	2.0E+00	(mg/kg-day)-1	B2	I	6/1/1997
Arsenic	7440-38-2	1.5E+00	(mg/kg-day)-1	1	1.5E+00	(mg/kg-day)-1	A	I	4/10/1998
Benzene	71-43-2	5.5E-02	(mg/kg-day)-1	1	5.5E-02	(mg/kg-day)-1	A	I	1/19/2000
Benzo(a)anthracene	56-55-3	7.3E-01	(mg/kg-day)-1	1	7.3E-01	(mg/kg-day)-1	B2(3)	E	3/1/1994
Benzo(a)pyrene	50-32-8	7.3E+00	(mg/kg-day)-1	1	7.3E+00	(mg/kg-day)-1	B2	I	11/1/1994
Benzo(b)fluoranthene	205-99-2	7.3E-01	(mg/kg-day)-1	1	7.3E-01	(mg/kg-day)-1	B2(3)	E	3/1/1994
Benzo(k)fluoranthene	207-08-9	7.3E-02	(mg/kg-day)-1	1	7.3E-02	(mg/kg-day)-1	B2(3)	E	3/1/1994
Benzo[j]fluoranthene	205-82-3	1.2E+00	(mg/kg-day)-1	--	1.2E+00	(mg/kg-day)-1	NC	C	
Cadmium (Water)	7440-43-9	--	--	--	--	--	--	--	--
Chromium III	16065-83-1	--	--	--	--	--	--	--	--
Chromium IV	18540-29-9	--	--	--	--	(mg/kg-day)-1	D(3)	J	9/3/1998
Chrysene	218-01-9	7.3E-03	(mg/kg-day)-1	1	7.3E-03	(mg/kg-day)-1	B2(3)	E	3/1/1994
Cobalt	7440-48-4	--	--	--	--	--	--	--	--
Copper	7440-50-8	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	7.3E+00	(mg/kg-day)-1	1	7.3E+00	(mg/kg-day)-1	B2(3)	E	3/1/1994
Dibenzofuran	132-64-9	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	1.6E+01	(mg/kg-day)-1	1	1.6E+01	(mg/kg-day)-1	B2	I	7/1/1993
Total D/F, as TEQ	1746-01-6	1.56E-04	(pg/kg-day)-1	1	1.56E-04	(pg/kg-day)-1	B2	U	

Table 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Ley Creek

Chemical of Potential Concern	CAS #	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Heptachlor	76-44-8	4.5E+00	(mg/kg-day)-1	1	4.5E+00	(mg/kg-day)-1	B2	I	7/1/1993
Heptachlor epoxide	1024-57-3	9.1E+00	(mg/kg-day)-1	1	9.1E+00	(mg/kg-day)-1	B2	I	7/1/1993
Indeno(1,2,3-cd)pyrene	193-39-5	7.3E-01	(mg/kg-day)-1	1	7.3E-01	(mg/kg-day)-1	B2(3)	E	3/1/1994
Iron	7439-89-6	--	--	1	--	--	--	--	--
Lead	7439-92-1	--	--	1	--	--	--	--	--
Manganese (Water)	7439-96-5	--	--	--	--	--	--	--	--
Mercuric Chloride	7487-94-7	--	--	--	--	--	--	--	--
Methyl Mercury	22967-92-6	--	--	1	--	--	--	--	--
Naphthalene	91-20-3	--	--	1	--		--	--	--
Nickel	7440-02-0	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	1.2E-01	(mg/kg-day)-1	1	1.2E-01	(mg/kg-day)-1	B2	I	7/1/1993
Selenium	7782-49-2	--	--	1	--	--	--	--	--
Vanadium	7440-62-2	--	--	--	--	--	--	--	--
Vinyl chloride	75-01-4	7.2E-01	(mg/kg-day)-1	1	7.2E-01	(mg/kg-day)-1	A	I	8/7/2000
Zinc	7440-66-6	--	--	1	--	--	--	--	--

-- Not Available

Sources:

C = Cal EPA

E = Environmental Criteria and Assessment Office

I = IRIS

J = New Jersey

H = HEAST

U = USEPA (1985)

Weight of Evidence/Cancer Guideline Description:

A = Human carcinogen. Sufficient evidence of cancer in humans.

B2 = Probable human carcinogen. Sufficient evidence of cancer in animals, but lack of data or insufficient data from humans.

D = Cannot be evaluated. No evidence or inadequate evidence of cancer in animals or humans

NC = Not classified

8.7 Series 7 Tables

TABLE 7.1a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	4.6E-08	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	1E-06	3.6E-07	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	3.3E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	6E-09	2.6E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	9E-05
				ALUMINUM	7429-90-5	7E+03	mg/kg	5.3E-05	(mg/kg-day)	NA	NA		4.1E-04	(mg/kg-day)	1.0E+00	(mg/kg-day)	4E-04
				Aroclor-1242	53469-21-9	6E+00	mg/kg	4.4E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-08	3.4E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-03
				Aroclor-1260	11096-82-5	2E+01	mg/kg	1.4E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-07	1.1E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	5.4E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	8E-08	4.2E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				Benzene	71-43-2	5E-02	mg/kg	4.0E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	2E-11	3.1E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	8E-07
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	9.8E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-08	7.6E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	7.2E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-07	5.6E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	9.8E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-08	7.6E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	4.5E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-09	3.5E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	3.3E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	4E-08	2.6E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	2.3E-07	(mg/kg-day)	NA	NA		1.8E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	4E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	1.6E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	8E-07	1.3E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-03
				Chrysene	218-01-9	1E+01	mg/kg	9.4E-08	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	7E-10	7.3E-07	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	4.4E-08	(mg/kg-day)	NA	NA		3.5E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				COPPER	7440-50-8	2E+02	mg/kg	1.4E-06	(mg/kg-day)	NA	NA		1.1E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	3E-04
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	5.9E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-08	4.6E-08	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	2.3E-08	(mg/kg-day)	NA	NA		1.8E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-04
				Dieldrin	60-57-1	1E-01	mg/kg	8.9E-10	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	1E-08	6.9E-09	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	1.9E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	3E-07	1.5E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	1E-02
				Heptachlor	76-44-8	5E-02	mg/kg	4.1E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	2E-09	3.2E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	6E-06
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	4.3E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	3.4E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	1.2E-04	(mg/kg-day)	NA	NA		9.4E-04	(mg/kg-day)	7.0E-01	(mg/kg-day)	1E-03
				MANGANESE	7439-96-5	3E+02	mg/kg	2.8E-06	(mg/kg-day)	NA	NA		2.2E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	9E-04
				MERCURY	7487-94-7	5E-01	mg/kg	3.7E-09	(mg/kg-day)	NA	NA		2.8E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	9E-05
				Naphthalene	91-20-3	7E+00	mg/kg	5.2E-08	(mg/kg-day)	NA	NA		4.1E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-05
				NICKEL	7440-02-0	8E+01	mg/kg	6.3E-07	(mg/kg-day)	NA	NA		4.9E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	1.3E-07	(mg/kg-day)	NA	NA		1.0E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-02
				Vinyl chloride	75-01-4	4E-03	mg/kg	3.3E-11	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	2E-11	2.6E-10	(mg/kg-day)	3.0E-03	(mg/kg-day)	9E-08
			Exp. Route Total									3E-06					1E-01
		Lower Ley Creek		3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
			Dermal	Aldrin	309-00-2	4E-02	mg/kg	5.6E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	1E-08	4.4E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	1E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	1.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	8.3E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	3.5E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	7E-07	2.7E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	2.8E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-08	2.1E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-04
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.2E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	1.7E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	1.6E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-06	1.2E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	2.2E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	1.7E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.0E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-09	7.8E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	7.3E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	9E-08	5.7E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	3.9E-09	(mg/kg-day)	NA	NA		3.0E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	2.1E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	2E-09	1.6E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.3E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-07	1.0E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	4.0E-08	(mg/kg-day)	NA	NA		3.1E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	3E-04
				Dieldrin	60-57-1	1E-01	mg/kg	1.5E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	2E-08	1.2E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	2E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	

TABLE 7.1a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Heptachlor	76-44-8	5E-02	mg/kg	7.1E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	3E-09	5.5E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	9.7E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-08	7.5E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	1.2E-07	(mg/kg-day)	NA	NA		9.1E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	5E-05
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									3E-06					1E-01
		Exposure Point Total										6E-06					3E-01
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	1.7E-04	(mg/kg-day)	NA	NA		1.3E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-03
				ANTIMONY	7440-36-0	3E+00	mg/kg	4.6E-08	(mg/kg-day)	NA	NA		3.5E-07	(mg/kg-day)	4.0E-04	(mg/kg-day)	9E-04
				Aroclor-1242	53469-21-9	4E-01	mg/kg	8.1E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-08	6.3E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	9E-04
				Aroclor-1248	12672-29-6	1E+00	mg/kg	1.8E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-08	1.4E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E-03
				ARSENIC	7440-38-2	7E+00	mg/kg	1.3E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-07	1.0E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	2.1E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	1.6E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	2.4E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-07	1.8E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	3.4E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	2.7E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	1.8E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-09	1.4E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.3E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-08	1.0E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.7E-07	(mg/kg-day)	NA	NA		1.3E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	4.0E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-06	3.1E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				COBALT	7440-48-4	7E+00	mg/kg	1.4E-07	(mg/kg-day)	NA	NA		1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	2.3E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-08	1.8E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	9.4E-13	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	1E-07	7.3E-12	(mg/kg-day)	1.0E-09	(mg/kg-day)	7E-03
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	2.1E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-08	1.7E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	3.7E-04	(mg/kg-day)	NA	NA		2.9E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-03
				MANGANESE	7439-96-5	4E+02	mg/kg	7.0E-06	(mg/kg-day)	NA	NA		5.4E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-03
				MERCURY	7487-94-7	5E-01	mg/kg	9.1E-09	(mg/kg-day)	NA	NA		7.1E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	4.4E-07	(mg/kg-day)	NA	NA		3.4E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-02
			Exp. Route Total									3E-06					9E-02
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	1.9E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-08	1.5E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	4.4E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-08	3.4E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	6.7E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-07	5.2E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	4.6E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	3.5E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	5.3E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-07	4.1E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	7.6E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-08	5.9E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	3.9E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-09	3.0E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	3.0E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	4E-08	2.3E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	2.9E-09	(mg/kg-day)	NA	NA		2.2E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	5.1E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-08	3.9E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	4.7E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	3.7E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	

TABLE 7.1a.CT

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Exp. Route Total									8E-07					2E-02
		Exposure Point Total										3E-06					1E-01
	Exposure Medium Total											1E-05					4E-01
Medium Total												1E-05					4E-01
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	8.6E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-08	6.7E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	1.3E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	9E-10	1.0E-08	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	3.6E-08	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-08	2.8E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	9E-05
				MANGANESE	7439-96-5	1E+02	µg/L	8.1E-07	(mg/kg-day)	NA	NA		6.3E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	3E-04
				Naphthalene	91-20-3	3E-01	µg/L	2.7E-09	(mg/kg-day)	NA	NA		2.1E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	5.4E-09	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	6E-10	4.2E-08	(mg/kg-day)	3.0E-02	(mg/kg-day)	1E-06
				VANADIUM	7440-62-2	1E+00	µg/L	1.1E-08	(mg/kg-day)	NA	NA		8.3E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-03
				Vinyl chloride	75-01-4	8E-01	µg/L	6.0E-09	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	4E-09	4.7E-08	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-05
			Exp. Route Total									4E-08					2E-03
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	3.1E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	5E-09	2.4E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	8E-05
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	6.7E-08	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-06	5.2E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	7E-03
				MANGANESE	7439-96-5	1E+02	µg/L	7.6E-07	(mg/kg-day)	NA	NA		5.9E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	6E-03
				Naphthalene	91-20-3	3E-01	µg/L	3.8E-07	(mg/kg-day)	NA	NA		2.9E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-04
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	1.0E-08	(mg/kg-day)	NA	NA		7.8E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-02
				Vinyl chloride	75-01-4	8E-01	µg/L	9.5E-08	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	7E-08	7.4E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-04
			Exp. Route Total									1E-06					6E-02
		Exposure Point Total										1E-06					6E-02
	Exposure Medium Total											1E-06					6E-02
Medium Total												1E-06					6E-02
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Ingestion	Aroclor-1254	11097-69-1	1E+00	mg/kg	1.2E-05	(mg/kg-day)	NA	NA		9.0E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E+00
				Aroclor-1260	11096-82-5	6E-01	mg/kg	5.7E-06	(mg/kg-day)	NA	NA		4.4E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E+00
				Total Aroclors		1E+00	mg/kg	1.3E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-05	1.0E-04	(mg/kg-day)	NA	NA	
				ARSENIC	7440-38-2	1E+00	mg/kg	1.7E-05	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-05	1.3E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-01
				CHROMIUM	18540-29-9	4E+01	mg/kg	6.4E-04	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	3E-04	5.0E-03	(mg/kg-day)	3E-03	(mg/kg-day)	2E+00
				Dieldrin	60-57-1	2E-02	mg/kg	2.5E-07	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	4E-06	1.9E-06	(mg/kg-day)	5.0E-05	(mg/kg-day)	4E-02
				Total D/F, as TEQ	1746-01-6	3E-06	mg/kg	3.4E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	5E-06	2.7E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	3E-01
				Heptachlor epoxide	1024-57-3	7E-03	mg/kg	1.1E-07	(mg/kg-day)	9.1E+00	(mg/kg-day)-1	1E-06	8.2E-07	(mg/kg-day)	1.3E-05	(mg/kg-day)	6E-02
				IRON	7439-89-6	2E+02	mg/kg	2.6E-03	(mg/kg-day)	NA	NA		2.0E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	3E-02
				MERCURY	22967-92-6	5E-01	mg/kg	7.0E-06	(mg/kg-day)	NA	NA		5.5E-05	(mg/kg-day)	1.0E-04	(mg/kg-day)	5E-01
				SELENIUM	7782-49-2	3E+00	mg/kg	4.3E-05	(mg/kg-day)	NA	NA		3.3E-04	(mg/kg-day)	5.0E-03	(mg/kg-day)	7E-02
				ZINC	7440-66-6	8E+01	mg/kg	1.1E-03	(mg/kg-day)	NA	NA		8.7E-03	(mg/kg-day)	3.0E-01	(mg/kg-day)	3E-02
			Exp. Route Total									4E-04					1E+01
		Exposure Point										4E-04					1E+01
	Exposure Medium Total											4E-04					1E+01
Medium Total												4E-04					1E+01
								Total of Receptor Risks Across All Media				4E-04	Total of Receptor Risks Across All Media				1E+01

TABLE 7.1b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	4.2E-07	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	9E-06	9.8E-07	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	3.0E-09	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	5E-08	7.1E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	2E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	4.8E-04	(mg/kg-day)	NA	NA		1.1E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-03
				Aroclor-1242	53469-21-9	6E+00	mg/kg	4.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	8E-07	9.5E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	1.3E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-06	3.1E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	4.9E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	7E-07	1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Benzene	71-43-2	5E-02	mg/kg	3.7E-09	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	2E-10	8.6E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	2E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	9.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-07	2.1E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	6.6E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-06	1.5E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	9.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-07	2.1E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	4.2E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-08	9.7E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	3.0E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	4E-07	7.1E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	2.1E-06	(mg/kg-day)	NA	NA		4.9E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	1.5E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	7E-06	3.5E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				Chrysene	218-01-9	1E+01	mg/kg	8.6E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	6E-09	2.0E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	4.1E-07	(mg/kg-day)	NA	NA		9.5E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				COPPER	7440-50-8	2E+02	mg/kg	1.3E-05	(mg/kg-day)	NA	NA		3.0E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	8E-04
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	5.4E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-07	1.3E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	2.1E-07	(mg/kg-day)	NA	NA		5.0E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	5E-04
				Dieldrin	60-57-1	1E-01	mg/kg	8.1E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	1E-07	1.9E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	4E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	1.7E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	3E-06	4.0E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	4E-02
				Heptachlor	76-44-8	5E-02	mg/kg	3.8E-09	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	2E-08	8.8E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	4.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	9.3E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	1.1E-03	(mg/kg-day)	NA	NA		2.6E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-03
				MANGANESE	7439-96-5	3E+02	mg/kg	2.6E-05	(mg/kg-day)	NA	NA		6.0E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	3E-03
				MERCURY	7487-94-7	5E-01	mg/kg	3.4E-08	(mg/kg-day)	NA	NA		7.8E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				Naphthalene	91-20-3	7E+00	mg/kg	4.8E-07	(mg/kg-day)	NA	NA		1.1E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	6E-05
				NICKEL	7440-02-0	8E+01	mg/kg	5.8E-06	(mg/kg-day)	NA	NA		1.3E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	7E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	1.2E-06	(mg/kg-day)	NA	NA		2.8E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-02
				Vinyl chloride	75-01-4	4E-03	mg/kg	3.0E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	2E-10	7.1E-10	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-07
			Exp. Route Total									3E-05					3E-01
		Lower Ley Creek	Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	5.2E-09	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	9E-08	1.2E-08	(mg/kg-day)	3.0E-05	(mg/kg-day)	4E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	9.7E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	2.3E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	3E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	3.2E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-06	7.4E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	2.5E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-07	5.9E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.0E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	4.7E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	1.5E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-05	3.4E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	2.0E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	4.7E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	9.2E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-08	2.2E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	6.7E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	8E-07	1.6E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	3.6E-08	(mg/kg-day)	NA	NA		8.3E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	8E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	1.9E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	1E-08	4.5E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.2E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-07	2.8E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	3.7E-07	(mg/kg-day)	NA	NA		8.6E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	9E-04
				Dieldrin	60-57-1	1E-01	mg/kg	1.4E-08	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	2E-07	3.2E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	6E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	

TABLE 7.1b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Heptachlor	76-44-8	5E-02	mg/kg	6.5E-09	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	3E-08	1.5E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	8.9E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-07	2.1E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	1.1E-06	(mg/kg-day)	NA	NA		2.5E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-04
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									3E-05					4E-01
		Exposure Point Total										6E-05					7E-01
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	2.2E-03	(mg/kg-day)	NA	NA		5.1E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	5E-03
				ANTIMONY	7440-36-0	3E+00	mg/kg	6.0E-07	(mg/kg-day)	NA	NA		1.4E-06	(mg/kg-day)	4.0E-04	(mg/kg-day)	4E-03
				Aroclor-1242	53469-21-9	4E-01	mg/kg	1.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	2.5E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	2.4E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-07	5.7E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	1.7E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-06	4.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-02
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	2.7E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	6.3E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	3.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-06	7.3E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	4.5E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	1.1E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	2.3E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-08	5.4E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.8E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-07	4.1E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	2.2E-06	(mg/kg-day)	NA	NA		5.2E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	5.3E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	3E-05	1.2E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-02
				COBALT	7440-48-4	7E+00	mg/kg	1.8E-06	(mg/kg-day)	NA	NA		4.2E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-02
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	3.0E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-07	7.1E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	1.2E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	2E-06	2.9E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	3E-02
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	2.8E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	6.6E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	4.9E-03	(mg/kg-day)	NA	NA		1.1E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-02
				MANGANESE	7439-96-5	4E+02	mg/kg	9.2E-05	(mg/kg-day)	NA	NA		2.2E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	9E-03
				MERCURY	7487-94-7	5E-01	mg/kg	1.2E-07	(mg/kg-day)	NA	NA		2.8E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	9E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	5.8E-06	(mg/kg-day)	NA	NA		1.4E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-01
			Exp. Route Total									4E-05					4E-01
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	2.6E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-07	6.0E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	9E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	5.8E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-06	1.4E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	8.9E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-06	2.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	6.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	1.4E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	7.0E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-06	1.6E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	1.0E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-07	2.4E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	5.2E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	4E-08	1.2E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	3.9E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	5E-07	9.2E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	3.8E-08	(mg/kg-day)	NA	NA		8.9E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	9E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	6.7E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-07	1.6E-07	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	6.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-07	1.5E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	

TABLE 7.1b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Exp. Route Total									1E-05					8E-02
		Exposure Point Total										5E-05					5E-01
	Exposure Medium Total											1E-04					1E+00
Medium Total												1E-04					1E+00
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	1.0E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-07	2.4E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	8E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	1.5E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	3.6E-08	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	4.2E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-07	9.9E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-04
				MANGANESE	7439-96-5	1E+02	µg/L	9.6E-06	(mg/kg-day)	NA	NA		2.2E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	9E-04
				Naphthalene	91-20-3	3E-01	µg/L	3.2E-08	(mg/kg-day)	NA	NA		7.4E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	6.4E-08	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	8E-09	1.5E-07	(mg/kg-day)	3.0E-02	(mg/kg-day)	5E-06
				VANADIUM	7440-62-2	1E+00	µg/L	1.3E-07	(mg/kg-day)	NA	NA		3.0E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-03
				Vinyl chloride	75-01-4	8E-01	µg/L	7.2E-08	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	5E-08	1.7E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	6E-05
			Exp. Route Total									4E-07					6E-03
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	3.7E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	6E-08	8.6E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	3.1E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	6E-06	7.1E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				MANGANESE	7439-96-5	1E+02	µg/L	3.5E-06	(mg/kg-day)	NA	NA		8.1E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	8E-03
				Naphthalene	91-20-3	3E-01	µg/L	1.7E-06	(mg/kg-day)	NA	NA		4.0E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-04
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	4.6E-08	(mg/kg-day)	NA	NA		1.1E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	6E-02
				Vinyl chloride	75-01-4	8E-01	µg/L	4.4E-07	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	3E-07	1.0E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-04
			Exp. Route Total									6E-06					8E-02
		Exposure Point Total										7E-06					8E-02
	Exposure Medium Total											7E-06					8E-02
Medium Total												7E-06					8E-02
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Ingestion	Aroclor-1254	11097-69-1	1E+00	mg/kg	1.2E-04	(mg/kg-day)	NA	NA		2.8E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+01
				Aroclor-1260	11096-82-5	6E-01	mg/kg	5.9E-05	(mg/kg-day)	NA	NA		1.4E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E+00
				Total Aroclors		1E+00	mg/kg	1.4E-04	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-04	3.2E-04	(mg/kg-day)	NA	NA	
				ARSENIC	7440-38-2	1E+00	mg/kg	1.7E-04	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-04	4.1E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E+00
				CHROMIUM	18540-29-9	4E+01	mg/kg	6.7E-03	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	3E-03	1.6E-02	(mg/kg-day)	3E-03	(mg/kg-day)	5E+00
				Dieldrin	60-57-1	2E-02	mg/kg	2.6E-06	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	4E-05	6.0E-06	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-01
				Total D/F, as TEQ	1746-01-6	3E-06	mg/kg	3.6E-10	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	5E-05	8.3E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	8E-01
				Heptachlor epoxide	1024-57-3	7E-03	mg/kg	1.1E-06	(mg/kg-day)	9.1E+00	(mg/kg-day)-1	1E-05	2.6E-06	(mg/kg-day)	1.3E-05	(mg/kg-day)	2E-01
				IRON	7439-89-6	2E+02	mg/kg	2.7E-02	(mg/kg-day)	NA	NA		6.2E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	9E-02
				MERCURY	22967-92-6	5E-01	mg/kg	7.3E-05	(mg/kg-day)	NA	NA		1.7E-04	(mg/kg-day)	1.0E-04	(mg/kg-day)	2E+00
				SELENIUM	7782-49-2	3E+00	mg/kg	4.4E-04	(mg/kg-day)	NA	NA		1.0E-03	(mg/kg-day)	5.0E-03	(mg/kg-day)	2E-01
				ZINC	7440-66-6	8E+01	mg/kg	1.2E-02	(mg/kg-day)	NA	NA		2.7E-02	(mg/kg-day)	3.0E-01	(mg/kg-day)	9E-02
			Exp. Route Total									4E-03					3E+01
		Exposure Point										4E-03					3E+01
	Exposure Medium Total											4E-03					3E+01
Medium Total												4E-03					3E+01
								Total of Receptor Risks Across All Media				4E-03	Total of Receptor Risks Across All Media				3E+01

TABLE 7.2a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	3.0E-07	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	7E-06	4.3E-07	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	3.5E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	6E-09	3.1E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	1E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	5.6E-05	(mg/kg-day)	NA	NA		4.9E-04	(mg/kg-day)	1.0E+00	(mg/kg-day)	5E-04
				Aroclor-1242	53469-21-9	6E+00	mg/kg	4.8E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	4.2E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	6E-03
				Aroclor-1260	11096-82-5	2E+01	mg/kg	1.6E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-07	1.4E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	5.8E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	9E-08	5.0E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Benzene	71-43-2	5E-02	mg/kg	4.3E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	2E-11	3.8E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	9E-07
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	1.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	9.2E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	4.7E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-06	6.7E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	1.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	9.2E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	4.9E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	4E-09	4.3E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	3.5E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	4E-08	3.1E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	2.4E-07	(mg/kg-day)	NA	NA		2.1E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	4E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	1.8E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	9E-07	1.5E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	5E-03
				Chrysene	218-01-9	1E+01	mg/kg	1.0E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	7E-10	8.8E-07	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	4.8E-08	(mg/kg-day)	NA	NA		4.2E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				COPPER	7440-50-8	2E+02	mg/kg	1.5E-06	(mg/kg-day)	NA	NA		1.3E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	3E-04
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	3.8E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-07	5.5E-08	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	2.5E-08	(mg/kg-day)	NA	NA		2.2E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-04
				Dieldrin	60-57-1	1E-01	mg/kg	9.5E-10	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	2E-08	8.3E-09	(mg/kg-day)	5.0E-05	(mg/kg-day)	2E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	2.0E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	3E-07	1.8E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	2E-02
				Heptachlor	76-44-8	5E-02	mg/kg	4.4E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	2E-09	3.9E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	8E-06
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	4.7E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	4.1E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	1.3E-04	(mg/kg-day)	NA	NA		1.1E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-03
				MANGANESE	7439-96-5	3E+02	mg/kg	3.0E-06	(mg/kg-day)	NA	NA		2.6E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-03
				MERCURY	7487-94-7	5E-01	mg/kg	3.9E-09	(mg/kg-day)	NA	NA		3.4E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-04
				Naphthalene	91-20-3	7E+00	mg/kg	5.6E-08	(mg/kg-day)	NA	NA		4.9E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-05
				NICKEL	7440-02-0	8E+01	mg/kg	6.8E-07	(mg/kg-day)	NA	NA		5.9E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	3E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	1.4E-07	(mg/kg-day)	NA	NA		1.2E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-02
				Vinyl chloride	75-01-4	4E-03	mg/kg	3.5E-11	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	3E-11	3.1E-10	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-07
		Lower Ley Creek	Exp. Route Total									1E-05					1E-01
			Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	7.6E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	1E-08	6.7E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	2E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	1.4E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-07	1.3E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	4.7E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-07	4.1E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	3.7E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	6E-08	3.3E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	3.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	2.6E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	9.4E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-06	1.9E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	3.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	2.6E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.4E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-08	1.2E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	1.0E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	1E-07	8.7E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	5.3E-09	(mg/kg-day)	NA	NA		4.6E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	5E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	2.8E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	2E-09	2.5E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	7.7E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	6E-07	1.5E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	5.4E-08	(mg/kg-day)	NA	NA		4.8E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	5E-04
				Dieldrin	60-57-1	1E-01	mg/kg	2.1E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	3E-08	1.8E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	4E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	

TABLE 7.2a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Heptachlor	76-44-8	5E-02	mg/kg	9.6E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	4E-09	8.4E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	1.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.1E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	1.6E-07	(mg/kg-day)	NA	NA		1.4E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	7E-05
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									9E-06					2E-01
		Exposure Point Total										2E-05					4E-01
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	1.8E-04	(mg/kg-day)	NA	NA		1.6E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	2E-03
				ANTIMONY	7440-36-0	3E+00	mg/kg	4.9E-08	(mg/kg-day)	NA	NA		4.3E-07	(mg/kg-day)	4.0E-04	(mg/kg-day)	1E-03
				Aroclor-1242	53469-21-9	4E-01	mg/kg	8.7E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-08	7.6E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	2.0E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-08	1.7E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	9E-03
				ARSENIC	7440-38-2	7E+00	mg/kg	1.4E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-07	1.2E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	2.2E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-08	1.9E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	1.5E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-06	2.2E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	3.7E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	3.2E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	1.9E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-09	1.7E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.4E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-08	1.3E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.8E-07	(mg/kg-day)	NA	NA		1.6E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	4.3E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-06	3.8E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				COBALT	7440-48-4	7E+00	mg/kg	1.5E-07	(mg/kg-day)	NA	NA		1.3E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	1.5E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-07	2.1E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	1.0E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	2E-07	8.8E-12	(mg/kg-day)	1.0E-09	(mg/kg-day)	9E-03
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	2.3E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-08	2.0E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	4.0E-04	(mg/kg-day)	NA	NA		3.5E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	5E-03
				MANGANESE	7439-96-5	4E+02	mg/kg	7.5E-06	(mg/kg-day)	NA	NA		6.6E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	3E-03
				MERCURY	7487-94-7	5E-01	mg/kg	9.8E-09	(mg/kg-day)	NA	NA		8.6E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	4.7E-07	(mg/kg-day)	NA	NA		4.1E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	6E-02
			Exp. Route Total									4E-06					1E-01
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	2.6E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-08	2.3E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	3E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	5.9E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	5.2E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	9.1E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-07	8.0E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	6.2E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-08	5.4E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	3.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-06	6.3E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	1.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	9.0E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	5.3E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	4E-09	4.6E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	4.0E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	5E-08	3.5E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	3.9E-09	(mg/kg-day)	NA	NA		3.4E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	3.0E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-07	6.0E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	6.4E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-08	5.6E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	

TABLE 7.2a.CT

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Exp. Route Total									3E-06					3E-02
		Exposure Point Total										7E-06					1E-01
	Exposure Medium Total											3E-05					5E-01
Medium Total												3E-05					5E-01
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	9.2E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-08	8.0E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	1.4E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-09	1.2E-08	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	3.8E-08	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-08	3.3E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-04
				MANGANESE	7439-96-5	1E+02	µg/L	8.7E-07	(mg/kg-day)	NA	NA		7.6E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	3E-04
				Naphthalene	91-20-3	3E-01	µg/L	2.9E-09	(mg/kg-day)	NA	NA		2.5E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	5.8E-09	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	7E-10	5.1E-08	(mg/kg-day)	3.0E-02	(mg/kg-day)	2E-06
				VANADIUM	7440-62-2	1E+00	µg/L	1.1E-08	(mg/kg-day)	NA	NA		1.0E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-03
				Vinyl chloride	75-01-4	8E-01	µg/L	6.5E-09	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	5E-09	5.7E-08	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-05
			Exp. Route Total									4E-08					2E-03
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	2.4E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-09	2.1E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-05
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	5.2E-08	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-06	4.5E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	6E-03
				MANGANESE	7439-96-5	1E+02	µg/L	5.9E-07	(mg/kg-day)	NA	NA		5.1E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	5E-03
				Naphthalene	91-20-3	3E-01	µg/L	2.9E-07	(mg/kg-day)	NA	NA		2.6E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-04
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	7.8E-09	(mg/kg-day)	NA	NA		6.8E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-02
				Vinyl chloride	75-01-4	8E-01	µg/L	7.4E-08	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	5E-08	6.4E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-04
			Exp. Route Total									1E-06					5E-02
		Exposure Point Total										1E-06					5E-02
	Exposure Medium Total											1E-06					5E-02
Medium Total												1E-06					5E-02
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Ingestion	Aroclor-1254	11097-69-1	1E+00	mg/kg	8.2E-06	(mg/kg-day)	NA	NA		7.2E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E+00
				Aroclor-1260	11096-82-5	6E-01	mg/kg	4.1E-06	(mg/kg-day)	NA	NA		3.6E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E+00
				Total Aroclors		1E+00	mg/kg	9.4E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-05	8.3E-05	(mg/kg-day)	NA	NA	
				ARSENIC	7440-38-2	1E+00	mg/kg	1.2E-05	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-05	1.0E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-01
				CHROMIUM	18540-29-9	4E+01	mg/kg	4.6E-04	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-04	4.0E-03	(mg/kg-day)	3E-03	(mg/kg-day)	1E+00
				Dieldrin	60-57-1	2E-02	mg/kg	1.7E-07	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	3E-06	1.5E-06	(mg/kg-day)	5.0E-05	(mg/kg-day)	3E-02
				Total D/F, as TEQ	1746-01-6	3E-06	mg/kg	2.4E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	4E-06	2.1E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	2E-01
				Heptachlor epoxide	1024-57-3	7E-03	mg/kg	7.5E-08	(mg/kg-day)	9.1E+00	(mg/kg-day)-1	7E-07	6.6E-07	(mg/kg-day)	1.3E-05	(mg/kg-day)	5E-02
				IRON	7439-89-6	2E+02	mg/kg	1.8E-03	(mg/kg-day)	NA	NA		1.6E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-02
				MERCURY	22967-92-6	5E-01	mg/kg	5.0E-06	(mg/kg-day)	NA	NA		4.4E-05	(mg/kg-day)	1.0E-04	(mg/kg-day)	4E-01
				SELENIUM	7782-49-2	3E+00	mg/kg	3.0E-05	(mg/kg-day)	NA	NA		2.7E-04	(mg/kg-day)	5.0E-03	(mg/kg-day)	5E-02
				ZINC	7440-66-6	8E+01	mg/kg	8.0E-04	(mg/kg-day)	NA	NA		7.0E-03	(mg/kg-day)	3.0E-01	(mg/kg-day)	2E-02
			Exp. Route Total									3E-04					8E+00
		Exposure Point										3E-04					8E+00
	Exposure Medium Total											3E-04					8E+00
Medium Total												3E-04					8E+00
								Total of Receptor Risks Across All Media				3E-04	Total of Receptor Risks Across All Media				8E+00

TABLE 7.2b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	8.3E-07	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	2E-05	1.2E-06	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	1.2E-09	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	2E-08	8.5E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	3E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	1.9E-04	(mg/kg-day)	NA	NA		1.4E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-03
				Aroclor-1242	53469-21-9	6E+00	mg/kg	1.6E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-07	1.1E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	5.3E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-06	3.7E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	2.0E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-07	1.4E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-03
				Benzene	71-43-2	5E-02	mg/kg	1.5E-09	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	8E-11	1.0E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	3E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	3.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	2.5E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	1.3E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-06	1.8E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	3.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	2.5E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.7E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-08	1.2E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	1.2E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	1E-07	8.5E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	8.4E-07	(mg/kg-day)	NA	NA		5.9E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	6.0E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	3E-06	4.2E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				Chrysene	218-01-9	1E+01	mg/kg	3.5E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	3E-09	2.4E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	1.6E-07	(mg/kg-day)	NA	NA		1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				COPPER	7440-50-8	2E+02	mg/kg	5.2E-06	(mg/kg-day)	NA	NA		3.6E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	9E-04
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	8E-07	1.5E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	8.6E-08	(mg/kg-day)	NA	NA		6.1E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	6E-04
				Dieldrin	60-57-1	1E-01	mg/kg	3.3E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	5E-08	2.3E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	5E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	7.0E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	1E-06	4.9E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	5E-02
				Heptachlor	76-44-8	5E-02	mg/kg	1.5E-09	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	7E-09	1.1E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	1.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.1E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	4.5E-04	(mg/kg-day)	NA	NA		3.1E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-03
				MANGANESE	7439-96-5	3E+02	mg/kg	1.0E-05	(mg/kg-day)	NA	NA		7.3E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	3E-03
				MERCURY	7487-94-7	5E-01	mg/kg	1.3E-08	(mg/kg-day)	NA	NA		9.4E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				Naphthalene	91-20-3	7E+00	mg/kg	1.9E-07	(mg/kg-day)	NA	NA		1.4E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	7E-05
				NICKEL	7440-02-0	8E+01	mg/kg	2.3E-06	(mg/kg-day)	NA	NA		1.6E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	8E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	4.8E-07	(mg/kg-day)	NA	NA		3.4E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-02
				Vinyl chloride	75-01-4	4E-03	mg/kg	1.2E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	9E-11	8.5E-10	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-07
			Exp. Route Total									4E-05					3E-01
		Lower Ley Creek	Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	2.2E-08	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	4E-07	1.5E-07	(mg/kg-day)	3.0E-05	(mg/kg-day)	5E-03
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	4.1E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	8E-06	2.9E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-01
				Aroclor-1260	11096-82-5	2E+01	mg/kg	1.3E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-05	9.3E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E+00
				ARSENIC	7440-38-2	7E+00	mg/kg	1.1E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-06	7.4E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	8.4E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-06	5.9E-05	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	2.1E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-04	4.3E-05	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	8.4E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-06	5.9E-05	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	3.9E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-07	2.7E-05	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	2.8E-06	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	3E-06	2.0E-05	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	1.5E-07	(mg/kg-day)	NA	NA		1.0E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-04
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	8.0E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	6E-08	5.6E-05	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.8E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-05	3.5E-06	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	1.5E-06	(mg/kg-day)	NA	NA		1.1E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-02
				Dieldrin	60-57-1	1E-01	mg/kg	5.8E-08	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	9E-07	4.1E-07	(mg/kg-day)	5.0E-05	(mg/kg-day)	8E-03
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	

TABLE 7.2b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Heptachlor	76-44-8	5E-02	mg/kg	2.7E-08	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	1E-07	1.9E-07	(mg/kg-day)	5.0E-04	(mg/kg-day)	4E-04
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	3.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	2.6E-05	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	4.5E-06	(mg/kg-day)	NA	NA		3.1E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-03
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									2E-04					5E+00
		Exposure Point Total										3E-04					5E+00
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	8.8E-04	(mg/kg-day)	NA	NA		6.2E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	6E-03
				ANTIMONY	7440-36-0	3E+00	mg/kg	2.4E-07	(mg/kg-day)	NA	NA		1.7E-06	(mg/kg-day)	4.0E-04	(mg/kg-day)	4E-03
				Aroclor-1242	53469-21-9	4E-01	mg/kg	4.3E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-08	3.0E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	9.8E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	6.8E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	7.0E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-06	4.9E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	1.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	7.6E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	6.2E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-06	8.8E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	1.8E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.3E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	9.4E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-09	6.6E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	7.1E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	9E-08	5.0E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	9.0E-07	(mg/kg-day)	NA	NA		6.3E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	2.1E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-05	1.5E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	5E-02
				COBALT	7440-48-4	7E+00	mg/kg	7.2E-07	(mg/kg-day)	NA	NA		5.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	5.9E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-07	8.5E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	5.0E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	8E-07	3.5E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	4E-02
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	1.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	7.9E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	2.0E-03	(mg/kg-day)	NA	NA		1.4E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-02
				MANGANESE	7439-96-5	4E+02	mg/kg	3.7E-05	(mg/kg-day)	NA	NA		2.6E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-02
				MERCURY	7487-94-7	5E-01	mg/kg	4.9E-08	(mg/kg-day)	NA	NA		3.4E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				VANADIUM	7440-62-2	2E+01	mg/kg	2.3E-06	(mg/kg-day)	NA	NA		1.6E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-01
			Exp. Route Total									2E-05					4E-01
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	1.1E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	7.5E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-01
				Aroclor-1248	12672-29-6	1E+00	mg/kg	2.4E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-06	1.7E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	9E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	3.7E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	6E-06	2.6E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	9E-02
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	2.5E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	1.8E-05	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	1.0E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-05	2.0E-05	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	4.2E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	3.0E-05	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	2.2E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-07	1.5E-05	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.7E-06	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-06	1.2E-05	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.6E-07	(mg/kg-day)	NA	NA		1.1E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-04
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	9.8E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-06	2.0E-06	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	2.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	1.8E-05	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	

TABLE 7.2b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Exp. Route Total									1E-04					1E+00
		Exposure Point Total										1E-04					1E+00
	Exposure Medium Total											4E-04					7E+00
Medium Total												4E-04					7E+00
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	4.1E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	6E-08	2.9E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	6.2E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-09	4.3E-08	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	1.7E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	9E-08	1.2E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-04
				MANGANESE	7439-96-5	1E+02	µg/L	3.9E-06	(mg/kg-day)	NA	NA		2.7E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-03
				Naphthalene	91-20-3	3E-01	µg/L	1.3E-08	(mg/kg-day)	NA	NA		8.9E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	2.6E-08	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	3E-09	1.8E-07	(mg/kg-day)	3.0E-02	(mg/kg-day)	6E-06
				VANADIUM	7440-62-2	1E+00	µg/L	5.1E-08	(mg/kg-day)	NA	NA		3.6E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-03
				Vinyl chloride	75-01-4	8E-01	µg/L	2.9E-08	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	2E-08	2.0E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	7E-05
			Exp. Route Total									2E-07					8E-03
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	1.1E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-08	7.5E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	8.9E-08	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-06	6.2E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	8E-03
				MANGANESE	7439-96-5	1E+02	µg/L	1.0E-06	(mg/kg-day)	NA	NA		7.0E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	7E-03
				Naphthalene	91-20-3	3E-01	µg/L	5.0E-07	(mg/kg-day)	NA	NA		3.5E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-04
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	1.3E-08	(mg/kg-day)	NA	NA		9.3E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-02
				Vinyl chloride	75-01-4	8E-01	µg/L	1.3E-07	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	9E-08	8.9E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-04
			Exp. Route Total									2E-06					7E-02
		Exposure Point Total										2E-06					8E-02
	Exposure Medium Total											2E-06					8E-02
Medium Total												2E-06					8E-02
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Ingestion	Aroclor-1254	11097-69-1	1E+00	mg/kg	3.2E-05	(mg/kg-day)	NA	NA		2.3E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+01
				Aroclor-1260	11096-82-5	6E-01	mg/kg	1.6E-05	(mg/kg-day)	NA	NA		1.1E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E+00
				Total Aroclors		1E+00	mg/kg	3.7E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	7E-05	2.6E-04	(mg/kg-day)	NA	NA	
				ARSENIC	7440-38-2	1E+00	mg/kg	4.7E-05	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	7E-05	3.3E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E+00
				CHROMIUM	18540-29-9	4E+01	mg/kg	1.8E-03	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	9E-04	1.3E-02	(mg/kg-day)	3E-03	(mg/kg-day)	4E+00
				Dieldrin	60-57-1	2E-02	mg/kg	6.9E-07	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	1E-05	4.8E-06	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-01
				Total D/F, as TEQ	1746-01-6	3E-06	mg/kg	9.6E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	1E-05	6.7E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	7E-01
				Heptachlor epoxide	1024-57-3	7E-03	mg/kg	3.0E-07	(mg/kg-day)	9.1E+00	(mg/kg-day)-1	3E-06	2.1E-06	(mg/kg-day)	1.3E-05	(mg/kg-day)	2E-01
				IRON	7439-89-6	2E+02	mg/kg	7.1E-03	(mg/kg-day)	NA	NA		5.0E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	7E-02
				MERCURY	22967-92-6	5E-01	mg/kg	2.0E-05	(mg/kg-day)	NA	NA		1.4E-04	(mg/kg-day)	1.0E-04	(mg/kg-day)	1E+00
				SELENIUM	7782-49-2	3E+00	mg/kg	1.2E-04	(mg/kg-day)	NA	NA		8.4E-04	(mg/kg-day)	5.0E-03	(mg/kg-day)	2E-01
				ZINC	7440-66-6	8E+01	mg/kg	3.1E-03	(mg/kg-day)	NA	NA		2.2E-02	(mg/kg-day)	3.0E-01	(mg/kg-day)	7E-02
			Exp. Route Total									1E-03					2E+01
		Exposure Point										1E-03					2E+01
	Exposure Medium Total											1E-03					2E+01
Medium Total												1E-03					2E+01
								Total of Receptor Risks Across All Media				1E-03	Total of Receptor Risks Across All Media				3E+01

TABLE 7.3a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	1.9E-06	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	4E-05	3.3E-06	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	2.1E-09	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	3E-08	2.4E-08	(mg/kg-day)	3.0E-05	(mg/kg-day)	8E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	3.3E-04	(mg/kg-day)	NA	NA		3.8E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	4E-03
				Aroclor-1242	53469-21-9	6E+00	mg/kg	2.8E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-07	3.2E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	9.0E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	1.1E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	3.3E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	5E-07	3.9E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-02
				Benzene	71-43-2	5E-02	mg/kg	2.5E-09	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	1E-10	2.9E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	7E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	6.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	7.1E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	3.0E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-05	5.2E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	6.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	7.1E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	2.8E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-08	3.3E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	2.1E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-07	2.4E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	1.4E-06	(mg/kg-day)	NA	NA		1.7E-05	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	1.0E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	5E-06	1.2E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-02
				Chrysene	218-01-9	1E+01	mg/kg	5.8E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	4E-09	6.8E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	2.8E-07	(mg/kg-day)	NA	NA		3.2E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-02
				COPPER	7440-50-8	2E+02	mg/kg	8.7E-06	(mg/kg-day)	NA	NA		1.0E-04	(mg/kg-day)	4.0E-02	(mg/kg-day)	3E-03
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	2.5E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-06	4.3E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	1.5E-07	(mg/kg-day)	NA	NA		1.7E-06	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-03
				Dieldrin	60-57-1	1E-01	mg/kg	5.5E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	9E-08	6.4E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-03
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	1.2E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	2E-06	1.4E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	1E-01
				Heptachlor	76-44-8	5E-02	mg/kg	2.6E-09	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	1E-08	3.0E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	6E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	2.7E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	3.2E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	7.5E-04	(mg/kg-day)	NA	NA		8.8E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	1E-02
				MANGANESE	7439-96-5	3E+02	mg/kg	1.7E-05	(mg/kg-day)	NA	NA		2.0E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	8E-03
				MERCURY	7487-94-7	5E-01	mg/kg	2.3E-08	(mg/kg-day)	NA	NA		2.7E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	9E-04
				Naphthalene	91-20-3	7E+00	mg/kg	3.3E-07	(mg/kg-day)	NA	NA		3.8E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-04
				NICKEL	7440-02-0	8E+01	mg/kg	3.9E-06	(mg/kg-day)	NA	NA		4.6E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-03
				VANADIUM	7440-62-2	2E+01	mg/kg	8.1E-07	(mg/kg-day)	NA	NA		9.5E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-01
				Vinyl chloride	75-01-4	4E-03	mg/kg	2.1E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	1E-10	2.4E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	8E-07
			Exp. Route Total									8E-05					1E+00
		Lower Ley Creek	Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	1.2E-09	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	2E-08	1.3E-08	(mg/kg-day)	3.0E-05	(mg/kg-day)	4E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	2.2E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-07	2.5E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	7.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-06	8.2E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	5.6E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	8E-08	6.5E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	4.5E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	5.2E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	2.1E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-05	3.8E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	4.4E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	5.2E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	2.1E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-08	2.4E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	1.5E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-07	1.7E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	7.9E-09	(mg/kg-day)	NA	NA		9.3E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	9E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	4.2E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	3E-09	5.0E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.7E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-06	3.1E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	8.2E-08	(mg/kg-day)	NA	NA		9.5E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-03
				Dieldrin	60-57-1	1E-01	mg/kg	3.1E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	5E-08	3.6E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	7E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	

TABLE 7.3a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Heptachlor	76-44-8	5E-02	mg/kg	1.4E-09	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	6E-09	1.7E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	2.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	2.3E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	2.4E-07	(mg/kg-day)	NA	NA		2.8E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-04
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									2E-05					5E-01
		Exposure Point Total										1E-04					1E+00
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	1.0E-03	(mg/kg-day)	NA	NA		1.2E-02	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-02
				ANTIMONY	7440-36-0	3E+00	mg/kg	2.8E-07	(mg/kg-day)	NA	NA		3.3E-06	(mg/kg-day)	4.0E-04	(mg/kg-day)	8E-03
				Aroclor-1242	53469-21-9	4E-01	mg/kg	5.0E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	5.9E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	8E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	1.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	1.3E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	8.2E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-06	9.5E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-02
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	1.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	9E-08	1.5E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	1.0E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-06	1.7E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	2.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	2.5E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	1.1E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	8E-09	1.3E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	8.3E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	1E-07	9.7E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.1E-06	(mg/kg-day)	NA	NA		1.2E-05	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	2.5E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-05	2.9E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-01
				COBALT	7440-48-4	7E+00	mg/kg	8.4E-07	(mg/kg-day)	NA	NA		9.8E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-02
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	9.7E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-07	1.7E-07	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	5.9E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	9E-07	6.8E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	7E-02
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	1.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.5E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	2.3E-03	(mg/kg-day)	NA	NA		2.7E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-02
				MANGANESE	7439-96-5	4E+02	mg/kg	4.3E-05	(mg/kg-day)	NA	NA		5.1E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-02
				MERCURY	7487-94-7	5E-01	mg/kg	5.7E-08	(mg/kg-day)	NA	NA		6.6E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				VANADIUM	7440-62-2	2E+01	mg/kg	2.7E-06	(mg/kg-day)	NA	NA		3.2E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-01
			Exp. Route Total									2E-05					9E-01
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	4.0E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	8E-08	4.6E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	7E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	8.9E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	1.0E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	1.4E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-07	1.6E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	9.3E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-08	1.1E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	7.0E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-06	1.3E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	1.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.8E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	8.0E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	6E-09	9.3E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	6.1E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	7E-08	7.1E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	5.9E-09	(mg/kg-day)	NA	NA		6.9E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	7E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	6.8E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-07	1.2E-07	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	9.6E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-08	1.1E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	

TABLE 7.3a.CT

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Exp. Route Total									6E-06					6E-02
		Exposure Point Total										3E-05					9E-01
	Exposure Medium Total											1E-04					2E+00
Medium Total												1E-04					2E+00
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	2.7E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-08	3.1E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-03
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	4.0E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-09	4.7E-08	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	1.1E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	6E-08	1.3E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-04
				MANGANESE	7439-96-5	1E+02	µg/L	2.5E-06	(mg/kg-day)	NA	NA		2.9E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-03
				Naphthalene	91-20-3	3E-01	µg/L	8.3E-09	(mg/kg-day)	NA	NA		9.7E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	5E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	1.7E-08	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	2E-09	2.0E-07	(mg/kg-day)	3.0E-02	(mg/kg-day)	7E-06
				VANADIUM	7440-62-2	1E+00	µg/L	3.3E-08	(mg/kg-day)	NA	NA		3.9E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	6E-03
				Vinyl chloride	75-01-4	8E-01	µg/L	1.9E-08	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	1E-08	2.2E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	7E-05
			Exp. Route Total									1E-07					8E-03
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	3.5E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	5E-09	4.1E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	7.6E-08	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-06	8.9E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				MANGANESE	7439-96-5	1E+02	µg/L	8.6E-07	(mg/kg-day)	NA	NA		1.0E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-02
				Naphthalene	91-20-3	3E-01	µg/L	4.3E-07	(mg/kg-day)	NA	NA		5.0E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	3E-04
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	1.1E-08	(mg/kg-day)	NA	NA		1.3E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	7E-02
				Vinyl chloride	75-01-4	8E-01	µg/L	1.1E-07	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	8E-08	1.3E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-04
			Exp. Route Total									2E-06					1E-01
		Exposure Point Total										2E-06					1E-01
	Exposure Medium Total											2E-06					1E-01
Medium Total												2E-06					1E-01
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Ingestion	Aroclor-1254	11097-69-1	1E+00	mg/kg	1.2E-05	(mg/kg-day)	NA	NA		1.4E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E+00
				Aroclor-1260	11096-82-5	6E-01	mg/kg	6.0E-06	(mg/kg-day)	NA	NA		7.0E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E+00
				Total Aroclors		1E+00	mg/kg	1.4E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-05	1.6E-04	(mg/kg-day)	NA	NA	
				ARSENIC	7440-38-2	1E+00	mg/kg	1.8E-05	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-05	2.0E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-01
				CHROMIUM	18540-29-9	4E+01	mg/kg	6.7E-04	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	3E-04	7.9E-03	(mg/kg-day)	3E-03	(mg/kg-day)	3E+00
				Dieldrin	60-57-1	2E-02	mg/kg	2.6E-07	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	4E-06	3.0E-06	(mg/kg-day)	5.0E-05	(mg/kg-day)	6E-02
				Total D/F, as TEQ	1746-01-6	3E-06	mg/kg	3.6E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	5E-06	4.2E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	4E-01
				Heptachlor epoxide	1024-57-3	7E-03	mg/kg	1.1E-07	(mg/kg-day)	9.1E+00	(mg/kg-day)-1	1E-06	1.3E-06	(mg/kg-day)	1.3E-05	(mg/kg-day)	1E-01
				IRON	7439-89-6	2E+02	mg/kg	2.7E-03	(mg/kg-day)	NA	NA		3.1E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-02
				MERCURY	22967-92-6	5E-01	mg/kg	7.4E-06	(mg/kg-day)	NA	NA		8.6E-05	(mg/kg-day)	1.0E-04	(mg/kg-day)	9E-01
				SELENIUM	7782-49-2	3E+00	mg/kg	4.5E-05	(mg/kg-day)	NA	NA		5.2E-04	(mg/kg-day)	5.0E-03	(mg/kg-day)	1E-01
				ZINC	7440-66-6	8E+01	mg/kg	1.2E-03	(mg/kg-day)	NA	NA		1.4E-02	(mg/kg-day)	3.0E-01	(mg/kg-day)	5E-02
			Exp. Route Total									4E-04					2E+01
		Exposure Point										4E-04					2E+01
	Exposure Medium Total											4E-04					2E+01
Medium Total												4E-04					2E+01
								Total of Receptor Risks Across All Media				5E-04	Total of Receptor Risks Across All Media				2E+01

TABLE 7.3b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	5.4E-06	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	1E-04	9.2E-06	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	5.6E-09	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	1E-07	6.6E-08	(mg/kg-day)	3.0E-05	(mg/kg-day)	2E-03
				ALUMINUM	7429-90-5	7E+03	mg/kg	9.0E-04	(mg/kg-day)	NA	NA		1.0E-02	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-02
				Aroclor-1242	53469-21-9	6E+00	mg/kg	7.6E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	8.9E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-01
				Aroclor-1260	11096-82-5	2E+01	mg/kg	2.5E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-06	2.9E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+00
				ARSENIC	7440-38-2	7E+00	mg/kg	9.2E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-06	1.1E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-02
				Benzene	71-43-2	5E-02	mg/kg	6.9E-09	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	4E-10	8.0E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	2E-05
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	1.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	2.0E-05	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	8.4E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	6E-05	1.4E-05	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	1.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	2.0E-05	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	7.8E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	6E-08	9.0E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	5.7E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	7E-07	6.6E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	3.9E-06	(mg/kg-day)	NA	NA		4.5E-05	(mg/kg-day)	5.0E-04	(mg/kg-day)	9E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	2.8E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-05	3.3E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-01
				Chrysene	218-01-9	1E+01	mg/kg	1.6E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	1E-08	1.9E-05	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	7.6E-07	(mg/kg-day)	NA	NA		8.9E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-02
				COPPER	7440-50-8	2E+02	mg/kg	2.4E-05	(mg/kg-day)	NA	NA		2.8E-04	(mg/kg-day)	4.0E-02	(mg/kg-day)	7E-03
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	6.9E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-06	1.2E-06	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	4.0E-07	(mg/kg-day)	NA	NA		4.7E-06	(mg/kg-day)	1.0E-03	(mg/kg-day)	5E-03
				Dieldrin	60-57-1	1E-01	mg/kg	1.5E-08	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	2E-07	1.8E-07	(mg/kg-day)	5.0E-05	(mg/kg-day)	4E-03
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	3.2E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	5E-06	3.8E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	4E-01
				Heptachlor	76-44-8	5E-02	mg/kg	7.1E-09	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	3E-08	8.2E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-04
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	7.4E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-07	8.7E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	2.1E-03	(mg/kg-day)	NA	NA		2.4E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	3E-02
				MANGANESE	7439-96-5	3E+02	mg/kg	4.8E-05	(mg/kg-day)	NA	NA		5.6E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-02
				MERCURY	7487-94-7	5E-01	mg/kg	6.3E-08	(mg/kg-day)	NA	NA		7.3E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Naphthalene	91-20-3	7E+00	mg/kg	9.0E-07	(mg/kg-day)	NA	NA		1.0E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	5E-04
				NICKEL	7440-02-0	8E+01	mg/kg	1.1E-05	(mg/kg-day)	NA	NA		1.3E-04	(mg/kg-day)	2.0E-02	(mg/kg-day)	6E-03
				VANADIUM	7440-62-2	2E+01	mg/kg	2.2E-06	(mg/kg-day)	NA	NA		2.6E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-01
				Vinyl chloride	75-01-4	4E-03	mg/kg	5.6E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	4E-10	6.6E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-06
			Exp. Route Total									2E-04					3E+00
		Lower Ley Creek	Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	2.2E-08	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	4E-07	2.6E-07	(mg/kg-day)	3.0E-05	(mg/kg-day)	9E-03
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	4.2E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	8E-06	4.9E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	7E-01
				Aroclor-1260	11096-82-5	2E+01	mg/kg	1.4E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-05	1.6E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	8E+00
				ARSENIC	7440-38-2	7E+00	mg/kg	1.1E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-06	1.3E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-02
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	8.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-06	1.0E-04	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	4.8E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-04	7.3E-05	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	8.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-06	1.0E-04	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	4.0E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-07	4.6E-05	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	2.9E-06	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	3E-06	3.4E-05	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	1.5E-07	(mg/kg-day)	NA	NA		1.8E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-04
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	8.2E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	6E-08	9.5E-05	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	3.9E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-05	6.0E-06	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	1.6E-06	(mg/kg-day)	NA	NA		1.8E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-02
				Dieldrin	60-57-1	1E-01	mg/kg	5.9E-08	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	1E-06	6.9E-07	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-02
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	

TABLE 7.3b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Heptachlor	76-44-8	5E-02	mg/kg	2.8E-08	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	1E-07	3.2E-07	(mg/kg-day)	5.0E-04	(mg/kg-day)	6E-04
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	3.8E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	4.4E-05	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	4.6E-06	(mg/kg-day)	NA	NA		5.3E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	3E-03
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									4E-04					9E+00
		Exposure Point Total										7E-04					1E+01
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	4.1E-03	(mg/kg-day)	NA	NA		4.8E-02	(mg/kg-day)	1.0E+00	(mg/kg-day)	5E-02
				ANTIMONY	7440-36-0	3E+00	mg/kg	1.1E-06	(mg/kg-day)	NA	NA		1.3E-05	(mg/kg-day)	4.0E-04	(mg/kg-day)	3E-02
				Aroclor-1242	53469-21-9	4E-01	mg/kg	2.0E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-07	2.3E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	3E-02
				Aroclor-1248	12672-29-6	1E+00	mg/kg	4.5E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-07	5.3E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	3.2E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	5E-06	3.8E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-01
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	5.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	5.9E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	4.0E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-05	6.8E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	8.5E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-07	9.9E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	4.4E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-08	5.1E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	3.3E-07	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	4E-07	3.9E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	4.2E-06	(mg/kg-day)	NA	NA		4.9E-05	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-01
				CHROMIUM	18540-29-9	2E+02	mg/kg	9.9E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	5E-05	1.2E-03	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-01
				COBALT	7440-48-4	7E+00	mg/kg	3.3E-06	(mg/kg-day)	NA	NA		3.9E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-01
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	3.9E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-06	6.6E-07	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	2.3E-11	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	3E-06	2.7E-10	(mg/kg-day)	1.0E-09	(mg/kg-day)	3E-01
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	5.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	6.1E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	9.1E-03	(mg/kg-day)	NA	NA		1.1E-01	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-01
				MANGANESE	7439-96-5	4E+02	mg/kg	1.7E-04	(mg/kg-day)	NA	NA		2.0E-03	(mg/kg-day)	2.4E-02	(mg/kg-day)	8E-02
				MERCURY	7487-94-7	5E-01	mg/kg	2.3E-07	(mg/kg-day)	NA	NA		2.6E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	9E-03
				VANADIUM	7440-62-2	2E+01	mg/kg	1.1E-05	(mg/kg-day)	NA	NA		1.3E-04	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E+00
			Exp. Route Total									9E-05					3E+00
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	1.1E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	1.3E-05	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-01
				Aroclor-1248	12672-29-6	1E+00	mg/kg	2.5E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-06	2.9E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+00
				ARSENIC	7440-38-2	7E+00	mg/kg	3.8E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	6E-06	4.5E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-01
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	2.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	3.0E-05	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	2.3E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-04	3.5E-05	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	4.3E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	5.0E-05	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	2.2E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-07	2.6E-05	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.7E-06	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-06	2.0E-05	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.6E-07	(mg/kg-day)	NA	NA		1.9E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-04
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	2.2E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-05	3.4E-06	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	2.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	3.1E-05	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	

TABLE 7.3b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Exp. Route Total									2E-04					2E+00
		Exposure Point Total										3E-04					5E+00
	Exposure Medium Total											1E-03					2E+01
Medium Total												1E-03					2E+01
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	9.5E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-07	1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	1.4E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	1.7E-07	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	4.0E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-07	4.6E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-03
				MANGANESE	7439-96-5	1E+02	µg/L	9.0E-06	(mg/kg-day)	NA	NA		1.0E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	4E-03
				Naphthalene	91-20-3	3E-01	µg/L	3.0E-08	(mg/kg-day)	NA	NA		3.5E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-05
				Pentachlorophenol	87-86-5	7E-01	µg/L	6.0E-08	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	7E-09	7.0E-07	(mg/kg-day)	3.0E-02	(mg/kg-day)	2E-05
				VANADIUM	7440-62-2	1E+00	µg/L	1.2E-07	(mg/kg-day)	NA	NA		1.4E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-02
				Vinyl chloride	75-01-4	8E-01	µg/L	6.7E-08	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	5E-08	7.8E-07	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-04
			Exp. Route Total									4E-07					3E-02
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	1.3E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-08	1.5E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-04
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	1.0E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-06	1.2E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-02
				MANGANESE	7439-96-5	1E+02	µg/L	1.2E-06	(mg/kg-day)	NA	NA		1.4E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-02
				Naphthalene	91-20-3	3E-01	µg/L	5.9E-07	(mg/kg-day)	NA	NA		6.9E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	3E-04
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	1.6E-08	(mg/kg-day)	NA	NA		1.8E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-01
				Vinyl chloride	75-01-4	8E-01	µg/L	1.5E-07	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	1E-07	1.7E-06	(mg/kg-day)	3.0E-03	(mg/kg-day)	6E-04
			Exp. Route Total									2E-06					1E-01
		Exposure Point Total										3E-06					2E-01
	Exposure Medium Total											3E-06					2E-01
Medium Total												3E-06					2E-01
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Ingestion	Aroclor-1254	11097-69-1	1E+00	mg/kg	3.7E-05	(mg/kg-day)	NA	NA		4.4E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E+01
				Aroclor-1260	11096-82-5	6E-01	mg/kg	1.8E-05	(mg/kg-day)	NA	NA		2.2E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+01
				Total Aroclors		1E+00	mg/kg	4.3E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-05	5.0E-04	(mg/kg-day)	NA	NA	
				ARSENIC	7440-38-2	1E+00	mg/kg	5.4E-05	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	8E-05	6.3E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E+00
				CHROMIUM	18540-29-9	4E+01	mg/kg	2.1E-03	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-03	2.4E-02	(mg/kg-day)	3E-03	(mg/kg-day)	8E+00
				Dieldrin	60-57-1	2E-02	mg/kg	7.9E-07	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	1E-05	9.2E-06	(mg/kg-day)	5.0E-05	(mg/kg-day)	2E-01
				Total D/F, as TEQ	1746-01-6	3E-06	mg/kg	1.1E-10	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	2E-05	1.3E-09	(mg/kg-day)	1.0E-09	(mg/kg-day)	1E+00
				Heptachlor epoxide	1024-57-3	7E-03	mg/kg	3.4E-07	(mg/kg-day)	9.1E+00	(mg/kg-day)-1	3E-06	4.0E-06	(mg/kg-day)	1.3E-05	(mg/kg-day)	3E-01
				IRON	7439-89-6	2E+02	mg/kg	8.2E-03	(mg/kg-day)	NA	NA		9.6E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	1E-01
				MERCURY	22967-92-6	5E-01	mg/kg	2.3E-05	(mg/kg-day)	NA	NA		2.6E-04	(mg/kg-day)	1.0E-04	(mg/kg-day)	3E+00
				SELENIUM	7782-49-2	3E+00	mg/kg	1.4E-04	(mg/kg-day)	NA	NA		1.6E-03	(mg/kg-day)	5.0E-03	(mg/kg-day)	3E-01
				ZINC	7440-66-6	8E+01	mg/kg	3.6E-03	(mg/kg-day)	NA	NA		4.2E-02	(mg/kg-day)	3.0E-01	(mg/kg-day)	1E-01
			Exp. Route Total									1E-03					5E+01
		Exposure Point										1E-03					5E+01
	Exposure Medium Total											1E-03					5E+01
Medium Total												1E-03					5E+01
								Total of Receptor Risks Across All Media				2E-03	Total of Receptor Risks Across All Media				6E+01

TABLE 7.4a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	2.1E-08	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	5E-07	7.4E-07	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	1.5E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	3E-09	5.3E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	2E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	2.4E-05	(mg/kg-day)	NA	NA		8.4E-04	(mg/kg-day)	1.0E+00	(mg/kg-day)	8E-04
				Aroclor-1242	53469-21-9	6E+00	mg/kg	2.0E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-08	7.1E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	6.6E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	2.3E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	2.5E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-08	8.6E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Benzene	71-43-2	5E-02	mg/kg	1.8E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	1E-11	6.5E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	2E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	4.5E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	1.6E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	3.3E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-07	1.1E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	4.5E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	1.6E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	2.1E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-09	7.3E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	1.5E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-08	5.3E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	1.0E-07	(mg/kg-day)	NA	NA		3.7E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	7E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	7.5E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	4E-07	2.6E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	9E-03
				Chrysene	218-01-9	1E+01	mg/kg	4.3E-08	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	3E-10	1.5E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	2.0E-08	(mg/kg-day)	NA	NA		7.1E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				COPPER	7440-50-8	2E+02	mg/kg	6.4E-07	(mg/kg-day)	NA	NA		2.3E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	6E-04
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	2.7E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-08	9.4E-08	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	1.1E-08	(mg/kg-day)	NA	NA		3.8E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	4E-04
				Dieldrin	60-57-1	1E-01	mg/kg	4.1E-10	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	6E-09	1.4E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	3E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	8.7E-13	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	1E-07	3.0E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	3E-02
				Heptachlor	76-44-8	5E-02	mg/kg	1.9E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	9E-10	6.6E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	2.0E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	7.0E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	5.6E-05	(mg/kg-day)	NA	NA		1.9E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	3E-03
				MANGANESE	7439-96-5	3E+02	mg/kg	1.3E-06	(mg/kg-day)	NA	NA		4.5E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-03
				MERCURY	7487-94-7	5E-01	mg/kg	1.7E-09	(mg/kg-day)	NA	NA		5.9E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-04
				Naphthalene	91-20-3	7E+00	mg/kg	2.4E-08	(mg/kg-day)	NA	NA		8.4E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-05
				NICKEL	7440-02-0	8E+01	mg/kg	2.9E-07	(mg/kg-day)	NA	NA		1.0E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	5E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	6.0E-08	(mg/kg-day)	NA	NA		2.1E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	3E-02
				Vinyl chloride	75-01-4	4E-03	mg/kg	1.5E-11	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	1E-11	5.3E-10	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-07
			Exp. Route Total									2E-06					2E-01
		Lower Ley Creek	Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	5.2E-11	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	9E-10	1.8E-09	(mg/kg-day)	3.0E-05	(mg/kg-day)	6E-05
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	9.8E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-08	3.4E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	5E-03
				Aroclor-1260	11096-82-5	2E+01	mg/kg	3.2E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-08	1.1E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	2.5E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-09	8.9E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.0E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	7.1E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	1.5E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-07	5.2E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	2.0E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	7.1E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	9.3E-09	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-10	3.3E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	6.8E-09	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	8E-09	2.4E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	3.6E-10	(mg/kg-day)	NA	NA		1.3E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	1.9E-08	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	1E-10	6.8E-07	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.2E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-09	4.2E-08	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	3.7E-09	(mg/kg-day)	NA	NA		1.3E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-04
				Dieldrin	60-57-1	1E-01	mg/kg	1.4E-10	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	2E-09	4.9E-09	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-04

TABLE 7.4a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Heptachlor	76-44-8	5E-02	mg/kg	6.5E-11	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	3E-10	2.3E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	5E-06
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	8.9E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-09	3.1E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	1.1E-08	(mg/kg-day)	NA	NA		3.8E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-05
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									3E-07					6E-02
		Exposure Point Total										2E-06					3E-01
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	3.4E-05	(mg/kg-day)	NA	NA		1.2E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-03
				ANTIMONY	7440-36-0	3E+00	mg/kg	9.3E-09	(mg/kg-day)	NA	NA		3.2E-07	(mg/kg-day)	4.0E-04	(mg/kg-day)	8E-04
				Aroclor-1242	53469-21-9	4E-01	mg/kg	1.7E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-09	5.8E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	8E-04
				Aroclor-1248	12672-29-6	1E+00	mg/kg	3.7E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	7E-09	1.3E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	7E-03
				ARSENIC	7440-38-2	7E+00	mg/kg	2.7E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-08	9.4E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	4.2E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-09	1.5E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	4.8E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-08	1.7E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	7.0E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-09	2.4E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	3.6E-09	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-10	1.3E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	2.7E-09	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	3E-09	9.5E-08	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	3.4E-08	(mg/kg-day)	NA	NA		1.2E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	8.2E-07	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	4E-07	2.9E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-02
				COBALT	7440-48-4	7E+00	mg/kg	2.8E-08	(mg/kg-day)	NA	NA		9.7E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	4.6E-10	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-09	1.6E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	1.9E-13	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	3E-08	6.7E-12	(mg/kg-day)	1.0E-09	(mg/kg-day)	7E-03
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	4.3E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-09	1.5E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	7.5E-05	(mg/kg-day)	NA	NA		2.6E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-03
				MANGANESE	7439-96-5	4E+02	mg/kg	1.4E-06	(mg/kg-day)	NA	NA		5.0E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-03
				MERCURY	7487-94-7	5E-01	mg/kg	1.9E-09	(mg/kg-day)	NA	NA		6.5E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	9.0E-08	(mg/kg-day)	NA	NA		3.1E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-02
			Exp. Route Total									5E-07					9E-02
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	8.0E-10	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-09	2.8E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-04
				Aroclor-1248	12672-29-6	1E+00	mg/kg	1.8E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-09	6.3E-08	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-03
				ARSENIC	7440-38-2	7E+00	mg/kg	2.8E-09	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-09	9.7E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-04
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	1.9E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-09	6.6E-08	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	2.2E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-08	7.6E-08	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	3.1E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-09	1.1E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	1.6E-09	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-10	5.6E-08	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.2E-09	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	1E-09	4.3E-08	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.2E-10	(mg/kg-day)	NA	NA		4.2E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	4E-07
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	2.1E-10	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-09	7.3E-09	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	1.9E-09	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-09	6.8E-08	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	

TABLE 7.4a.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
			Exp. Route Total									3E-08					4E-03
		Exposure Point Total										6E-07					9E-02
	Exposure Medium Total											2E-06					4E-01
Medium Total												2E-06					4E-01
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	7.1E-11	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-10	2.5E-09	(mg/kg-day)	3.0E-04	(mg/kg-day)	8E-06
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	1.1E-11	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-12	3.8E-10	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	3.0E-10	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-10	1.0E-08	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-06
				MANGANESE	7439-96-5	1E+02	µg/L	6.7E-09	(mg/kg-day)	NA	NA		2.4E-07	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-05
				Naphthalene	91-20-3	3E-01	µg/L	2.2E-11	(mg/kg-day)	NA	NA		7.8E-10	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-08
				Pentachlorophenol	87-86-5	7E-01	µg/L	4.5E-11	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	5E-12	1.6E-09	(mg/kg-day)	3.0E-02	(mg/kg-day)	5E-08
				VANADIUM	7440-62-2	1E+00	µg/L	8.9E-11	(mg/kg-day)	NA	NA		3.1E-09	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-05
				Vinyl chloride	75-01-4	8E-01	µg/L	5.0E-11	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	4E-11	1.8E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	6E-07
			Exp. Route Total									3E-10					7E-05
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	1.7E-12	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-12	5.9E-11	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-07
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	2.8E-10	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	6E-09	9.9E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-04
				MANGANESE	7439-96-5	1E+02	µg/L	3.2E-09	(mg/kg-day)	NA	NA		1.1E-07	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-04
				Naphthalene	91-20-3	3E-01	µg/L	1.0E-09	(mg/kg-day)	NA	NA		3.6E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	4.2E-11	(mg/kg-day)	NA	NA		1.5E-09	(mg/kg-day)	7.0E-05	(mg/kg-day)	8E-04
				Vinyl chloride	75-01-4	8E-01	µg/L	1.3E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	1E-10	4.7E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-06
			Exp. Route Total									6E-09					1E-03
		Exposure Point Total										6E-09					1E-03
	Exposure Medium Total											6E-09					1E-03
Medium Total												6E-09					1E-03
								Total of Receptor Risks Across All Media				2E-06	Total of Receptor Risks Across All Media				4E-01

TABLE 7.4b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
			Ingestion	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	5.3E-08	(mg/kg-day)	2.2E+01	(mg/kg-day)-1	1E-06	1.8E-06	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	3.8E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	6E-09	1.3E-08	(mg/kg-day)	3.0E-05	(mg/kg-day)	4E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	6.0E-05	(mg/kg-day)	NA	NA		2.1E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	2E-03
				Aroclor-1242	53469-21-9	6E+00	mg/kg	5.1E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	1.8E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	3E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	1.7E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-07	5.8E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	6.1E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	9E-08	2.2E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-03
				Benzene	71-43-2	5E-02	mg/kg	4.6E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	3E-11	1.6E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	4E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	1.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	3.9E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	8.2E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	6E-07	2.9E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	1.1E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-08	3.9E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	5.2E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	4E-09	1.8E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	3.8E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	5E-08	1.3E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	2.6E-07	(mg/kg-day)	NA	NA		9.1E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-02
				CHROMIUM	18540-29-9	2E+02	mg/kg	1.9E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	9E-07	6.6E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-02
				Chrysene	218-01-9	1E+01	mg/kg	1.1E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	8E-10	3.8E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	5.1E-08	(mg/kg-day)	NA	NA		1.8E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	6E-03
				COPPER	7440-50-8	2E+02	mg/kg	1.6E-06	(mg/kg-day)	NA	NA		5.6E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	1E-03
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	6.7E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-08	2.4E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	2.7E-08	(mg/kg-day)	NA	NA		9.4E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	9E-04
				Dieldrin	60-57-1	1E-01	mg/kg	1.0E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	2E-08	3.6E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	7E-04
				Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	2.2E-12	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	3E-07	7.6E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	8E-02
				Heptachlor	76-44-8	5E-02	mg/kg	4.7E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	2E-09	1.7E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	5.0E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-08	1.7E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	1.4E-04	(mg/kg-day)	NA	NA		4.9E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	7E-03
				MANGANESE	7439-96-5	3E+02	mg/kg	3.2E-06	(mg/kg-day)	NA	NA		1.1E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	5E-03
				MERCURY	7487-94-7	5E-01	mg/kg	4.2E-09	(mg/kg-day)	NA	NA		1.5E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-04
				Naphthalene	91-20-3	7E+00	mg/kg	6.0E-08	(mg/kg-day)	NA	NA		2.1E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-04
				NICKEL	7440-02-0	8E+01	mg/kg	7.2E-07	(mg/kg-day)	NA	NA		2.5E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-03
				VANADIUM	7440-62-2	2E+01	mg/kg	1.5E-07	(mg/kg-day)	NA	NA		5.2E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	7E-02
				Vinyl chloride	75-01-4	4E-03	mg/kg	3.8E-11	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	3E-11	1.3E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	4E-07
			Exp. Route Total									4E-06					5E-01
		Lower Ley Creek	Dermal	3-Methylcholanthrene	56-49-5	6E+00	mg/kg	NA	NA	2.2E+01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				Aldrin	309-00-2	4E-02	mg/kg	5.9E-10	(mg/kg-day)	1.7E+01	(mg/kg-day)-1	1E-08	2.1E-08	(mg/kg-day)	3.0E-05	(mg/kg-day)	7E-04
				ALUMINUM	7429-90-5	7E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				Aroclor-1242	53469-21-9	6E+00	mg/kg	1.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	3.9E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	6E-02
				Aroclor-1260	11096-82-5	2E+01	mg/kg	3.6E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	7E-07	1.3E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E-01
				ARSENIC	7440-38-2	7E+00	mg/kg	2.9E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-08	1.0E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Benzene	71-43-2	5E-02	mg/kg	NA	NA	5.5E-02	(mg/kg-day)-1		NA	(mg/kg-day)	4.0E-03	(mg/kg-day)	
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	8.0E-06	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	9E+00	mg/kg	1.7E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-06	5.8E-06	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	1E+01	mg/kg	2.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	8.0E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.0E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	8E-09	3.7E-06	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	4E+00	mg/kg	7.7E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	9E-08	2.7E-06	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	3E+01	mg/kg	4.1E-09	(mg/kg-day)	NA	NA		1.4E-07	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-05
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				Chrysene	218-01-9	1E+01	mg/kg	2.2E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	2E-09	7.6E-06	(mg/kg-day)	NA	NA	
				COBALT	7440-48-4	6E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				COPPER	7440-50-8	2E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-02	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	7E-01	mg/kg	1.4E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-07	4.8E-07	(mg/kg-day)	NA	NA	
				Dibenzofuran	132-64-9	3E+00	mg/kg	4.2E-08	(mg/kg-day)	NA	NA		1.5E-06	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-03
				Dieldrin	60-57-1	1E-01	mg/kg	1.6E-09	(mg/kg-day)	1.6E+01	(mg/kg-day)-1	3E-08	5.5E-08	(mg/kg-day)	5.0E-05	(mg/kg-day)	1E-03

TABLE 7.4b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment to a depth of 12 inches			Total D/F, as TEQ	1746-01-6	2E-04	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Heptachlor	76-44-8	5E-02	mg/kg	7.4E-10	(mg/kg-day)	4.5E+00	(mg/kg-day)-1	3E-09	2.6E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	5E-05
				Indeno(1,2,3-cd)pyrene	193-39-5	5E+00	mg/kg	1.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-08	3.5E-06	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	3E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Naphthalene	91-20-3	7E+00	mg/kg	1.2E-07	(mg/kg-day)	NA	NA		4.2E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-04
				NICKEL	7440-02-0	8E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.0E-02	(mg/kg-day)	
				Vanadium	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
				Vinyl chloride	75-01-4	4E-03	mg/kg	NA	NA	7.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
			Exp. Route Total									3E-06					7E-01
		Exposure Point Total										7E-06					1E+00
		Dredge Spoils Area	Ingestion	ALUMINUM	7429-90-5	9E+03	mg/kg	8.4E-05	(mg/kg-day)	NA	NA		3.0E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	3E-03
				ANTIMONY	7440-36-0	3E+00	mg/kg	2.3E-08	(mg/kg-day)	NA	NA		8.1E-07	(mg/kg-day)	4.0E-04	(mg/kg-day)	2E-03
				Aroclor-1242	53469-21-9	4E-01	mg/kg	4.1E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	8E-09	1.4E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	9.3E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-08	3.3E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	6.7E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-07	2.3E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	8E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	1.0E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-09	3.7E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	1.2E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-08	4.2E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	1.7E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-08	6.1E-07	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	9.0E-09	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-10	3.1E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	6.8E-09	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	8E-09	2.4E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	8.6E-08	(mg/kg-day)	NA	NA		3.0E-06	(mg/kg-day)	5.0E-04	(mg/kg-day)	6E-03
				CHROMIUM	18540-29-9	2E+02	mg/kg	2.0E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-06	7.2E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-02
				COBALT	7440-48-4	7E+00	mg/kg	6.9E-08	(mg/kg-day)	NA	NA		2.4E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	8E-03
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	1.2E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	8E-09	4.1E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	4.8E-13	(mg/kg-day)	1.5E+05	(mg/kg-day)-1	7E-08	1.7E-11	(mg/kg-day)	1.0E-09	(mg/kg-day)	2E-02
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	1.1E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-09	3.8E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	1.9E-04	(mg/kg-day)	NA	NA		6.6E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	9E-03
				MANGANESE	7439-96-5	4E+02	mg/kg	3.6E-06	(mg/kg-day)	NA	NA		1.2E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	5E-03
				MERCURY	7487-94-7	5E-01	mg/kg	4.6E-09	(mg/kg-day)	NA	NA		1.6E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-04
				VANADIUM	7440-62-2	2E+01	mg/kg	2.2E-07	(mg/kg-day)	NA	NA		7.9E-06	(mg/kg-day)	7.0E-05	(mg/kg-day)	1E-01
			Exp. Route Total									1E-06					2E-01
			Dermal	ALUMINUM	7429-90-5	9E+03	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	1.0E+00	(mg/kg-day)	
				ANTIMONY	7440-36-0	3E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	4.0E-04	(mg/kg-day)	
				Aroclor-1242	53469-21-9	4E-01	mg/kg	9.0E-09	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-08	3.1E-07	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-03
				Aroclor-1248	12672-29-6	1E+00	mg/kg	2.0E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-08	7.1E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E-02
				ARSENIC	7440-38-2	7E+00	mg/kg	3.1E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	5E-08	1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Benzo(a)anthracene	56-55-3	1E+00	mg/kg	2.1E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-08	7.4E-07	(mg/kg-day)	NA	NA	
				Benzo(a)pyrene	50-32-8	1E+00	mg/kg	2.4E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-07	8.5E-07	(mg/kg-day)	NA	NA	
				Benzo(b)fluoranthene	205-99-2	2E+00	mg/kg	3.5E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-08	1.2E-06	(mg/kg-day)	NA	NA	
				Benzo(k)fluoranthene	207-08-9	1E+00	mg/kg	1.8E-08	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-09	6.3E-07	(mg/kg-day)	NA	NA	
				Benzo[j]fluoranthene	205-82-3	7E-01	mg/kg	1.4E-08	(mg/kg-day)	1.2E+00	(mg/kg-day)-1	2E-08	4.8E-07	(mg/kg-day)	NA	NA	
				CADMIUM	7440-43-9	9E+00	mg/kg	1.3E-09	(mg/kg-day)	NA	NA		4.7E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	5E-06
				CHROMIUM	18540-29-9	2E+02	mg/kg	NA	NA	5.0E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-03	(mg/kg-day)	
				COBALT	7440-48-4	7E+00	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				Dibenzo(a,h)anthracene	53-70-3	1E-01	mg/kg	2.3E-09	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-08	8.2E-08	(mg/kg-day)	NA	NA	
				Total D/F, as TEQ	1746-01-6	5E-05	mg/kg	NA	NA	1.5E+05	(mg/kg-day)-1		NA	(mg/kg-day)	1.0E-09	(mg/kg-day)	
				Indeno(1,2,3-cd)pyrene	193-39-5	1E+00	mg/kg	2.2E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-08	7.7E-07	(mg/kg-day)	NA	NA	
				IRON	7439-89-6	2E+04	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-01	(mg/kg-day)	
				MANGANESE	7439-96-5	4E+02	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	2.4E-02	(mg/kg-day)	

TABLE 7.4b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				MERCURY	7487-94-7	5E-01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	3.0E-04	(mg/kg-day)	
				VANADIUM	7440-62-2	2E+01	mg/kg	NA	NA	NA	NA		NA	(mg/kg-day)	7.0E-05	(mg/kg-day)	
			Exp. Route Total									4E-07					4E-02
		Exposure Point Total										2E-06					3E-01
	Exposure Medium Total											8E-06					1E+00
Medium Total												8E-06					1E+00
Surface Water	Surface Water	Lower Ley Creek	Incidental ingestion	ARSENIC	7440-38-2	1E+00	µg/L	3.6E-10	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	5E-10	1.2E-08	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-05
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	5.4E-11	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-11	1.9E-09	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	1.5E-09	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	7E-10	5.2E-08	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-05
				MANGANESE	7439-96-5	1E+02	µg/L	3.4E-08	(mg/kg-day)	NA	NA		1.2E-06	(mg/kg-day)	2.4E-02	(mg/kg-day)	5E-05
				Naphthalene	91-20-3	3E-01	µg/L	1.1E-10	(mg/kg-day)	NA	NA		3.9E-09	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-07
				Pentachlorophenol	87-86-5	7E-01	µg/L	2.2E-10	(mg/kg-day)	1.2E-01	(mg/kg-day)-1	3E-11	7.9E-09	(mg/kg-day)	3.0E-02	(mg/kg-day)	3E-07
				VANADIUM	7440-62-2	1E+00	µg/L	4.5E-10	(mg/kg-day)	NA	NA		1.6E-08	(mg/kg-day)	7.0E-05	(mg/kg-day)	2E-04
				Vinyl chloride	75-01-4	8E-01	µg/L	2.5E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	2E-10	8.8E-09	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-06
			Exp. Route Total									2E-09					3E-04
			Dermal	ARSENIC	7440-38-2	1E+00	µg/L	1.7E-10	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-10	5.9E-09	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-05
				Benzo(b)fluoranthene	205-99-2	2E-01	µg/L	NA	(mg/kg-day)	7.3E-01	(mg/kg-day)-1		NA	(mg/kg-day)	NA	NA	
				CHROMIUM	18540-29-9	4E+00	µg/L	1.4E-09	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	3E-08	4.9E-08	(mg/kg-day)	3.0E-03	(mg/kg-day)	7E-04
				MANGANESE	7439-96-5	1E+02	µg/L	1.6E-08	(mg/kg-day)	NA	NA		5.6E-07	(mg/kg-day)	2.4E-02	(mg/kg-day)	6E-04
				Naphthalene	91-20-3	3E-01	µg/L	5.1E-09	(mg/kg-day)	NA	NA		1.8E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	9E-06
				Pentachlorophenol	87-86-5	7E-01	µg/L	NA	(mg/kg-day)	1.2E-01	(mg/kg-day)-1		NA	(mg/kg-day)	3.0E-02	(mg/kg-day)	
				VANADIUM	7440-62-2	1E+00	µg/L	2.1E-10	(mg/kg-day)	NA	NA		7.4E-09	(mg/kg-day)	7.0E-05	(mg/kg-day)	4E-03
				Vinyl chloride	75-01-4	8E-01	µg/L	6.7E-10	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	5E-10	2.3E-08	(mg/kg-day)	3.0E-03	(mg/kg-day)	8E-06
			Exp. Route Total									3E-08					5E-03
		Exposure Point Total										3E-08					6E-03
	Exposure Medium Total											3E-08					6E-03
Medium Total												3E-08					6E-03
								Total of Receptor Risks Across All Media				8E-06	Total of Receptor Risks Across All Media				1E+00

8.8 Series 9 Tables

TABLE 9.1a.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	1E-06		1E-06				
			Aldrin	6E-09	1E-08	2E-08	liver	9E-05	1E-04	9E-05
			ALUMINUM				CNS	4E-04		4E-04
			Aroclor-1242	9E-08	2E-07	3E-07	whole body	5E-03	1E-02	5E-03
			Aroclor-1260	3E-07	7E-07	1E-06	whole body	6E-02	1E-01	6E-02
			ARSENIC	8E-08	4E-08	1E-07	skin	1E-03	7E-04	1E-03
			Benzene	2E-11		2E-11	blood	8E-07		8E-07
			Benzo(a)anthracene	7E-08	2E-07	2E-07				
			Benzo(a)pyrene	5E-07	1E-06	2E-06				
			Benzo(b)fluoranthene	7E-08	2E-07	2E-07				
			Benzo(k)fluoranthene	3E-09	7E-09	1E-08				
			Benzo[j]fluoranthene	4E-08	9E-08	1E-07				
			CADMIUM				kidney	4E-03	3E-06	4E-03
			CHROMIUM	8E-07		8E-07	GI	4E-03		4E-03
			Chrysene	7E-10	2E-09	2E-09				
			COBALT				thyroid	1E-03		1E-03
			COPPER				GI	3E-04		3E-04
			Dibenzo(a,h)anthracene	4E-08	1E-07	1E-07				
			Dibenzofuran					2E-04	3E-04	2E-04
			Dieldrin	1E-08	2E-08	4E-08	liver	1E-04	2E-04	1E-04
			Total D/F, as TEQ	3E-07		3E-07		1E-02		1E-02
			Heptachlor	2E-09	3E-09	5E-09	liver	6E-06	1E-05	6E-06
			Indeno(1,2,3-cd)pyrene	3E-08	7E-08	1E-07				
			IRON				GI	1E-03		1E-03
			MANGANESE				CNS	9E-04		9E-04
			MERCURY				developmental	9E-05		9E-05
			Naphthalene					2E-05	5E-05	2E-05
			NICKEL				whole body	2E-04		2E-04
			VANADIUM				kidney	1E-02		1E-02
			Vinyl chloride	2E-11		2E-11	liver	9E-08		9E-08
			Chemical Total			6E-06				1E-01
		Exposure Point Total				6E-06				1E-01
		Dredge Spoils Area	ALUMINUM				CNS	1E-03		1E-03
			ANTIMONY				blood	9E-04		9E-04
			Aroclor-1242	2E-08	4E-08	6E-08	whole body	9E-04	2E-03	9E-04
			Aroclor-1248	4E-08	9E-08	1E-07	whole body	7E-03	2E-02	7E-03
			ARSENIC	2E-07	1E-07	3E-07	skin	3E-03	2E-03	3E-03
			Benzo(a)anthracene	1E-08	3E-08	5E-08				
			Benzo(a)pyrene	2E-07	4E-07	6E-07				
			Benzo(b)fluoranthene	3E-08	6E-08	8E-08				
			Benzo(k)fluoranthene	1E-09	3E-09	4E-09				
			Benzo[j]fluoranthene	2E-08	4E-08	5E-08				
			CADMIUM				kidney	3E-03	2E-06	3E-03
			CHROMIUM	2E-06		2E-06	GI	1E-02		1E-02
			COBALT				thyroid	4E-03		4E-03
			Dibenzo(a,h)anthracene	2E-08	4E-08	5E-08				
			Total D/F, as TEQ	1E-07		1E-07		7E-03		7E-03
			Indeno(1,2,3-cd)pyrene	2E-08	3E-08	5E-08				
			IRON				GI	4E-03		4E-03
			MANGANESE				CNS	2E-03		2E-03
			MERCURY				developmental	2E-04		2E-04
			VANADIUM				kidney	5E-02		5E-02
			Chemical Total			3E-06				9E-02
		Exposure Point Total				3E-06				9E-02
	Exposure Medium Total					1E-05				2E-01
Medium Total						1E-05				2E-01
	Surface Water	Lower Ley Creek	ARSENIC	1E-08	5E-09	2E-08	skin	2E-04	8E-05	2E-04
			Benzo(b)fluoranthene	9E-10		9E-10				
			CHROMIUM	2E-08	1E-06	1E-06	GI	9E-05	7E-03	9E-05
			MANGANESE				CNS	3E-04	6E-03	3E-04
			Naphthalene					1E-06	1E-04	1E-06

TABLE 9.1a.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	6E-10		6E-10	liver/kidney	1E-06		1E-06
			VANADIUM				kidney	1E-03	4E-02	1E-03
			Vinyl chloride	4E-09	7E-08	7E-08	liver	2E-05	2E-04	2E-05
			Chemical Total			1E-06				2E-03
		Exposure Point Total				1E-06				2E-03
	Exposure Medium Total					1E-06				2E-03
Medium Total						1E-06				2E-03
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Aroclor-1254				whole body	5E+00		5E+00
			Aroclor-1260				whole body	2E+00		2E+00
			Total Aroclors	3E-05		3E-05				
			ARSENIC	3E-05		3E-05	skin	4E-01		4E-01
			CHROMIUM	3E-04		3E-04	GI	2E+00		2E+00
			Dieldrin	4E-06		4E-06	liver	4E-02		4E-02
			Total D/F, as TEQ	5E-06		5E-06		3E-01		3E-01
			Heptachlor epoxide	1E-06		1E-06	liver	6E-02		6E-02
			IRON				GI	3E-02		3E-02
			MERCURY				developmental	5E-01		5E-01
			SELENIUM					7E-02		7E-02
			ZINC				blood	3E-02		3E-02
			Chemical Total			4E-04				1E+01
		Exposure Point Total				4E-04				1E+01
	Exposure Medium Total					4E-04				1E+01
Medium Total						4E-04				1E+01
Receptor Total						4E-04			Receptor HI Total	1E+01

Blood HI Across All Media =	3E-02
CNS HI Across All Media =	5E-03
Developmental HI Across All Media =	5E-01
GI HI Across All Media =	2E+00
Kidney HI Across All Media =	6E-02
Liver HI Across All Media =	1E-01
Skin HI Across All Media =	4E-01
Thyroid HI Across All Media =	5E-03
Whole Body HI Across All Media =	7E+00

TABLE 9.1b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	9E-06		9E-06				
			Aldrin	5E-08	9E-08	1E-07	liver	2E-04	4E-04	2E-04
			ALUMINUM				CNS	1E-03		1E-03
			Aroclor-1242	8E-07	2E-06	3E-06	whole body	1E-02	3E-02	1E-02
			Aroclor-1260	3E-06	6E-06	9E-06	whole body	2E-01	4E-01	2E-01
			ARSENIC	7E-07	4E-07	1E-06	skin	4E-03	2E-03	4E-03
			Benzene	2E-10		2E-10	blood	2E-06		2E-06
			Benzo(a)anthracene	7E-07	1E-06	2E-06				
			Benzo(a)pyrene	5E-06	1E-05	2E-05				
			Benzo(b)fluoranthene	7E-07	1E-06	2E-06				
			Benzo(k)fluoranthene	3E-08	7E-08	1E-07				
			Benzo[j]fluoranthene	4E-07	8E-07	1E-06				
			CADMIUM				kidney	1E-02	8E-06	1E-02
			CHROMIUM	7E-06		7E-06	GI	1E-02		1E-02
			Chrysene	6E-09	1E-08	2E-08				
			COBALT				thyroid	3E-03		3E-03
			COPPER				GI	8E-04		8E-04
			Dibenzo(a,h)anthracene	4E-07	9E-07	1E-06				
			Dibenzofuran					5E-04	9E-04	5E-04
			Dieldrin	1E-07	2E-07	4E-07	liver	4E-04	6E-04	4E-04
			Total D/F, as TEQ	3E-06		3E-06		4E-02		4E-02
			Heptachlor	2E-08	3E-08	5E-08	liver	2E-05	3E-05	2E-05
			Indeno(1,2,3-cd)pyrene	3E-07	6E-07	9E-07				
			IRON				GI	4E-03		4E-03
			MANGANESE				CNS	3E-03		3E-03
			MERCURY				developmental	3E-04		3E-04
			Naphthalene					6E-05	1E-04	6E-05
			NICKEL				whole body	7E-04		7E-04
			VANADIUM				kidney	4E-02		4E-02
			Vinyl chloride	2E-10		2E-10	liver	2E-07		2E-07
			Chemical Total			6E-05				3E-01
		Exposure Point Total				6E-05				3E-01
		Dredge Spoils Area	ALUMINUM				CNS	5E-03		5E-03
			ANTIMONY				blood	4E-03		4E-03
			Aroclor-1242	2E-07	5E-07	7E-07	whole body	4E-03	9E-03	4E-03
			Aroclor-1248	5E-07	1E-06	2E-06	whole body	3E-02	7E-02	3E-02
			ARSENIC	3E-06	1E-06	4E-06	skin	1E-02	7E-03	1E-02
			Benzo(a)anthracene	2E-07	4E-07	6E-07				
			Benzo(a)pyrene	2E-06	5E-06	7E-06				
			Benzo(b)fluoranthene	3E-07	7E-07	1E-06				
			Benzo(k)fluoranthene	2E-08	4E-08	5E-08				
			Benzo[j]fluoranthene	2E-07	5E-07	7E-07				
			CADMIUM				kidney	1E-02	9E-06	1E-02
			CHROMIUM	3E-05		3E-05	GI	4E-02		4E-02
			COBALT				thyroid	1E-02		1E-02
			Dibenzo(a,h)anthracene	2E-07	5E-07	7E-07				
			Total D/F, as TEQ	2E-06		2E-06		3E-02		3E-02
			Indeno(1,2,3-cd)pyrene	2E-07	5E-07	7E-07				
			IRON				GI	2E-02		2E-02
			MANGANESE				CNS	9E-03		9E-03
			MERCURY				developmental	9E-04		9E-04
			VANADIUM				kidney	2E-01		2E-01
			Chemical Total			5E-05				4E-01
		Exposure Point Total				5E-05				4E-01
	Exposure Medium Total					1E-04				7E-01
Medium Total						1E-04				7E-01
	Surface Water	Lower Ley Creek	ARSENIC	2E-07	6E-08	2E-07	skin	8E-04	3E-04	8E-04
			Benzo(b)fluoranthene	1E-08		1E-08				
			CHROMIUM	2E-07	6E-06	6E-06	GI	3E-04	1E-02	3E-04
			MANGANESE				CNS	9E-04	8E-03	9E-04
			Naphthalene					4E-06	2E-04	4E-06

TABLE 9.1b.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	8E-09		8E-09	liver/kidney	5E-06		5E-06
			VANADIUM				kidney	4E-03	6E-02	4E-03
			Vinyl chloride	5E-08	3E-07	4E-07	liver	6E-05	3E-04	6E-05
			Chemical Total			7E-06				6E-03
		Exposure Point Total				7E-06				6E-03
	Exposure Medium Total					7E-06				6E-03
Medium Total						7E-06				6E-03
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Aroclor-1254				whole body	1E+01		1E+01
			Aroclor-1260				whole body	7E+00		7E+00
			Total Aroclors	3E-04		3E-04				
			ARSENIC	3E-04		3E-04	skin	1E+00		1E+00
			CHROMIUM	3E-03		3E-03	GI	5E+00		5E+00
			Dieldrin	4E-05		4E-05	liver	1E-01		1E-01
			Total D/F, as TEQ	5E-05		5E-05		8E-01		8E-01
			Heptachlor epoxide	1E-05		1E-05	liver	2E-01		2E-01
			IRON				GI	9E-02		9E-02
			MERCURY				developmental	2E+00		2E+00
			SELENIUM					2E-01		2E-01
			ZINC				blood	9E-02		9E-02
			Chemical Total			4E-03				3E+01
		Exposure Point Total				4E-03				3E+01
	Exposure Medium Total					4E-03				3E+01
Medium Total						4E-03				3E+01
Receptor Total						4E-03			Receptor HI Total	3E+01

Blood HI Across All Media =	9E-02
CNS HI Across All Media =	2E-02
Developmental HI Across All Media =	2E+00
GI HI Across All Media =	5E+00
Kidney HI Across All Media =	2E-01
Liver HI Across All Media =	3E-01
Skin HI Across All Media =	1E+00
Thyroid HI Across All Media =	2E-02
Whole Body HI Across All Media =	2E+01

TABLE 9.2a.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	7E-06		7E-06				
			Aldrin	6E-09	1E-08	2E-08	liver	1E-04	2E-04	1E-04
			ALUMINUM				CNS	5E-04		5E-04
			Aroclor-1242	1E-07	3E-07	4E-07	whole body	6E-03	2E-02	6E-03
			Aroclor-1260	3E-07	9E-07	1E-06	whole body	7E-02	2E-01	7E-02
			ARSENIC	9E-08	6E-08	1E-07	skin	2E-03	1E-03	2E-03
			Benzene	2E-11		2E-11	blood	9E-07		9E-07
			Benzo(a)anthracene	8E-08	2E-07	3E-07				
			Benzo(a)pyrene	3E-06	7E-06	1E-05				
			Benzo(b)fluoranthene	8E-08	2E-07	3E-07				
			Benzo(k)fluoranthene	4E-09	1E-08	1E-08				
			Benzo[j]fluoranthene	4E-08	1E-07	2E-07				
			CADMIUM				kidney	4E-03	5E-06	4E-03
			CHROMIUM	9E-07		9E-07	GI	5E-03		5E-03
			Chrysene	7E-10	2E-09	3E-09				
			COBALT				thyroid	1E-03		1E-03
			COPPER				GI	3E-04		3E-04
			Dibenzo(a,h)anthracene	3E-07	6E-07	8E-07				
			Dibenzofuran					2E-04	5E-04	2E-04
			Dieldrin	2E-08	3E-08	5E-08	liver	2E-04	4E-04	2E-04
			Total D/F, as TEQ	3E-07		3E-07		2E-02		2E-02
			Heptachlor	2E-09	4E-09	6E-09	liver	8E-06	2E-05	8E-06
			Indeno(1,2,3-cd)pyrene	3E-08	1E-07	1E-07				
			IRON				GI	2E-03		2E-03
			MANGANESE				CNS	1E-03		1E-03
			MERCURY				developmental	1E-04		1E-04
			Naphthalene					2E-05	7E-05	2E-05
			NICKEL				whole body	3E-04		3E-04
			VANADIUM				kidney	2E-02		2E-02
			Vinyl chloride	3E-11		3E-11	liver	1E-07		1E-07
			Chemical Total			2E-05				1E-01
		Exposure Point Total				2E-05				1E-01
		Dredge Spoils Area	ALUMINUM				CNS	2E-03		2E-03
			ANTIMONY				blood	1E-03		1E-03
			Aroclor-1242	2E-08	5E-08	7E-08	whole body	1E-03	3E-03	1E-03
			Aroclor-1248	4E-08	1E-07	2E-07	whole body	9E-03	3E-02	9E-03
			ARSENIC	2E-07	1E-07	3E-07	skin	4E-03	3E-03	4E-03
			Benzo(a)anthracene	2E-08	5E-08	6E-08				
			Benzo(a)pyrene	1E-06	2E-06	3E-06				
			Benzo(b)fluoranthene	3E-08	8E-08	1E-07				
			Benzo(k)fluoranthene	1E-09	4E-09	5E-09				
			Benzo[j]fluoranthene	2E-08	5E-08	7E-08				
			CADMIUM				kidney	3E-03	3E-06	3E-03
			CHROMIUM	2E-06		2E-06	GI	1E-02		1E-02
			COBALT				thyroid	4E-03		4E-03
			Dibenzo(a,h)anthracene	1E-07	2E-07	3E-07				
			Total D/F, as TEQ	2E-07		2E-07		9E-03		9E-03
			Indeno(1,2,3-cd)pyrene	2E-08	5E-08	6E-08				
			IRON				GI	5E-03		5E-03
			MANGANESE				CNS	3E-03		3E-03
			MERCURY				developmental	3E-04		3E-04
			VANADIUM				kidney	6E-02		6E-02
			Chemical Total			7E-06				1E-01
		Exposure Point Total				7E-06				1E-01
	Exposure Medium Total					3E-05				2E-01
Medium Total						3E-05				2E-01
	Surface Water	Lower Ley Creek	ARSENIC	1E-08	4E-09	2E-08	skin	3E-04	7E-05	3E-04
			Benzo(b)fluoranthene	1E-09		1E-09				
			CHROMIUM	2E-08	1E-06	1E-06	GI	1E-04	6E-03	1E-04
			MANGANESE				CNS	3E-04	5E-03	3E-04
			Naphthalene					1E-06	1E-04	1E-06

TABLE 9.2a.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	7E-10		7E-10	liver/kidney	2E-06		2E-06
			VANADIUM				kidney	1E-03	4E-02	1E-03
			Vinyl chloride	5E-09	5E-08	6E-08	liver	2E-05	2E-04	2E-05
			Chemical Total			1E-06				2E-03
		Exposure Point Total				1E-06				2E-03
	Exposure Medium Total					1E-06				2E-03
Medium Total						1E-06				2E-03
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Aroclor-1254				whole body	4E+00		4E+00
			Aroclor-1260				whole body	2E+00		2E+00
			Total Aroclors	2E-05		2E-05				
			ARSENIC	2E-05		2E-05	skin	3E-01		3E-01
			CHROMIUM	2E-04		2E-04	GI	1E+00		1E+00
			Dieldrin	3E-06		3E-06	liver	3E-02		3E-02
			Total D/F, as TEQ	4E-06		4E-06		2E-01		2E-01
			Heptachlor epoxide	7E-07		7E-07	liver	5E-02		5E-02
			IRON				GI	2E-02		2E-02
			MERCURY				developmental	4E-01		4E-01
			SELENIUM					5E-02		5E-02
			ZINC				blood	2E-02		2E-02
			Chemical Total			3E-04				8E+00
		Exposure Point Total				3E-04				8E+00
	Exposure Medium Total					3E-04				8E+00
Medium Total						3E-04				8E+00
Receptor Total						3E-04			Receptor HI Total	8E+00

Blood HI Across All Media =	2E-02
CNS HI Across All Media =	6E-03
Developmental HI Across All Media =	4E-01
GI HI Across All Media =	1E+00
Kidney HI Across All Media =	7E-02
Liver HI Across All Media =	8E-02
Skin HI Across All Media =	4E-01
Thyroid HI Across All Media =	6E-03
Whole Body HI Across All Media =	5E+00

TABLE 9.2b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	2E-05		2E-05				
			Aldrin	2E-08	4E-07	4E-07	liver	3E-04	5E-03	3E-04
			ALUMINUM				CNS	1E-03		1E-03
			Aroclor-1242	3E-07	8E-06	8E-06	whole body	2E-02	4E-01	2E-02
			Aroclor-1260	1E-06	3E-05	3E-05	whole body	2E-01	5E+00	2E-01
			ARSENIC	3E-07	2E-06	2E-06	skin	5E-03	2E-02	5E-03
			Benzene	8E-11		8E-11	blood	3E-06		3E-06
			Benzo(a)anthracene	3E-07	6E-06	6E-06				
			Benzo(a)pyrene	9E-06	2E-04	2E-04				
			Benzo(b)fluoranthene	3E-07	6E-06	6E-06				
			Benzo(k)fluoranthene	1E-08	3E-07	3E-07				
			Benzo[j]fluoranthene	1E-07	3E-06	4E-06				
			CADMIUM				kidney	1E-02	1E-04	1E-02
			CHROMIUM	3E-06		3E-06	GI	1E-02		1E-02
			Chrysene	3E-09	6E-08	6E-08				
			COBALT				thyroid	4E-03		4E-03
			COPPER				GI	9E-04		9E-04
			Dibenzo(a,h)anthracene	8E-07	1E-05	1E-05				
			Dibenzofuran					6E-04	1E-02	6E-04
			Dieldrin	5E-08	9E-07	1E-06	liver	5E-04	8E-03	5E-04
			Total D/F, as TEQ	1E-06		1E-06		5E-02		5E-02
			Heptachlor	7E-09	1E-07	1E-07	liver	2E-05	4E-04	2E-05
			Indeno(1,2,3-cd)pyrene	1E-07	3E-06	3E-06				
			IRON				GI	4E-03		4E-03
			MANGANESE				CNS	3E-03		3E-03
			MERCURY				developmental	3E-04		3E-04
			Naphthalene					7E-05	2E-03	7E-05
			NICKEL				whole body	8E-04		8E-04
			VANADIUM				kidney	5E-02		5E-02
			Vinyl chloride	9E-11		9E-11	liver	3E-07		3E-07
			Chemical Total			3E-04				3E-01
		Exposure Point Total				3E-04				3E-01
		Dredge Spoils Area	ALUMINUM				CNS	6E-03		6E-03
			ANTIMONY				blood	4E-03		4E-03
			Aroclor-1242	9E-08	2E-06	2E-06	whole body	4E-03	1E-01	4E-03
			Aroclor-1248	2E-07	5E-06	5E-06	whole body	3E-02	9E-01	3E-02
			ARSENIC	1E-06	6E-06	7E-06	skin	2E-02	9E-02	2E-02
			Benzo(a)anthracene	8E-08	2E-06	2E-06				
			Benzo(a)pyrene	5E-06	7E-05	8E-05				
			Benzo(b)fluoranthene	1E-07	3E-06	3E-06				
			Benzo(k)fluoranthene	7E-09	2E-07	2E-07				
			Benzo[j]fluoranthene	9E-08	2E-06	2E-06				
			CADMIUM				kidney	1E-02	1E-04	1E-02
			CHROMIUM	1E-05		1E-05	GI	5E-02		5E-02
			COBALT				thyroid	2E-02		2E-02
			Dibenzo(a,h)anthracene	4E-07	7E-06	8E-06				
			Total D/F, as TEQ	8E-07		8E-07		4E-02		4E-02
			Indeno(1,2,3-cd)pyrene	8E-08	2E-06	2E-06				
			IRON				GI	2E-02		2E-02
			MANGANESE				CNS	1E-02		1E-02
			MERCURY				developmental	1E-03		1E-03
			VANADIUM				kidney	2E-01		2E-01
			Chemical Total			1E-04				4E-01
		Exposure Point Total				1E-04				4E-01
	Exposure Medium Total					4E-04				8E-01
Medium Total						4E-04				8E-01
	Surface Water	Lower Ley Creek	ARSENIC	6E-08	2E-08	8E-08	skin	1E-03	2E-04	1E-03
			Benzo(b)fluoranthene	5E-09		5E-09				
			CHROMIUM	9E-08	2E-06	2E-06	GI	4E-04	8E-03	4E-04
			MANGANESE				CNS	1E-03	7E-03	1E-03
			Naphthalene					4E-06	2E-04	4E-06

TABLE 9.2b.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	3E-09		3E-09	liver/kidney	6E-06		6E-06
			VANADIUM				kidney	5E-03	5E-02	5E-03
			Vinyl chloride	2E-08	9E-08	1E-07	liver	7E-05	3E-04	7E-05
			Chemical Total			2E-06				8E-03
		Exposure Point Total				2E-06				8E-03
	Exposure Medium Total					2E-06				8E-03
Medium Total						2E-06				8E-03
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Aroclor-1254				whole body	1E+01		1E+01
			Aroclor-1260				whole body	6E+00		6E+00
			Total Aroclors	7E-05		7E-05				
			ARSENIC	7E-05		7E-05	skin	1E+00		1E+00
			CHROMIUM	9E-04		9E-04	GI	4E+00		4E+00
			Dieldrin	1E-05		1E-05	liver	1E-01		1E-01
			Total D/F, as TEQ	1E-05		1E-05		7E-01		7E-01
			Heptachlor epoxide	3E-06		3E-06	liver	2E-01		2E-01
			IRON				GI	7E-02		7E-02
			MERCURY				developmental	1E+00		1E+00
			SELENIUM					2E-01		2E-01
			ZINC				blood	7E-02		7E-02
			Chemical Total			1E-03				2E+01
		Exposure Point Total				1E-03				2E+01
	Exposure Medium Total					1E-03				2E+01
Medium Total						1E-03				2E+01
Receptor Total						1E-03			Receptor HI Total	3E+01

Blood HI Across All Media =	8E-02
CNS HI Across All Media =	2E-02
Developmental HI Across All Media =	1E+00
GI HI Across All Media =	4E+00
Kidney HI Across All Media =	3E-01
Liver HI Across All Media =	3E-01
Skin HI Across All Media =	1E+00
Thyroid HI Across All Media =	2E-02
Whole Body HI Across All Media =	2E+01

TABLE 9.3a.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	4E-05		4E-05				
			Aldrin	3E-08	2E-08	5E-08	liver	8E-04	4E-04	8E-04
			ALUMINUM				CNS	4E-03		4E-03
			Aroclor-1242	6E-07	4E-07	1E-06	whole body	5E-02	4E-02	5E-02
			Aroclor-1260	2E-06	1E-06	3E-06	whole body	5E-01	4E-01	5E-01
			ARSENIC	5E-07	8E-08	6E-07	skin	1E-02	2E-03	1E-02
			Benzene	1E-10		1E-10	blood	7E-06		7E-06
			Benzo(a)anthracene	4E-07	3E-07	8E-07				
			Benzo(a)pyrene	2E-05	2E-05	4E-05				
			Benzo(b)fluoranthene	4E-07	3E-07	8E-07				
			Benzo(k)fluoranthene	2E-08	1E-08	4E-08				
			Benzo[j]fluoranthene	2E-07	2E-07	4E-07				
			CADMIUM				kidney	3E-02	9E-06	3E-02
			CHROMIUM	5E-06		5E-06	GI	4E-02		4E-02
			Chrysene	4E-09	3E-09	7E-09				
			COBALT				thyroid	1E-02		1E-02
			COPPER				GI	3E-03		3E-03
			Dibenzo(a,h)anthracene	2E-06	1E-06	3E-06				
			Dibenzofuran					2E-03	1E-03	2E-03
			Dieldrin	9E-08	5E-08	1E-07	liver	1E-03	7E-04	1E-03
			Total D/F, as TEQ	2E-06		2E-06		1E-01		1E-01
			Heptachlor	1E-08	6E-09	2E-08	liver	6E-05	3E-05	6E-05
			Indeno(1,2,3-cd)pyrene	2E-07	1E-07	3E-07				
			IRON				GI	1E-02		1E-02
			MANGANESE				CNS	8E-03		8E-03
			MERCURY				developmental	9E-04		9E-04
			Naphthalene					2E-04	1E-04	2E-04
			NICKEL				whole body	2E-03		2E-03
			VANADIUM				kidney	1E-01		1E-01
			Vinyl chloride	1E-10		1E-10	liver	8E-07		8E-07
			Chemical Total			1E-04				1E+00
		Exposure Point Total				1E-04				1E+00
		Dredge Spoils Area	ALUMINUM				CNS	1E-02		1E-02
			ANTIMONY				blood	8E-03		8E-03
			Aroclor-1242	1E-07	8E-08	2E-07	whole body	8E-03	7E-03	8E-03
			Aroclor-1248	2E-07	2E-07	4E-07	whole body	7E-02	5E-02	7E-02
			ARSENIC	1E-06	2E-07	1E-06	skin	3E-02	5E-03	3E-02
			Benzo(a)anthracene	9E-08	7E-08	2E-07				
			Benzo(a)pyrene	7E-06	5E-06	1E-05				
			Benzo(b)fluoranthene	2E-07	1E-07	3E-07				
			Benzo(k)fluoranthene	8E-09	6E-09	1E-08				
			Benzo[j]fluoranthene	1E-07	7E-08	2E-07				
			CADMIUM				kidney	2E-02	7E-06	2E-02
			CHROMIUM	1E-05		1E-05	GI	1E-01		1E-01
			COBALT				thyroid	3E-02		3E-02
			Dibenzo(a,h)anthracene	7E-07	5E-07	1E-06				
			Total D/F, as TEQ	9E-07		9E-07		7E-02		7E-02
			Indeno(1,2,3-cd)pyrene	1E-07	7E-08	2E-07				
			IRON				GI	4E-02		4E-02
			MANGANESE				CNS	2E-02		2E-02
			MERCURY				developmental	2E-03		2E-03
			VANADIUM				kidney	5E-01		5E-01
			Chemical Total			3E-05				9E-01
		Exposure Point Total				3E-05				9E-01
	Exposure Medium Total					1E-04				2E+00
Medium Total						1E-04				2E+00
	Surface Water	Lower Ley Creek	ARSENIC	4E-08	5E-09	5E-08	skin	1E-03	1E-04	1E-03
			Benzo(b)fluoranthene	3E-09		3E-09				
			CHROMIUM	6E-08	2E-06	2E-06	GI	4E-04	1E-02	4E-04
			MANGANESE				CNS	1E-03	1E-02	1E-03
			Naphthalene					5E-06	3E-04	5E-06

TABLE 9.3a.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	2E-09		2E-09	liver/kidney	7E-06		7E-06
			VANADIUM				kidney	6E-03	7E-02	6E-03
			Vinyl chloride	1E-08	8E-08	9E-08	liver	7E-05	4E-04	7E-05
			Chemical Total			2E-06				8E-03
		Exposure Point Total				2E-06				8E-03
	Exposure Medium Total					2E-06				8E-03
Medium Total						2E-06				8E-03
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Aroclor-1254				whole body	7E+00		7E+00
			Aroclor-1260				whole body	3E+00		3E+00
			Total Aroclors	3E-05		3E-05				
			ARSENIC	3E-05		3E-05	skin	7E-01		7E-01
			CHROMIUM	3E-04		3E-04	GI	3E+00		3E+00
			Dieldrin	4E-06		4E-06	liver	6E-02		6E-02
			Total D/F, as TEQ	5E-06		5E-06		4E-01		4E-01
			Heptachlor epoxide	1E-06		1E-06	liver	1E-01		1E-01
			IRON				GI	4E-02		4E-02
			MERCURY				developmental	9E-01		9E-01
			SELENIUM					1E-01		1E-01
			ZINC				blood	5E-02		5E-02
			Chemical Total			4E-04				2E+01
		Exposure Point Total				4E-04				2E+01
	Exposure Medium Total					4E-04				2E+01
Medium Total						4E-04				2E+01
Receptor Total						5E-04			Receptor HI Total	2E+01

Blood HI Across All Media =	5E-02
CNS HI Across All Media =	5E-02
Developmental HI Across All Media =	9E-01
GI HI Across All Media =	3E+00
Kidney HI Across All Media =	5E-01
Liver HI Across All Media =	2E-01
Skin HI Across All Media =	7E-01
Thyroid HI Across All Media =	4E-02
Whole Body HI Across All Media =	1E+01

TABLE 9.3b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	1E-04		1E-04				
			Aldrin	1E-07	4E-07	5E-07	liver	2E-03	9E-03	2E-03
			ALUMINUM				CNS	1E-02		1E-02
			Aroclor-1242	2E-06	8E-06	1E-05	whole body	1E-01	7E-01	1E-01
			Aroclor-1260	5E-06	3E-05	3E-05	whole body	1E+00	8E+00	1E+00
			ARSENIC	1E-06	2E-06	3E-06	skin	4E-02	4E-02	4E-02
			Benzene	4E-10		4E-10	blood	2E-05		2E-05
			Benzo(a)anthracene	1E-06	6E-06	7E-06				
			Benzo(a)pyrene	6E-05	4E-04	4E-04				
			Benzo(b)fluoranthene	1E-06	6E-06	7E-06				
			Benzo(k)fluoranthene	6E-08	3E-07	3E-07				
			Benzo[j]fluoranthene	7E-07	3E-06	4E-06				
			CADMIUM				kidney	9E-02	2E-04	9E-02
			CHROMIUM	1E-05		1E-05	GI	1E-01		1E-01
			Chrysene	1E-08	6E-08	7E-08				
			COBALT				thyroid	3E-02		3E-02
			COPPER				GI	7E-03		7E-03
			Dibenzo(a,h)anthracene	5E-06	3E-05	3E-05				
			Dibenzofuran					5E-03	2E-02	5E-03
			Dieldrin	2E-07	1E-06	1E-06	liver	4E-03	1E-02	4E-03
			Total D/F, as TEQ	5E-06		5E-06		4E-01		4E-01
			Heptachlor	3E-08	1E-07	2E-07	liver	2E-04	6E-04	2E-04
			Indeno(1,2,3-cd)pyrene	5E-07	3E-06	3E-06				
			IRON				GI	3E-02		3E-02
			MANGANESE				CNS	2E-02		2E-02
			MERCURY				developmental	2E-03		2E-03
			Naphthalene					5E-04	3E-03	5E-04
			NICKEL				whole body	6E-03		6E-03
			VANADIUM				kidney	4E-01		4E-01
			Vinyl chloride	4E-10		4E-10	liver	2E-06		2E-06
			Chemical Total			7E-04				3E+00
		Exposure Point Total				7E-04				3E+00
		Dredge Spoils Area	ALUMINUM				CNS	5E-02		5E-02
			ANTIMONY				blood	3E-02		3E-02
			Aroclor-1242	4E-07	2E-06	3E-06	whole body	3E-02	2E-01	3E-02
			Aroclor-1248	9E-07	5E-06	6E-06	whole body	3E-01	1E+00	3E-01
			ARSENIC	5E-06	6E-06	1E-05	skin	1E-01	1E-01	1E-01
			Benzo(a)anthracene	4E-07	2E-06	2E-06				
			Benzo(a)pyrene	3E-05	2E-04	2E-04				
			Benzo(b)fluoranthene	6E-07	3E-06	4E-06				
			Benzo(k)fluoranthene	3E-08	2E-07	2E-07				
			Benzo[j]fluoranthene	4E-07	2E-06	2E-06				
			CADMIUM				kidney	1E-01	2E-04	1E-01
			CHROMIUM	5E-05		5E-05	GI	4E-01		4E-01
			COBALT				thyroid	1E-01		1E-01
			Dibenzo(a,h)anthracene	3E-06	2E-05	2E-05				
			Total D/F, as TEQ	3E-06		3E-06		3E-01		3E-01
			Indeno(1,2,3-cd)pyrene	4E-07	2E-06	2E-06				
			IRON				GI	2E-01		2E-01
			MANGANESE				CNS	8E-02		8E-02
			MERCURY				developmental	9E-03		9E-03
			VANADIUM				kidney	2E+00		2E+00
			Chemical Total			3E-04				3E+00
		Exposure Point Total				3E-04				3E+00
	Exposure Medium Total					1E-03				6E+00
Medium Total						1E-03				6E+00
	Surface Water	Lower Ley Creek	ARSENIC	1E-07	2E-08	2E-07	skin	4E-03	5E-04	4E-03
			Benzo(b)fluoranthene	1E-08		1E-08				
			CHROMIUM	2E-07	2E-06	2E-06	GI	2E-03	2E-02	2E-03
			MANGANESE				CNS	4E-03	1E-02	4E-03
			Naphthalene					2E-05	3E-04	2E-05

TABLE 9.3b.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	7E-09		7E-09	liver/kidney	2E-05		2E-05
			VANADIUM				kidney	2E-02	1E-01	2E-02
			Vinyl chloride	5E-08	1E-07	2E-07	liver	3E-04	6E-04	3E-04
			Chemical Total			3E-06				3E-02
		Exposure Point Total				3E-06				3E-02
	Exposure Medium Total					3E-06				3E-02
Medium Total						3E-06				3E-02
Edible Fish	Edible Fish Tissue	Lower Ley Creek	Aroclor-1254				whole body	2E+01		2E+01
			Aroclor-1260				whole body	1E+01		1E+01
			Total Aroclors	9E-05		9E-05				
			ARSENIC	8E-05		8E-05	skin	2E+00		2E+00
			CHROMIUM	1E-03		1E-03	GI	8E+00		8E+00
			Dieldrin	1E-05		1E-05	liver	2E-01		2E-01
			Total D/F, as TEQ	2E-05		2E-05		1E+00		1E+00
			Heptachlor epoxide	3E-06		3E-06	liver	3E-01		3E-01
			IRON				GI	1E-01		1E-01
			MERCURY				developmental	3E+00		3E+00
			SELENIUM					3E-01		3E-01
			ZINC				blood	1E-01		1E-01
			Chemical Total			1E-03				5E+01
		Exposure Point Total				1E-03				5E+01
	Exposure Medium Total					1E-03				5E+01
Medium Total						1E-03				5E+01
Receptor Total						2E-03			Receptor HI Total	5E+01

Blood HI Across All Media =	2E-01
CNS HI Across All Media =	2E-01
Developmental HI Across All Media =	3E+00
GI HI Across All Media =	9E+00
Kidney HI Across All Media =	2E+00
Liver HI Across All Media =	5E-01
Skin HI Across All Media =	2E+00
Thyroid HI Across All Media =	2E-01
Whole Body HI Across All Media =	3E+01

TABLE 9.4a.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	5E-07		5E-07				
			Aldrin	3E-09	9E-10	3E-09	liver	2E-04	6E-05	2E-04
			ALUMINUM				CNS	8E-04		8E-04
			Aroclor-1242	4E-08	2E-08	6E-08	whole body	1E-02	5E-03	1E-02
			Aroclor-1260	1E-07	6E-08	2E-07	whole body	1E-01	6E-02	1E-01
			ARSENIC	4E-08	4E-09	4E-08	skin	3E-03	3E-04	3E-03
			Benzene	1E-11		1E-11	blood	2E-06		2E-06
			Benzo(a)anthracene	3E-08	1E-08	5E-08				
			Benzo(a)pyrene	2E-07	1E-07	3E-07				
			Benzo(b)fluoranthene	3E-08	1E-08	5E-08				
			Benzo(k)fluoranthene	2E-09	7E-10	2E-09				
			Benzo[j]fluoranthene	2E-08	8E-09	3E-08				
			CADMIUM				kidney	7E-03	1E-06	7E-03
			CHROMIUM	4E-07		4E-07	GI	9E-03		9E-03
			Chrysene	3E-10	1E-10	5E-10				
			COBALT				thyroid	2E-03		2E-03
			COPPER				GI	6E-04		6E-04
			Dibenzo(a,h)anthracene	2E-08	9E-09	3E-08				
			Dibenzofuran					4E-04	1E-04	4E-04
			Dieldrin	6E-09	2E-09	9E-09	liver	3E-04	1E-04	3E-04
			Total D/F, as TEQ	1E-07		1E-07		3E-02		3E-02
			Heptachlor	9E-10	3E-10	1E-09	liver	1E-05	5E-06	1E-05
			Indeno(1,2,3-cd)pyrene	1E-08	7E-09	2E-08				
			IRON				GI	3E-03		3E-03
			MANGANESE				CNS	2E-03		2E-03
			MERCURY				developmental	2E-04		2E-04
			Naphthalene					4E-05	2E-05	4E-05
			NICKEL				whole body	5E-04		5E-04
			VANADIUM				kidney	3E-02		3E-02
			Vinyl chloride	1E-11		1E-11	liver	2E-07		2E-07
			Chemical Total			2E-06				2E-01
		Exposure Point Total				2E-06				2E-01
		Dredge Spoils Area	ALUMINUM				CNS	1E-03		1E-03
			ANTIMONY				blood	8E-04		8E-04
			Aroclor-1242	3E-09	2E-09	5E-09	whole body	8E-04	4E-04	8E-04
			Aroclor-1248	7E-09	4E-09	1E-08	whole body	7E-03	3E-03	7E-03
			ARSENIC	4E-08	4E-09	4E-08	skin	3E-03	3E-04	3E-03
			Benzo(a)anthracene	3E-09	1E-09	4E-09				
			Benzo(a)pyrene	4E-08	2E-08	5E-08				
			Benzo(b)fluoranthene	5E-09	2E-09	7E-09				
			Benzo(k)fluoranthene	3E-10	1E-10	4E-10				
			Benzo[j]fluoranthene	3E-09	1E-09	5E-09				
			CADMIUM				kidney	2E-03	4E-07	2E-03
			CHROMIUM	4E-07		4E-07	GI	1E-02		1E-02
			COBALT				thyroid	3E-03		3E-03
			Dibenzo(a,h)anthracene	3E-09	2E-09	5E-09				
			Total D/F, as TEQ	3E-08		3E-08		7E-03		7E-03
			Indeno(1,2,3-cd)pyrene	3E-09	1E-09	5E-09				
			IRON				GI	4E-03		4E-03
			MANGANESE				CNS	2E-03		2E-03
			MERCURY				developmental	2E-04		2E-04
			VANADIUM				kidney	4E-02		4E-02
			Chemical Total			6E-07				9E-02
		Exposure Point Total				6E-07				9E-02
	Exposure Medium Total					2E-06				3E-01
Medium Total						2E-06				3E-01
	Surface Water	Lower Ley Creek	ARSENIC	1E-10	3E-12	1E-10	skin	8E-06	2E-07	8E-06
			Benzo(b)fluoranthene	8E-12		8E-12				
			CHROMIUM	1E-10	6E-09	6E-09	GI	3E-06	1E-04	3E-06
			MANGANESE				CNS	1E-05	1E-04	1E-05
			Naphthalene					4E-08	2E-06	4E-08

TABLE 9.4a.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	5E-12		5E-12	liver/kidney	5E-08		5E-08
			VANADIUM				kidney	4E-05	8E-04	4E-05
			Vinyl chloride	4E-11	1E-10	1E-10	liver	6E-07	2E-06	6E-07
			Chemical Total			6E-09				7E-05
		Exposure Point Total				6E-09				7E-05
	Exposure Medium Total					6E-09				7E-05
Medium Total						6E-09				7E-05
Receptor Total						2E-06			Receptor HI Total	3E-01

Blood HI Across All Media =	8E-04
CNS HI Across All Media =	6E-03
Developmental HI Across All Media =	4E-04
GI HI Across All Media =	3E-02
Kidney HI Across All Media =	5E-02
Liver HI Across All Media =	5E-04
Skin HI Across All Media =	6E-03
Thyroid HI Across All Media =	6E-03
Whole Body HI Across All Media =	1E-01

TABLE 9.4b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Sediment	Sediment to a depth of 12 inches	Lower Ley Creek	3-Methylcholanthrene	1E-06		1E-06				
			Aldrin	6E-09	1E-08	2E-08	liver	4E-04	7E-04	4E-04
			ALUMINUM				CNS	2E-03		2E-03
			Aroclor-1242	1E-07	2E-07	3E-07	whole body	3E-02	6E-02	3E-02
			Aroclor-1260	3E-07	7E-07	1E-06	whole body	3E-01	6E-01	3E-01
			ARSENIC	9E-08	4E-08	1E-07	skin	7E-03	3E-03	7E-03
			Benzene	3E-11		3E-11	blood	4E-06		4E-06
			Benzo(a)anthracene	8E-08	2E-07	2E-07				
			Benzo(a)pyrene	6E-07	1E-06	2E-06				
			Benzo(b)fluoranthene	8E-08	2E-07	2E-07				
			Benzo(k)fluoranthene	4E-09	8E-09	1E-08				
			Benzo[j]fluoranthene	5E-08	9E-08	1E-07				
			CADMIUM				kidney	2E-02	1E-05	2E-02
			CHROMIUM	9E-07		9E-07	GI	2E-02		2E-02
			Chrysene	8E-10	2E-09	2E-09				
			COBALT				thyroid	6E-03		6E-03
			COPPER				GI	1E-03		1E-03
			Dibenzo(a,h)anthracene	5E-08	1E-07	1E-07				
			Dibenzofuran					9E-04	1E-03	9E-04
			Dieldrin	2E-08	3E-08	4E-08	liver	7E-04	1E-03	7E-04
			Total D/F, as TEQ	3E-07		3E-07		8E-02		8E-02
			Heptachlor	2E-09	3E-09	5E-09	liver	3E-05	5E-05	3E-05
			Indeno(1,2,3-cd)pyrene	4E-08	7E-08	1E-07				
			IRON				GI	7E-03		7E-03
			MANGANESE				CNS	5E-03		5E-03
			MERCURY				developmental	5E-04		5E-04
			Naphthalene					1E-04	2E-04	1E-04
			NICKEL				whole body	1E-03		1E-03
			VANADIUM				kidney	7E-02		7E-02
			Vinyl chloride	3E-11		3E-11	liver	4E-07		4E-07
			Chemical Total			7E-06				5E-01
		Exposure Point Total				7E-06				5E-01
		Dredge Spoils Area	ALUMINUM				CNS	3E-03		3E-03
			ANTIMONY				blood	2E-03		2E-03
			Aroclor-1242	8E-09	2E-08	3E-08	whole body	2E-03	4E-03	2E-03
			Aroclor-1248	2E-08	4E-08	6E-08	whole body	2E-02	4E-02	2E-02
			ARSENIC	1E-07	5E-08	1E-07	skin	8E-03	4E-03	8E-03
			Benzo(a)anthracene	8E-09	2E-08	2E-08				
			Benzo(a)pyrene	9E-08	2E-07	3E-07				
			Benzo(b)fluoranthene	1E-08	3E-08	4E-08				
			Benzo(k)fluoranthene	7E-10	1E-09	2E-09				
			Benzo[j]fluoranthene	8E-09	2E-08	2E-08				
			CADMIUM				kidney	6E-03	5E-06	6E-03
			CHROMIUM	1E-06		1E-06	GI	2E-02		2E-02
			COBALT				thyroid	8E-03		8E-03
			Dibenzo(a,h)anthracene	8E-09	2E-08	3E-08				
			Total D/F, as TEQ	7E-08		7E-08		2E-02		2E-02
			Indeno(1,2,3-cd)pyrene	8E-09	2E-08	2E-08				
			IRON				GI	9E-03		9E-03
			MANGANESE				CNS	5E-03		5E-03
			MERCURY				developmental	5E-04		5E-04
			VANADIUM				kidney	1E-01		1E-01
			Chemical Total			2E-06				2E-01
		Exposure Point Total				2E-06				2E-01
	Exposure Medium Total					8E-06				8E-01
Medium Total						8E-06				8E-01
	Surface Water	Lower Ley Creek	ARSENIC	5E-10	3E-10	8E-10	skin	4E-05	2E-05	4E-05
			Benzo(b)fluoranthene	4E-11		4E-11				
			CHROMIUM	7E-10	3E-08	3E-08	GI	2E-05	7E-04	2E-05
			MANGANESE				CNS	5E-05	6E-04	5E-05
			Naphthalene					2E-07	9E-06	2E-07

TABLE 9.4b.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Surface Water	Surface Water		Pentachlorophenol	3E-11		3E-11	liver/kidney	3E-07		3E-07
			VANADIUM				kidney	2E-04	4E-03	2E-04
			Vinyl chloride	2E-10	5E-10	7E-10	liver	3E-06	8E-06	3E-06
			Chemical Total			3E-08				3E-04
		Exposure Point Total				3E-08				3E-04
	Exposure Medium Total					3E-08				3E-04
Medium Total						3E-08				3E-04
Receptor Total						8E-06			Receptor HI Total	8E-01

Blood HI Across All Media =	2E-03
CNS HI Across All Media =	1E-02
Developmental HI Across All Media =	1E-03
GI HI Across All Media =	6E-02
Kidney HI Across All Media =	1E-01
Liver HI Across All Media =	1E-03
Skin HI Across All Media =	2E-02
Thyroid HI Across All Media =	1E-02
Whole Body HI Across All Media =	3E-01

APPENDIX A

ProUCL Output

FISH UCL

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Documents and Settings\anatracordone\My Documents\EPA-ERT\Onondaga Lake\LeyCreek\macro-s
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

alpha-Chlordane

General Statistics

Number of Valid Data	13	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	3
		Percent Non-Detects	23.08%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	8.9000E-4	Minimum Detected	-7.024
Maximum Detected	0.0096	Maximum Detected	-4.646
Mean of Detected	0.0053	Mean of Detected	-5.494
SD of Detected	0.00309	SD of Detected	0.857
Minimum Non-Detect	0.0017	Minimum Non-Detect	-6.377
Maximum Non-Detect	0.0033	Maximum Non-Detect	-5.714

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	7
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	46.15%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.916	Shapiro Wilk Test Statistic	0.832
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00433	Mean	-5.807
SD	0.00325	SD	0.964
95% DL/2 (t) UCL	0.00594	95% H-Stat (DL/2) UCL	0.00588
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.00704	Mean in Log Scale	-5.756
SD	0.00155	SD in Log Scale	0.9
95% MLE (t) UCL	0.00781	Mean in Original Scale	0.00439
95% MLE (Tiku) UCL	0.00808	SD in Original Scale	0.00319
		95% Percentile Bootstrap UCL	0.00574
		95% BCA Bootstrap UCL	0.00592

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.553	Data appear Normal at 5% Significance Level
Theta Star	0.00341	
nu star	31.05	

A-D Test Statistic	0.702	Nonparametric Statistics	
5% A-D Critical Value	0.735	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.735	Mean	0.00434
5% K-S Critical Value	0.27	SD	0.00311
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	9.1151E-4
		95% KM (t) UCL	0.00596
Assuming Gamma Distribution		95% KM (z) UCL	0.00584
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.00595
Minimum	8.9000E-4	95% KM (bootstrap t) UCL	0.00597
Maximum	0.0096	95% KM (BCA) UCL	0.0061
Mean	0.00477	95% KM (Percentile Bootstrap) UCL	0.00603
Median	0.005	95% KM (Chebyshev) UCL	0.00831
SD	0.00289	97.5% KM (Chebyshev) UCL	0.01
k star	1.834	99% KM (Chebyshev) UCL	0.0134
Theta star	0.0026		
Nu star	47.69	Potential UCLs to Use	
AppChi2	32.84	95% KM (t) UCL	0.00596
95% Gamma Approximate UCL	0.00693	95% KM (Percentile Bootstrap) UCL	0.00603
95% Adjusted Gamma UCL	0.00732		

Note: DL/2 is not a recommended method.

Aroclor-1254

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	0.17	Minimum of Log Data	-1.772
Maximum	2	Maximum of Log Data	0.693
Mean	0.635	Mean of log Data	-0.781
Median	0.36	SD of log Data	0.841
SD	0.54		
Coefficient of Variation	0.85		
Skewness	1.328		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.82	Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.89	95% H-UCL	1.179
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.292
95% Adjusted-CLT UCL	0.927	97.5% Chebyshev (MVUE) UCL	1.578
95% Modified-t UCL	0.899	99% Chebyshev (MVUE) UCL	2.139
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.364	Data appear Lognormal at 5% Significance Level	
Theta Star	0.466		
MLE of Mean	0.635		

MLE of Standard Deviation	0.544		
nu star	38.18		
Approximate Chi Square Value (.05)	25.03	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.872
Adjusted Chi Square Value	23.63	95% Jackknife UCL	0.89
		95% Standard Bootstrap UCL	0.863
Anderson-Darling Test Statistic	0.755	95% Bootstrap-t UCL	0.982
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	0.948
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	0.879
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	0.911
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.264
		97.5% Chebyshev(Mean, Sd) UCL	1.536
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.07
95% Approximate Gamma UCL	0.969		
95% Adjusted Gamma UCL	1.026		
Potential UCL to Use		Use 95% H-UCL	1.179

Aroclor-1260

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	13
Raw Statistics		Log-transformed Statistics	
Minimum	0.087	Minimum of Log Data	-2.442
Maximum	0.86	Maximum of Log Data	-0.151
Mean	0.297	Mean of log Data	-1.539
Median	0.18	SD of log Data	0.845
SD	0.243		
Coefficient of Variation	0.818		
Skewness	1.015		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.829	Shapiro Wilk Test Statistic	0.845
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.412	95% H-UCL	0.558
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.609
95% Adjusted-CLT UCL	0.423	97.5% Chebyshev (MVUE) UCL	0.745
95% Modified-t UCL	0.415	99% Chebyshev (MVUE) UCL	1.01
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.371	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.217		
MLE of Mean	0.297		
MLE of Standard Deviation	0.254		
nu star	38.4		
Approximate Chi Square Value (.05)	25.21	Nonparametric Statistics	

Adjusted Level of Significance	0.0312	95% CLT UCL	0.404
Adjusted Chi Square Value	23.79	95% Jackknife UCL	0.412
		95% Standard Bootstrap UCL	0.401
Anderson-Darling Test Statistic	0.977	95% Bootstrap-t UCL	0.446
Anderson-Darling 5% Critical Value	0.749	95% Hall's Bootstrap UCL	0.421
Kolmogorov-Smirnov Test Statistic	0.273	95% Percentile Bootstrap UCL	0.402
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	0.425
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.58
		97.5% Chebyshev(Mean, Sd) UCL	0.703
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.944
95% Approximate Gamma UCL	0.453		
95% Adjusted Gamma UCL	0.479		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.58

ARSENIC

General Statistics

Number of Valid Data	14	Number of Detected Data	12
Number of Distinct Detected Data	8	Number of Non-Detect Data	2
		Percent Non-Detects	14.29%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.92	Minimum Detected	-0.0834
Maximum Detected	1.9	Maximum Detected	0.642
Mean of Detected	1.277	Mean of Detected	0.224
SD of Detected	0.278	SD of Detected	0.209
Minimum Non-Detect	3.8	Minimum Non-Detect	1.335
Maximum Non-Detect	4.7	Maximum Non-Detect	1.548

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	14
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk Test Statistic	0.968
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.398	Mean	0.299
SD	0.41	SD	0.273
95% DL/2 (t) UCL	1.592	95% H-Stat (DL/2) UCL	1.613
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.224
		SD in Log Scale	0.192
		Mean in Original Scale	1.273
		SD in Original Scale	0.256

95% Percentile Bootstrap UCL	1.382
95% BCA Bootstrap UCL	1.405

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	18.55
Theta Star	0.0688
nu star	445.3
A-D Test Statistic	0.237
5% A-D Critical Value	0.732
K-S Test Statistic	0.732
5% K-S Critical Value	0.245
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.92
Maximum	1.9
Mean	1.284
Median	1.3
SD	0.256
k star	22.51
Theta star	0.0571
Nu star	630.2
AppChi2	573
95% Gamma Approximate UCL	1.412
95% Adjusted Gamma UCL	1.43

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	1.277
SD	0.266
SE of Mean	0.0801
95% KM (t) UCL	1.419
95% KM (z) UCL	1.408
95% KM (jackknife) UCL	1.42
95% KM (bootstrap t) UCL	1.46
95% KM (BCA) UCL	1.413
95% KM (Percentile Bootstrap) UCL	1.409
95% KM (Chebyshev) UCL	1.626
97.5% KM (Chebyshev) UCL	1.777
99% KM (Chebyshev) UCL	2.074
Potential UCLs to Use	
95% KM (t) UCL	1.419
95% KM (Percentile Bootstrap) UCL	1.409

Note: DL/2 is not a recommended method.

CHROMIUM

General Statistics

Number of Valid Data	14	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	12
		Percent Non-Detects	85.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	5.5	Minimum Detected	1.705
Maximum Detected	61.7	Maximum Detected	4.122
Mean of Detected	33.6	Mean of Detected	2.914
SD of Detected	39.74	SD of Detected	1.709
Minimum Non-Detect	3.8	Minimum Non-Detect	1.335
Maximum Non-Detect	4.9	Maximum Non-Detect	1.589

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	12
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	2
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	85.71%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level	
Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	6.689
SD	15.86
95% DL/2 (t) UCL	14.2
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Lognormal at 5% Significance Level	
Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	1.091
SD	0.91
95% H-Stat (DL/2) UCL	5.991
Log ROS Method	
Mean in Log Scale	N/A
SD in Log Scale	N/A
Mean in Original Scale	N/A
SD in Original Scale	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A

Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	9.514
SD	14.47
SE of Mean	5.471
95% KM (t) UCL	19.2
95% KM (z) UCL	18.51
95% KM (jackknife) UCL	47.49
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	61.7
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	33.36
97.5% KM (Chebyshev) UCL	43.68
99% KM (Chebyshev) UCL	63.95
Potential UCLs to Use	

AppChi2	N/A	97.5% KM (Chebyshev) UCL	43.68
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Dieldrin

General Statistics

Number of Valid Data	5	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	40.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.004	Minimum Detected	-5.521
Maximum Detected	0.018	Maximum Detected	-4.017
Mean of Detected	0.0127	Mean of Detected	-4.558
SD of Detected	0.00757	SD of Detected	0.836
Minimum Non-Detect	0.0033	Minimum Non-Detect	-5.714
Maximum Non-Detect	0.0033	Maximum Non-Detect	-5.714

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Test Statistic	0.808
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00826	Mean	-5.298
SD	0.00807	SD	1.173
95% DL/2 (t) UCL	0.016	95% H-Stat (DL/2) UCL	0.0115
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.00611	Mean in Log Scale	-5.464
SD	0.00998	SD in Log Scale	1.402
95% MLE (t) UCL	0.0156	Mean in Original Scale	0.00807
95% MLE (Tiku) UCL	0.0169	SD in Original Scale	0.00827
		95% Percentile Bootstrap UCL	0.0141
		95% BCA Bootstrap UCL	0.014

Gamma Distribution Test with Detected Values Only	Data Distribution Test with Detected Values Only

k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.0092
5% K-S Critical Value	N/A	SD	0.0064
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.00351
		95% KM (t) UCL	0.0167
Assuming Gamma Distribution		95% KM (z) UCL	0.015
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0188
Minimum	N/A	95% KM (bootstrap t) UCL	0.0132
Maximum	N/A	95% KM (BCA) UCL	0.018
Mean	N/A	95% KM (Percentile Bootstrap) UCL	0.018
Median	N/A	95% KM (Chebyshev) UCL	0.0245
SD	N/A	97.5% KM (Chebyshev) UCL	0.0311
k star	N/A	99% KM (Chebyshev) UCL	0.0441
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	0.0167
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	0.018
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

gamma-Chlordane

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	13

Raw Statistics		Log-transformed Statistics	
Minimum	0.003	Minimum of Log Data	-5.809
Maximum	0.049	Maximum of Log Data	-3.016
Mean	0.0152	Mean of log Data	-4.497
Median	0.012	SD of log Data	0.839
SD	0.0127		
Coefficient of Variation	0.831		
Skewness	1.525		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.84	Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.0212	95% H-UCL	0.0286
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0313
95% Adjusted-CLT UCL	0.0223	97.5% Chebyshev (MVUE) UCL	0.0382
95% Modified-t UCL	0.0215	99% Chebyshev (MVUE) UCL	0.0518

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.419	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.0107		
MLE of Mean	0.0152		
MLE of Standard Deviation	0.0128		
nu star	39.74		
Approximate Chi Square Value (.05)	26.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	0.0208
Adjusted Chi Square Value	24.85	95% Jackknife UCL	0.0212
		95% Standard Bootstrap UCL	0.0207
Anderson-Darling Test Statistic	0.391	95% Bootstrap-t UCL	0.0236
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	0.0252
Kolmogorov-Smirnov Test Statistic	0.206	95% Percentile Bootstrap UCL	0.0212
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	0.0219
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.03
		97.5% Chebyshev(Mean, Sd) UCL	0.0364
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0489
95% Approximate Gamma UCL	0.023		
95% Adjusted Gamma UCL	0.0244		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.023

Heptachlor epoxide

General Statistics

Number of Valid Data	2	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	1
		Percent Non-Detects	50.00%

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Heptachlor epoxide was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

IRON

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	14

Raw Statistics		Log-transformed Statistics	
Minimum	14.5	Minimum of Log Data	2.674
Maximum	370	Maximum of Log Data	5.914
Mean	71.84	Mean of log Data	3.967
Median	47.95	SD of log Data	0.695
SD	87.49		
Coefficient of Variation	1.218		
Skewness	3.501		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.464	Shapiro Wilk Test Statistic	0.787
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	113.2	95% H-UCL	105.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	121.9
95% Adjusted-CLT UCL	133.7	97.5% Chebyshev (MVUE) UCL	146.1
95% Modified-t UCL	116.9	99% Chebyshev (MVUE) UCL	193.7
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.444	Data do not follow a Discernable Distribution (0.05)	
Theta Star	49.75		
MLE of Mean	71.84		
MLE of Standard Deviation	59.78		
nu star	40.43		
Approximate Chi Square Value (.05)	26.86	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	110.3
Adjusted Chi Square Value	25.4	95% Jackknife UCL	113.2
		95% Standard Bootstrap UCL	109.3
Anderson-Darling Test Statistic	1.99	95% Bootstrap-t UCL	294.9
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	339.9
Kolmogorov-Smirnov Test Statistic	0.343	95% Percentile Bootstrap UCL	115.9
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	138.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	173.8
		97.5% Chebyshev(Mean, Sd) UCL	217.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	304.5
95% Approximate Gamma UCL	108.1		
95% Adjusted Gamma UCL	114.3		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	173.8

MERCURY

General Statistics

Number of Valid Data	14	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	7
		Percent Non-Detects	50.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.24	Minimum Detected	-1.427
Maximum Detected	0.74	Maximum Detected	-0.301
Mean of Detected	0.44	Mean of Detected	-0.876
SD of Detected	0.159	SD of Detected	0.359
Minimum Non-Detect	0.38	Minimum Non-Detect	-0.968
Maximum Non-Detect	0.49	Maximum Non-Detect	-0.713
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	13

For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	92.86%

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Test Statistic	0.937
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.338	Mean	-1.162
SD	0.152	SD	0.39
95% DL/2 (t) UCL	0.41	95% H-Stat (DL/2) UCL	0.378
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.961
		SD in Log Scale	0.297
		Mean in Original Scale	0.399
		SD in Original Scale	0.127
		95% Percentile Bootstrap UCL	0.455
		95% BCA Bootstrap UCL	0.466
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.412	Data appear Normal at 5% Significance Level	
Theta Star	0.0813		
nu star	75.77		
A-D Test Statistic	0.379	Nonparametric Statistics	
5% A-D Critical Value	0.709	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.709	Mean	0.399
5% K-S Critical Value	0.312	SD	0.13
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0447
		95% KM (t) UCL	0.478
Assuming Gamma Distribution		95% KM (z) UCL	0.473
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.48
Minimum	0.24	95% KM (bootstrap t) UCL	0.477
Maximum	0.74	95% KM (BCA) UCL	0.484
Mean	0.435	95% KM (Percentile Bootstrap) UCL	0.477
Median	0.435	95% KM (Chebyshev) UCL	0.594
SD	0.129	97.5% KM (Chebyshev) UCL	0.678
k star	9.91	99% KM (Chebyshev) UCL	0.844
Theta star	0.0439		
Nu star	277.5	Potential UCLs to Use	
AppChi2	239.9	95% KM (t) UCL	0.478

95% Gamma Approximate UCL	0.503	95% KM (Percentile Bootstrap) UCL	0.477
95% Adjusted Gamma UCL	0.513		

Note: DL/2 is not a recommended method.

SELENIUM

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	2.4	Minimum of Log Data	0.875
Maximum	3.3	Maximum of Log Data	1.194
Mean	2.764	Mean of log Data	1.011
Median	2.75	SD of log Data	0.107
SD	0.298		
Coefficient of Variation	0.108		
Skewness	0.323		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.905	95% H-UCL	2.914
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.109
95% Adjusted-CLT UCL	2.903	97.5% Chebyshev (MVUE) UCL	3.258
95% Modified-t UCL	2.906	99% Chebyshev (MVUE) UCL	3.551
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	73.86	Data appear Normal at 5% Significance Level	
Theta Star	0.0374		
MLE of Mean	2.764		
MLE of Standard Deviation	0.322		
nu star	2068		
Approximate Chi Square Value (.05)	1964	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	2.895
Adjusted Chi Square Value	1950	95% Jackknife UCL	2.905
		95% Standard Bootstrap UCL	2.889
Anderson-Darling Test Statistic	0.345	95% Bootstrap-t UCL	2.912
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	2.898
Kolmogorov-Smirnov Test Statistic	0.139	95% Percentile Bootstrap UCL	2.893
Kolmogorov-Smirnov 5% Critical Value	0.228	95% BCA Bootstrap UCL	2.886
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.111
		97.5% Chebyshev(Mean, Sd) UCL	3.261
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.556
95% Approximate Gamma UCL	2.912		
95% Adjusted Gamma UCL	2.932		

Potential UCL to Use		Use 95% Student's-t UCL	2.905

Total Aroclor

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	12

Raw Statistics		Log-transformed Statistics	
Minimum	0.26	Minimum of Log Data	-1.347
Maximum	2.8	Maximum of Log Data	1.03
Mean	0.893	Mean of log Data	-0.425
Median	0.525	SD of log Data	0.813
SD	0.752		
Coefficient of Variation	0.842		
Skewness	1.372		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.82	Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.249	95% H-UCL	1.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.775
95% Adjusted-CLT UCL	1.302	97.5% Chebyshev (MVUE) UCL	2.16
95% Modified-t UCL	1.261	99% Chebyshev (MVUE) UCL	2.918

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.426	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.626		
MLE of Mean	0.893		
MLE of Standard Deviation	0.748		
nu star	39.93		
Approximate Chi Square Value (.05)	26.45	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	1.224
Adjusted Chi Square Value	25	95% Jackknife UCL	1.249
		95% Standard Bootstrap UCL	1.209
Anderson-Darling Test Statistic	0.736	95% Bootstrap-t UCL	1.387
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	1.364
Kolmogorov-Smirnov Test Statistic	0.265	95% Percentile Bootstrap UCL	1.238
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	1.322
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.769
		97.5% Chebyshev(Mean, Sd) UCL	2.148
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.893
95% Approximate Gamma UCL	1.348		
95% Adjusted Gamma UCL	1.426		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.348

ZINC

General Statistics

Number of Valid Observations	14	Number of Distinct Observations	14

Raw Statistics		Log-transformed Statistics	
Minimum	41.7	Minimum of Log Data	3.731
Maximum	99.4	Maximum of Log Data	4.599
Mean	65.19	Mean of log Data	4.132
Median	55.5	SD of log Data	0.309
SD	21.04		
Coefficient of Variation	0.323		
Skewness	0.698		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical Value	0.874	Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	75.15	95% H-UCL	76.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	88.82
95% Adjusted-CLT UCL	75.56	97.5% Chebyshev (MVUE) UCL	99.08
95% Modified-t UCL	75.33	99% Chebyshev (MVUE) UCL	119.2

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	8.775	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	7.429		
MLE of Mean	65.19		
MLE of Standard Deviation	22.01		
nu star	245.7		
Approximate Chi Square Value (.05)	210.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0312	95% CLT UCL	74.44
Adjusted Chi Square Value	206.1	95% Jackknife UCL	75.15
		95% Standard Bootstrap UCL	74.04
Anderson-Darling Test Statistic	0.691	95% Bootstrap-t UCL	77.14
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	73.9
Kolmogorov-Smirnov Test Statistic	0.208	95% Percentile Bootstrap UCL	73.92
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	74.81
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	89.7
		97.5% Chebyshev(Mean, Sd) UCL	100.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	121.1
95% Approximate Gamma UCL	76.13		
95% Adjusted Gamma UCL	77.73		

Potential UCL to Use			
		Use 95% Approximate Gamma UCL	76.13

General UCL Statistics for Data Sets with Non-Detects

SEDIMENT UCLs

User Selected Options	
From File	C:\Documents and Settings\anatracordone\My Documents\EPA-ERT\Onondaga Lake\LeyCreek\macro-s
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1'-Biphenyl, 3,3',4,4'-tetrachloro-

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	5

Raw Statistics		Log-transformed Statistics	
Minimum	0.45	Minimum of Log Data	-0.799
Maximum	6.2	Maximum of Log Data	1.825
Mean	2.7	Mean of log Data	0.562
Median	2.6	SD of log Data	1.132
SD	2.256		
Coefficient of Variation	0.836		
Skewness	0.557		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.914	Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	4.556	95% H-UCL	34.05
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.566
95% Adjusted-CLT UCL	4.439	97.5% Chebyshev (MVUE) UCL	11.02
95% Modified-t UCL	4.591	99% Chebyshev (MVUE) UCL	15.85

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.762	Data appear Normal at 5% Significance Level
Theta Star	3.546	
MLE of Mean	2.7	
MLE of Standard Deviation	3.094	

nu star	9.138		
Approximate Chi Square Value (.05)	3.411	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	4.215
Adjusted Chi Square Value	2.276	95% Jackknife UCL	4.556
		95% Standard Bootstrap UCL	4.058
Anderson-Darling Test Statistic	0.386	95% Bootstrap-t UCL	5.066
Anderson-Darling 5% Critical Value	0.711	95% Hall's Bootstrap UCL	4.156
Kolmogorov-Smirnov Test Statistic	0.229	95% Percentile Bootstrap UCL	4.092
Kolmogorov-Smirnov 5% Critical Value	0.339	95% BCA Bootstrap UCL	4.233
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.715
		97.5% Chebyshev(Mean, Sd) UCL	8.453
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.87
95% Approximate Gamma UCL	7.234		
95% Adjusted Gamma UCL	10.84		
Potential UCL to Use		Use 95% Student's-t UCL	4.556

1,2,3,4,6,7,8-HpCDD

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	4.1000E-6	Minimum of Log Data	-12.4
Maximum	0.0039	Maximum of Log Data	-5.547
Mean	5.6428E-4	Mean of log Data	-8.911
Median	1.5000E-4	SD of log Data	1.963
SD	0.00113		
Coefficient of Variation	1.999		
Skewness	3.092		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.513	Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.00118	95% H-UCL	0.0215
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.00239
95% Adjusted-CLT UCL	0.00146	97.5% Chebyshev (MVUE) UCL	0.00314
95% Modified-t UCL	0.00123	99% Chebyshev (MVUE) UCL	0.00463
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.389	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.00145		
MLE of Mean	5.6428E-4		
MLE of Standard Deviation	9.0522E-4		
nu star	8.549		
Approximate Chi Square Value (.05)	3.057	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.00112

Adjusted Chi Square Value	2.547	95% Jackknife UCL	0.00118
		95% Standard Bootstrap UCL	0.0011
Anderson-Darling Test Statistic	0.46	95% Bootstrap-t UCL	0.00283
Anderson-Darling 5% Critical Value	0.791	95% Hall's Bootstrap UCL	0.00327
Kolmogorov-Smirnov Test Statistic	0.22	95% Percentile Bootstrap UCL	0.00122
Kolmogorov-Smirnov 5% Critical Value	0.271	95% BCA Bootstrap UCL	0.00135
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.00205
		97.5% Chebyshev(Mean, Sd) UCL	0.00269
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.00395
95% Approximate Gamma UCL	0.00158		
95% Adjusted Gamma UCL	0.00189		
Potential UCL to Use		Use 95% Adjusted Gamma UCL	0.00189

1,2,3,4,6,7,8-HpCDF

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	9.4000E-6	Minimum of Log Data	-11.57
Maximum	4.7000E-4	Maximum of Log Data	-7.663
Mean	1.1501E-4	Mean of log Data	-9.774
Median	7.8000E-5	SD of log Data	1.347
SD	1.3973E-4		
Coefficient of Variation	1.215		
Skewness	2.075		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.9601E-4	95% H-UCL	7.9489E-4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.6183E-4
95% Adjusted-CLT UCL	2.1867E-4	97.5% Chebyshev (MVUE) UCL	4.6556E-4
95% Modified-t UCL	2.0084E-4	99% Chebyshev (MVUE) UCL	6.6931E-4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.653	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.7605E-4		
MLE of Mean	1.1501E-4		
MLE of Standard Deviation	1.4229E-4		
nu star	13.07		
Approximate Chi Square Value (.05)	5.937	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	1.8769E-4
Adjusted Chi Square Value	5.126	95% Jackknife UCL	1.9601E-4
		95% Standard Bootstrap UCL	1.8370E-4

Anderson-Darling Test Statistic	0.346	95% Bootstrap-t UCL	2.6237E-4
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	4.8457E-4
Kolmogorov-Smirnov Test Statistic	0.137	95% Percentile Bootstrap UCL	1.8940E-4
Kolmogorov-Smirnov 5% Critical Value	0.275	95% BCA Bootstrap UCL	2.1554E-4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.0762E-4
		97.5% Chebyshev(Mean, Sd) UCL	3.9096E-4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.5466E-4
95% Approximate Gamma UCL	2.5311E-4		
95% Adjusted Gamma UCL	2.9316E-4		
Potential UCL to Use		Use 95% Approximate Gamma UCL	2.5311E-4

1,2,3,4,7,8,9-HpCDF

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9
Raw Statistics		Log-transformed Statistics	
Minimum	9.4000E-7	Minimum of Log Data	-13.88
Maximum	3.6000E-5	Maximum of Log Data	-10.23
Mean	1.3849E-5	Mean of log Data	-11.74
Median	1.4000E-5	SD of log Data	1.277
SD	1.2280E-5		
Coefficient of Variation	N/A		
Skewness	0.629		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.906	Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.1461E-5	95% H-UCL	1.0405E-4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.6017E-5
95% Adjusted-CLT UCL	2.1499E-5	97.5% Chebyshev (MVUE) UCL	5.9125E-5
95% Modified-t UCL	2.1604E-5	99% Chebyshev (MVUE) UCL	8.4871E-5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.768	Data appear Normal at 5% Significance Level	
Theta Star	1.8034E-5		
MLE of Mean	1.3849E-5		
MLE of Standard Deviation	1.5803E-5		
nu star	13.82		

Approximate Chi Square Value (.05)	6.45	Nonparametric Statistics	
Adjusted Level of Significance	0.0231	95% CLT UCL	2.0582E-5
Adjusted Chi Square Value	5.425	95% Jackknife UCL	2.1461E-5
		95% Standard Bootstrap UCL	2.0235E-5
Anderson-Darling Test Statistic	0.364	95% Bootstrap-t UCL	2.2834E-5
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	2.1216E-5
Kolmogorov-Smirnov Test Statistic	0.208	95% Percentile Bootstrap UCL	2.0333E-5
Kolmogorov-Smirnov 5% Critical Value	0.287	95% BCA Bootstrap UCL	2.1189E-5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.1691E-5
		97.5% Chebyshev(Mean, Sd) UCL	3.9412E-5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.4577E-5
95% Approximate Gamma UCL	2.9678E-5		
95% Adjusted Gamma UCL	3.5287E-5		
Potential UCL to Use		Use 95% Student's-t UCL	2.1461E-5

1,2,3,4,7,8-HxCDD

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		Log-transformed Statistics	
Minimum	1.5000E-6	Minimum of Log Data	-13.41
Maximum	9.8000E-5	Maximum of Log Data	-9.231
Mean	2.3120E-5	Mean of log Data	-11.86
Median	6.1000E-6	SD of log Data	1.608
SD	4.1929E-5		
Coefficient of Variation	N/A		
Skewness	2.217		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.606	Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6.3095E-5	95% H-UCL	0.0116

95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	6.5302E-5
95% Adjusted-CLT UCL	7.3832E-5	97.5% Chebyshev (MVUE) UCL	8.6072E-5
95% Modified-t UCL	6.6194E-5	99% Chebyshev (MVUE) UCL	1.2687E-4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.345	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	6.7004E-5		
MLE of Mean	2.3120E-5		
MLE of Standard Deviation	3.9359E-5		
nu star	3.451		
Approximate Chi Square Value (.05)	0.518	Nonparametric Statistics	
Adjusted Level of Significance	0.0086	95% CLT UCL	5.3963E-5
Adjusted Chi Square Value	0.2	95% Jackknife UCL	6.3095E-5
		95% Standard Bootstrap UCL	5.0732E-5
Anderson-Darling Test Statistic	0.668	95% Bootstrap-t UCL	4.2965E-4
Anderson-Darling 5% Critical Value	0.709	95% Hall's Bootstrap UCL	4.3018E-4
Kolmogorov-Smirnov Test Statistic	0.384	95% Percentile Bootstrap UCL	5.9840E-5
Kolmogorov-Smirnov 5% Critical Value	0.371	95% BCA Bootstrap UCL	6.1240E-5
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.0486E-4
		97.5% Chebyshev(Mean, Sd) UCL	1.4022E-4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.0969E-4
95% Approximate Gamma UCL	1.5415E-4		
95% Adjusted Gamma UCL	3.9982E-4		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.5415E-4

Recommended UCL exceeds the maximum observation

1,2,3,4,7,8-HxCDF

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	8
Raw Statistics		Log-transformed Statistics	
Minimum	2.1000E-6	Minimum of Log Data	-13.07
Maximum	3.6000E-5	Maximum of Log Data	-10.23
Mean	1.8011E-5	Mean of log Data	-11.41
Median	1.9000E-5	SD of log Data	1.172
SD	1.4684E-5		
Coefficient of Variation	N/A		
Skewness	0.1		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.837	Shapiro Wilk Test Statistic	0.84

Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.7113E-5	95% H-UCL	9.9193E-5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.4628E-5
95% Adjusted-CLT UCL	2.6237E-5	97.5% Chebyshev (MVUE) UCL	6.9728E-5
95% Modified-t UCL	2.7140E-5	99% Chebyshev (MVUE) UCL	9.9390E-5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.852	Data appear Normal at 5% Significance Level	
Theta Star	2.1148E-5		
MLE of Mean	1.8011E-5		
MLE of Standard Deviation	1.9517E-5		
nu star	15.33		
Approximate Chi Square Value (.05)	7.491	Nonparametric Statistics	
Adjusted Level of Significance	0.0231	95% CLT UCL	2.6062E-5
Adjusted Chi Square Value	6.371	95% Jackknife UCL	2.7113E-5
		95% Standard Bootstrap UCL	2.5562E-5
Anderson-Darling Test Statistic	0.701	95% Bootstrap-t UCL	2.6934E-5
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	2.4104E-5
Kolmogorov-Smirnov Test Statistic	0.231	95% Percentile Bootstrap UCL	2.5456E-5
Kolmogorov-Smirnov 5% Critical Value	0.286	95% BCA Bootstrap UCL	2.5689E-5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.9346E-5
		97.5% Chebyshev(Mean, Sd) UCL	4.8577E-5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.6711E-5
95% Approximate Gamma UCL	3.6856E-5		
95% Adjusted Gamma UCL	4.3335E-5		
Potential UCL to Use		Use 95% Student's-t UCL	2.7113E-5

1,2,3,6,7,8-HxCDD

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	4.5000E-7	Minimum of Log Data	-14.61
Maximum	4.8000E-4	Maximum of Log Data	-7.642
Mean	5.8677E-5	Mean of log Data	-11.42
Median	8.8000E-6	SD of log Data	1.932
SD	1.4063E-4		
Coefficient of Variation	N/A		
Skewness	3.241		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.44	Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.3553E-4	95% H-UCL	0.00151
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.8478E-4
95% Adjusted-CLT UCL	1.7269E-4	97.5% Chebyshev (MVUE) UCL	2.4309E-4
95% Modified-t UCL	1.4243E-4	99% Chebyshev (MVUE) UCL	3.5764E-4

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.348	Data appear Lognormal at 5% Significance Level	
Theta Star	1.6885E-4		
MLE of Mean	5.8677E-5		
MLE of Standard Deviation	9.9537E-5		
nu star	7.645		
Approximate Chi Square Value (.05)	2.531	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	1.2842E-4
Adjusted Chi Square Value	2.078	95% Jackknife UCL	1.3553E-4
		95% Standard Bootstrap UCL	1.2577E-4
Anderson-Darling Test Statistic	0.814	95% Bootstrap-t UCL	5.2026E-4
Anderson-Darling 5% Critical Value	0.802	95% Hall's Bootstrap UCL	4.5097E-4
Kolmogorov-Smirnov Test Statistic	0.28	95% Percentile Bootstrap UCL	1.4043E-4
Kolmogorov-Smirnov 5% Critical Value	0.273	95% BCA Bootstrap UCL	1.8532E-4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.4350E-4
		97.5% Chebyshev(Mean, Sd) UCL	3.2347E-4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.8055E-4
95% Approximate Gamma UCL	1.7722E-4		
95% Adjusted Gamma UCL	2.1588E-4		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	4.8055E-4

Recommended UCL exceeds the maximum observation

1,2,3,6,7,8-HxCDF

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	2.3000E-6	Minimum of Log Data	-12.98
Maximum	1.7000E-5	Maximum of Log Data	-10.98
Mean	9.8286E-6	Mean of log Data	-11.79
Median	1.2000E-5	SD of log Data	0.84
SD	6.3305E-6		
Coefficient of Variation	N/A		
Skewness	-0.207		

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.839	Shapiro Wilk Test Statistic	0.833
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.4478E-5	95% H-UCL	3.3136E-5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.4378E-5
95% Adjusted-CLT UCL	1.3565E-5	97.5% Chebyshev (MVUE) UCL	3.0520E-5
95% Modified-t UCL	1.4447E-5	99% Chebyshev (MVUE) UCL	4.2583E-5

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.296	Data appear Normal at 5% Significance Level	
Theta Star	7.5844E-6		
MLE of Mean	9.8286E-6		
MLE of Standard Deviation	8.6339E-6		
nu star	18.14		
Approximate Chi Square Value (.05)	9.494	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0158	95% CLT UCL	1.3764E-5
Adjusted Chi Square Value	7.68	95% Jackknife UCL	1.4478E-5
		95% Standard Bootstrap UCL	1.3459E-5
Anderson-Darling Test Statistic	0.661	95% Bootstrap-t UCL	1.4399E-5
Anderson-Darling 5% Critical Value	0.715	95% Hall's Bootstrap UCL	1.2340E-5
Kolmogorov-Smirnov Test Statistic	0.273	95% Percentile Bootstrap UCL	1.3486E-5
Kolmogorov-Smirnov 5% Critical Value	0.315	95% BCA Bootstrap UCL	1.3571E-5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.0258E-5
		97.5% Chebyshev(Mean, Sd) UCL	2.4771E-5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.3636E-5
95% Approximate Gamma UCL	1.8782E-5		
95% Adjusted Gamma UCL	2.3217E-5		
Potential UCL to Use		Use 95% Student's-t UCL	1.4478E-5

1,2,3,7,8,9-HxCDD

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	8
Raw Statistics		**Log-transformed Statistics**	
Minimum	2.0000E-6	Minimum of Log Data	-13.12
Maximum	6.0000E-4	Maximum of Log Data	-7.419
Mean	8.1644E-5	Mean of log Data	-11.02
Median	2.7000E-5	SD of log Data	1.736
SD	1.9482E-4		
Coefficient of Variation	N/A		

Skewness	2.974

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.449	Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.0240E-4	95% H-UCL	0.00161
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.9325E-4
95% Adjusted-CLT UCL	2.5725E-4	97.5% Chebyshev (MVUE) UCL	2.5344E-4
95% Modified-t UCL	2.1313E-4	99% Chebyshev (MVUE) UCL	3.7169E-4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.346	Data appear Lognormal at 5% Significance Level	
Theta Star	2.3613E-4		
MLE of Mean	8.1644E-5		
MLE of Standard Deviation	1.3885E-4		
nu star	6.224		
Approximate Chi Square Value (.05)	1.755	Nonparametric Statistics	
Adjusted Level of Significance	0.0231	95% CLT UCL	1.8846E-4
Adjusted Chi Square Value	1.302	95% Jackknife UCL	2.0240E-4
		95% Standard Bootstrap UCL	1.8322E-4
Anderson-Darling Test Statistic	1.107	95% Bootstrap-t UCL	0.00118
Anderson-Darling 5% Critical Value	0.788	95% Hall's Bootstrap UCL	9.4161E-4
Kolmogorov-Smirnov Test Statistic	0.367	95% Percentile Bootstrap UCL	2.1070E-4
Kolmogorov-Smirnov 5% Critical Value	0.297	95% BCA Bootstrap UCL	2.7490E-4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.6471E-4
		97.5% Chebyshev(Mean, Sd) UCL	4.8720E-4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.2780E-4
95% Approximate Gamma UCL	2.8950E-4		
95% Adjusted Gamma UCL	3.9025E-4		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	7.2780E-4

Recommended UCL exceeds the maximum observation

1,2,3,7,8,9-HxCDF

General Statistics

Number of Valid Observations	3	Number of Distinct Observations	3

Warning: This data set only has 3 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable 1,2,3,7,8,9-HxCDF was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

1,2,3,7,8-PeCDD

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	1.5000E-6	Minimum of Log Data	-13.41
Maximum	3.3000E-4	Maximum of Log Data	-8.016
Mean	5.4729E-5	Mean of log Data	-11.36
Median	1.2000E-5	SD of log Data	1.716
SD	1.2148E-4		
Coefficient of Variation	N/A		
Skewness	2.637		

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.489	Shapiro Wilk Test Statistic	0.849
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.4395E-4	95% H-UCL	0.00305
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.3057E-4
95% Adjusted-CLT UCL	1.7915E-4	97.5% Chebyshev (MVUE) UCL	1.7179E-4
95% Modified-t UCL	1.5158E-4	99% Chebyshev (MVUE) UCL	2.5277E-4

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.336	Data appear Lognormal at 5% Significance Level
Theta Star	1.6290E-4	
MLE of Mean	5.4729E-5	
MLE of Standard Deviation	9.4422E-5	

nu star	4.703		
Approximate Chi Square Value (.05)	1.018	Nonparametric Statistics	
Adjusted Level of Significance	0.0158	95% CLT UCL	1.3025E-4
Adjusted Chi Square Value	0.597	95% Jackknife UCL	1.4395E-4
		95% Standard Bootstrap UCL	1.2357E-4
Anderson-Darling Test Statistic	1.101	95% Bootstrap-t UCL	0.00141
Anderson-Darling 5% Critical Value	0.764	95% Hall's Bootstrap UCL	0.00162
Kolmogorov-Smirnov Test Statistic	0.442	95% Percentile Bootstrap UCL	1.4530E-4
Kolmogorov-Smirnov 5% Critical Value	0.33	95% BCA Bootstrap UCL	1.4857E-4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.5487E-4
		97.5% Chebyshev(Mean, Sd) UCL	3.4147E-4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.1158E-4
95% Approximate Gamma UCL	2.5293E-4		
95% Adjusted Gamma UCL	4.3111E-4		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	5.1158E-4

Recommended UCL exceeds the maximum observation

1,2,3,7,8-PeCDF

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	7
Raw Statistics		Log-transformed Statistics	
Minimum	2.4000E-7	Minimum of Log Data	-15.24
Maximum	2.3000E-5	Maximum of Log Data	-10.68
Mean	5.5529E-6	Mean of log Data	-13.09
Median	1.5000E-6	SD of log Data	1.55
SD	8.3893E-6		
Coefficient of Variation	N/A		
Skewness	1.956		

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.695	Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.1714E-5	95% H-UCL	2.0089E-4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.8110E-5
95% Adjusted-CLT UCL	1.3273E-5	97.5% Chebyshev (MVUE) UCL	2.3695E-5
95% Modified-t UCL	1.2105E-5	99% Chebyshev (MVUE) UCL	3.4666E-5

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.45	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.2335E-5		
MLE of Mean	5.5529E-6		
MLE of Standard Deviation	8.2760E-6		
nu star	6.303		
Approximate Chi Square Value (.05)	1.796	Nonparametric Statistics	
Adjusted Level of Significance	0.0158	95% CLT UCL	1.0768E-5
Adjusted Chi Square Value	1.164	95% Jackknife UCL	1.1714E-5
		95% Standard Bootstrap UCL	1.0338E-5
Anderson-Darling Test Statistic	0.47	95% Bootstrap-t UCL	5.9350E-5
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	4.9899E-5
Kolmogorov-Smirnov Test Statistic	0.288	95% Percentile Bootstrap UCL	1.0524E-5
Kolmogorov-Smirnov 5% Critical Value	0.325	95% BCA Bootstrap UCL	1.3343E-5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.9374E-5
		97.5% Chebyshev(Mean, Sd) UCL	2.5355E-5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.7102E-5
95% Approximate Gamma UCL	1.9482E-5		
95% Adjusted Gamma UCL	3.0060E-5		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.9482E-5

2,3,4,6,7,8-HxCDF

General Statistics

Number of Valid Observations	4	Number of Distinct Observations	4

Warning: This data set only has 4 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable 2,3,4,6,7,8-HxCDF was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,3,4,7,8-PeCDF

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	11

Raw Statistics		Log-transformed Statistics	
Minimum	2.8000E-7	Minimum of Log Data	-15.09
Maximum	3.5000E-5	Maximum of Log Data	-10.26

Mean	1.3698E-5	Mean of log Data	-11.87
Median	8.0000E-6	SD of log Data	1.485
SD	1.2684E-5		
Coefficient of Variation	N/A		
Skewness	0.594		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.877	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.0630E-5	95% H-UCL	1.3836E-4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.5224E-5
95% Adjusted-CLT UCL	2.0721E-5	97.5% Chebyshev (MVUE) UCL	7.1416E-5
95% Modified-t UCL	2.0744E-5	99% Chebyshev (MVUE) UCL	1.0322E-4
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.697	Data appear Normal at 5% Significance Level	
Theta Star	1.9640E-5		
MLE of Mean	1.3698E-5		
MLE of Standard Deviation	1.6402E-5		
nu star	15.34		
Approximate Chi Square Value (.05)	7.501	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	1.9989E-5
Adjusted Chi Square Value	6.627	95% Jackknife UCL	2.0630E-5
		95% Standard Bootstrap UCL	1.9732E-5
Anderson-Darling Test Statistic	0.302	95% Bootstrap-t UCL	2.1544E-5
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	1.9119E-5
Kolmogorov-Smirnov Test Statistic	0.151	95% Percentile Bootstrap UCL	1.9655E-5
Kolmogorov-Smirnov 5% Critical Value	0.264	95% BCA Bootstrap UCL	2.0255E-5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.0368E-5
		97.5% Chebyshev(Mean, Sd) UCL	3.7581E-5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.1750E-5
95% Approximate Gamma UCL	2.8019E-5		
95% Adjusted Gamma UCL	3.1718E-5		
Potential UCL to Use		Use 95% Student's-t UCL	2.0630E-5

2,3,7,8-TCDD

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	8.2000E-7	Minimum of Log Data	-14.01
Maximum	2.0000E-4	Maximum of Log Data	-8.517
Mean	3.5357E-5	Mean of log Data	-12.36
Median	3.1000E-6	SD of log Data	2.004
SD	8.0669E-5		

Coefficient of Variation	N/A
Skewness	2.448

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.512
Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level	

Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.783
Shapiro Wilk Critical Value	0.788
Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	
95% Student's-t UCL	1.0172E-4
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1.2469E-4
95% Modified-t UCL	1.0720E-4

Assuming Lognormal Distribution	
95% H-UCL	0.0321
95% Chebyshev (MVUE) UCL	7.1372E-5
97.5% Chebyshev (MVUE) UCL	9.4764E-5
99% Chebyshev (MVUE) UCL	1.4071E-4

Gamma Distribution Test	
k star (bias corrected)	0.272
Theta Star	1.2982E-4
MLE of Mean	3.5357E-5
MLE of Standard Deviation	6.7750E-5
nu star	3.268
Approximate Chi Square Value (.05)	0.456
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	0.207
Anderson-Darling Test Statistic	1.11
Anderson-Darling 5% Critical Value	0.763
Kolmogorov-Smirnov Test Statistic	0.446
Kolmogorov-Smirnov 5% Critical Value	0.356
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution	
95% Approximate Gamma UCL	2.5334E-4
95% Adjusted Gamma UCL	5.5723E-4

Data Distribution
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics	
95% CLT UCL	8.9527E-5
95% Jackknife UCL	1.0172E-4
95% Standard Bootstrap UCL	8.4775E-5
95% Bootstrap-t UCL	0.00242
95% Hall's Bootstrap UCL	0.00192
95% Percentile Bootstrap UCL	1.0084E-4
95% BCA Bootstrap UCL	1.0160E-4
95% Chebyshev(Mean, Sd) UCL	1.7891E-4
97.5% Chebyshev(Mean, Sd) UCL	2.4102E-4
99% Chebyshev(Mean, Sd) UCL	3.6304E-4

Potential UCL to Use	Use 95% Hall's Bootstrap UCL	0.00192

Recommended UCL exceeds the maximum observation

In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL

2,3,7,8-TCDF

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	20

Raw Statistics		Log-transformed Statistics	
Minimum	1.6000E-6	Minimum of Log Data	-13.35
Maximum	2.7000E-5	Maximum of Log Data	-10.52
Mean	1.1505E-5	Mean of log Data	-11.75
Median	8.6000E-6	SD of log Data	0.957
SD	8.9648E-6		
Coefficient of Variation	N/A		
Skewness	0.458		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.871	Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.4971E-5	95% H-UCL	2.1916E-5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.4592E-5
95% Adjusted-CLT UCL	1.5021E-5	97.5% Chebyshev (MVUE) UCL	3.0007E-5
95% Modified-t UCL	1.5005E-5	99% Chebyshev (MVUE) UCL	4.0645E-5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.281	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	8.9821E-6		
MLE of Mean	1.1505E-5		
MLE of Standard Deviation	1.0166E-5		
nu star	51.24		
Approximate Chi Square Value (.05)	35.8	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	1.4802E-5
Adjusted Chi Square Value	34.78	95% Jackknife UCL	1.4971E-5
		95% Standard Bootstrap UCL	1.4734E-5
Anderson-Darling Test Statistic	0.792	95% Bootstrap-t UCL	1.5232E-5
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	1.4899E-5
Kolmogorov-Smirnov Test Statistic	0.168	95% Percentile Bootstrap UCL	1.4805E-5
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	1.4855E-5
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.0243E-5
		97.5% Chebyshev(Mean, Sd) UCL	2.4024E-5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.1450E-5
95% Approximate Gamma UCL	1.6467E-5		
95% Adjusted Gamma UCL	1.6950E-5		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.6467E-5

3,4-Dihydrocyclopenta(cd)pyrene (acepyrene)

General Statistics

Number of Valid Observations	35	Number of Distinct Observations	32

Raw Statistics		Log-transformed Statistics	
Minimum	0.1	Minimum of Log Data	-2.303
Maximum	6.8	Maximum of Log Data	1.917
Mean	1.512	Mean of log Data	-0.207
Median	0.62	SD of log Data	1.132
SD	1.825		
Coefficient of Variation	1.206		
Skewness	1.759		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.723	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.934	Shapiro Wilk Critical Value	0.934
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.034	95% H-UCL	2.566
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.99
95% Adjusted-CLT UCL	2.118	97.5% Chebyshev (MVUE) UCL	3.635
95% Modified-t UCL	2.049	99% Chebyshev (MVUE) UCL	4.902
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.876	Data appear Lognormal at 5% Significance Level	
Theta Star	1.727		
MLE of Mean	1.512		
MLE of Standard Deviation	1.616		
nu star	61.29		
Approximate Chi Square Value (.05)	44.28	Nonparametric Statistics	
Adjusted Level of Significance	0.0425	95% CLT UCL	2.02
Adjusted Chi Square Value	43.59	95% Jackknife UCL	2.034
		95% Standard Bootstrap UCL	2.004
Anderson-Darling Test Statistic	1.18	95% Bootstrap-t UCL	2.217
Anderson-Darling 5% Critical Value	0.779	95% Hall's Bootstrap UCL	2.093
Kolmogorov-Smirnov Test Statistic	0.181	95% Percentile Bootstrap UCL	2.06
Kolmogorov-Smirnov 5% Critical Value	0.153	95% BCA Bootstrap UCL	2.09
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.857
		97.5% Chebyshev(Mean, Sd) UCL	3.438
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.581
95% Approximate Gamma UCL	2.093		
95% Adjusted Gamma UCL	2.126		
Potential UCL to Use		Use 95% H-UCL	2.566

3-Methylcholanthrene

General Statistics

Number of Valid Observations	3	Number of Distinct Observations	3

Warning: This data set only has 3 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable 3-Methylcholanthrene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4H-Cyclopenta[def]phenanthrene

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	31

Raw Statistics		Log-transformed Statistics	
Minimum	0.21	Minimum of Log Data	-1.561
Maximum	24	Maximum of Log Data	3.178
Mean	3.105	Mean of log Data	0.393
Median	1.2	SD of log Data	1.185
SD	4.723		
Coefficient of Variation	1.521		
Skewness	3.112		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.617	Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4.498	95% H-UCL	5.235
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	6.012
95% Adjusted-CLT UCL	4.933	97.5% Chebyshev (MVUE) UCL	7.362
95% Modified-t UCL	4.572	99% Chebyshev (MVUE) UCL	10.02

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.749	Data appear Lognormal at 5% Significance Level	
Theta Star	4.146		
MLE of Mean	3.105		
MLE of Standard Deviation	3.588		
nu star	49.43		
Approximate Chi Square Value (.05)	34.29	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0419	95% CLT UCL	4.457
Adjusted Chi Square Value	33.64	95% Jackknife UCL	4.498
		95% Standard Bootstrap UCL	4.424
Anderson-Darling Test Statistic	1.403	95% Bootstrap-t UCL	5.492
Anderson-Darling 5% Critical Value	0.785	95% Hall's Bootstrap UCL	9.232
Kolmogorov-Smirnov Test Statistic	0.181	95% Percentile Bootstrap UCL	4.645
Kolmogorov-Smirnov 5% Critical Value	0.159	95% BCA Bootstrap UCL	5.063
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.689
		97.5% Chebyshev(Mean, Sd) UCL	8.24

Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.29
95% Approximate Gamma UCL	4.476		
95% Adjusted Gamma UCL	4.563		
Potential UCL to Use		Use 95% H-UCL	5.235

9,10-Anthracenedione

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	20
Raw Statistics		Log-transformed Statistics	
Minimum	0.33	Minimum of Log Data	-1.109
Maximum	24	Maximum of Log Data	3.178
Mean	3.375	Mean of log Data	0.378
Median	0.835	SD of log Data	1.246
SD	5.516		
Coefficient of Variation	1.634		
Skewness	3.056		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.584	Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	5.508	95% H-UCL	7.495
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.175
95% Adjusted-CLT UCL	6.304	97.5% Chebyshev (MVUE) UCL	8.991
95% Modified-t UCL	5.648	99% Chebyshev (MVUE) UCL	12.56
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.644	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.244		
MLE of Mean	3.375		
MLE of Standard Deviation	4.207		
nu star	25.74		
Approximate Chi Square Value (.05)	15.18	Nonparametric Statistics	
Adjusted Level of Significance	0.038	95% CLT UCL	5.404
Adjusted Chi Square Value	14.54	95% Jackknife UCL	5.508
		95% Standard Bootstrap UCL	5.302
Anderson-Darling Test Statistic	1.448	95% Bootstrap-t UCL	7.701
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL	12.84
Kolmogorov-Smirnov Test Statistic	0.269	95% Percentile Bootstrap UCL	5.624
Kolmogorov-Smirnov 5% Critical Value	0.202	95% BCA Bootstrap UCL	6.468
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.752
		97.5% Chebyshev(Mean, Sd) UCL	11.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.65
95% Approximate Gamma UCL	5.723		
95% Adjusted Gamma UCL	5.975		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	15.65

Aldrin

General Statistics

Number of Valid Data	66	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	65
		Percent Non-Detects	98.48%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Aldrin was not processed!

ALUMINUM

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	65

Raw Statistics		Log-transformed Statistics	
Minimum	930	Minimum of Log Data	6.835
Maximum	15100	Maximum of Log Data	9.622
Mean	5683	Mean of log Data	8.416
Median	5340	SD of log Data	0.733
SD	3634		
Coefficient of Variation	0.639		
Skewness	0.971		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.124	Lilliefors Test Statistic	0.112
Lilliefors Critical Value	0.107	Lilliefors Critical Value	0.107
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6418	95% H-UCL	7096
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8405
95% Adjusted-CLT UCL	6463	97.5% Chebyshev (MVUE) UCL	9498
95% Modified-t UCL	6426	99% Chebyshev (MVUE) UCL	11644

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.24	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	2537		
MLE of Mean	5683		
MLE of Standard Deviation	3797		
nu star	304.7		
Approximate Chi Square Value (.05)	265.2	Nonparametric Statistics	
Adjusted Level of Significance	0.0465	95% CLT UCL	6407

Adjusted Chi Square Value	264.4	95% Jackknife UCL	6418
		95% Standard Bootstrap UCL	6410
Anderson-Darling Test Statistic	0.514	95% Bootstrap-t UCL	6522
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	6462
Kolmogorov-Smirnov Test Statistic	0.0704	95% Percentile Bootstrap UCL	6434
Kolmogorov-Smirnov 5% Critical Value	0.109	95% BCA Bootstrap UCL	6445
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	7603
		97.5% Chebyshev(Mean, Sd) UCL	8434
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10067
95% Approximate Gamma UCL	6528		
95% Adjusted Gamma UCL	6547		
Potential UCL to Use		Use 95% Approximate Gamma UCL	6528

Aroclor-1242

General Statistics

Number of Valid Data	67	Number of Detected Data	47
Number of Distinct Detected Data	38	Number of Non-Detect Data	20
		Percent Non-Detects	29.85%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.061	Minimum Detected	-2.797
Maximum Detected	43	Maximum Detected	3.761
Mean of Detected	3.178	Mean of Detected	0.0569
SD of Detected	7.104	SD of Detected	1.432
Minimum Non-Detect	0.041	Minimum Non-Detect	-3.194
Maximum Non-Detect	0.16	Maximum Non-Detect	-1.833
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	24
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	43
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	35.82%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.442	Shapiro Wilk Test Statistic	0.974
5% Shapiro Wilk Critical Value	0.946	5% Shapiro Wilk Critical Value	0.946
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.241	Mean	-0.963
SD	6.105	SD	1.99
95% DL/2 (t) UCL	3.485	95% H-Stat (DL/2) UCL	1.858
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.896
		SD in Log Scale	1.903
		Mean in Original Scale	2.243
		SD in Original Scale	6.104
		95% Percentile Bootstrap UCL	3.66

95% BCA Bootstrap UCL	4.252

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.545
Theta Star	5.832
nu star	51.22
A-D Test Statistic	2.24
5% A-D Critical Value	0.808
K-S Test Statistic	0.808
5% K-S Critical Value	0.136
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1.0000E-9
Maximum	43
Mean	2.23
Median	0.45
SD	6.109
k star	0.123
Theta star	18.06
Nu star	16.55
AppChi2	8.35
95% Gamma Approximate UCL	4.42
95% Adjusted Gamma UCL	4.489

Data Distribution Test with Detected Values Only	
Data appear Lognormal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	2.248
SD	6.056
SE of Mean	0.748
95% KM (t) UCL	3.495
95% KM (z) UCL	3.478
95% KM (jackknife) UCL	3.486
95% KM (bootstrap t) UCL	5.128
95% KM (BCA) UCL	3.736
95% KM (Percentile Bootstrap) UCL	3.635
95% KM (Chebyshev) UCL	5.508
97.5% KM (Chebyshev) UCL	6.918
99% KM (Chebyshev) UCL	9.689
Potential UCLs to Use	
95% KM (Chebyshev) UCL	5.508

Note: DL/2 is not a recommended method.

Aroclor-1260

General Statistics

Number of Valid Data	67	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	66
		Percent Non-Detects	98.51%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Aroclor-1260 was not processed!

ARSENIC

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	52

Raw Statistics		Log-transformed Statistics	
Minimum	0.95	Minimum of Log Data	-0.0513
Maximum	23.6	Maximum of Log Data	3.161
Mean	7.249	Mean of log Data	1.75

Median	5.9	SD of log Data	0.735
SD	4.788		
Coefficient of Variation	0.661		
Skewness	1.202		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.173	Lilliefors Test Statistic	0.119
Lilliefors Critical Value	0.107	Lilliefors Critical Value	0.107
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	8.218	95% H-UCL	9.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.74
95% Adjusted-CLT UCL	8.295	97.5% Chebyshev (MVUE) UCL	12.14
95% Modified-t UCL	8.232	99% Chebyshev (MVUE) UCL	14.88
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.225	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.258		
MLE of Mean	7.249		
MLE of Standard Deviation	4.86		
nu star	302.6		
Approximate Chi Square Value (.05)	263.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0465	95% CLT UCL	8.204
Adjusted Chi Square Value	262.5	95% Jackknife UCL	8.218
		95% Standard Bootstrap UCL	8.221
Anderson-Darling Test Statistic	0.619	95% Bootstrap-t UCL	8.299
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	8.377
Kolmogorov-Smirnov Test Statistic	0.0909	95% Percentile Bootstrap UCL	8.165
Kolmogorov-Smirnov 5% Critical Value	0.109	95% BCA Bootstrap UCL	8.329
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.78
		97.5% Chebyshev(Mean, Sd) UCL	10.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.03
95% Approximate Gamma UCL	8.331		
95% Adjusted Gamma UCL	8.356		
Potential UCL to Use		Use 95% Approximate Gamma UCL	8.331

Benzo(a)anthracene

General Statistics

Number of Valid Data	67	Number of Detected Data	64
Number of Distinct Detected Data	56	Number of Non-Detect Data	3
		Percent Non-Detects	4.48%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	47	Maximum Detected	3.85
Mean of Detected	5.099	Mean of Detected	0.00496
SD of Detected	9.774	SD of Detected	2.076

Minimum Non-Detect	0.24	Minimum Non-Detect	-1.427
Maximum Non-Detect	0.28	Maximum Non-Detect	-1.273
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	18
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	49
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	26.87%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.301	Lilliefors Test Statistic	0.0615
5% Lilliefors Critical Value	0.111	5% Lilliefors Critical Value	0.111
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.876	Mean	-0.0861
SD	9.605	SD	2.072
95% DL/2 (t) UCL	6.834	95% H-Stat (DL/2) UCL	13.88
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2.621	Mean in Log Scale	-0.112
SD	11.76	SD in Log Scale	2.1
95% MLE (t) UCL	5.017	Mean in Original Scale	4.874
95% MLE (Tiku) UCL	5.064	SD in Original Scale	9.607
		95% Percentile Bootstrap UCL	6.854
		95% BCA Bootstrap UCL	7.562
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.396	Data appear Lognormal at 5% Significance Level	
Theta Star	12.88		
nu star	50.68		
A-D Test Statistic	1.422	Nonparametric Statistics	
5% A-D Critical Value	0.839	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.839	Mean	4.874
5% K-S Critical Value	0.119	SD	9.535
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.174
		95% KM (t) UCL	6.832
Assuming Gamma Distribution		95% KM (z) UCL	6.805
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.832
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	7.554
Maximum	47	95% KM (BCA) UCL	6.937
Mean	4.87	95% KM (Percentile Bootstrap) UCL	6.976
Median	0.95	95% KM (Chebyshev) UCL	9.991
SD	9.608	97.5% KM (Chebyshev) UCL	12.21
k star	0.276	99% KM (Chebyshev) UCL	16.56
Theta star	17.65		
Nu star	36.98	Potential UCLs to Use	
AppChi2	24.06	97.5% KM (Chebyshev) UCL	12.21
95% Gamma Approximate UCL	7.486		
95% Adjusted Gamma UCL	7.558		

Note: DL/2 is not a recommended method.

Benzo(a)pyrene

General Statistics

Number of Valid Data	67	Number of Detected Data	61
Number of Distinct Detected Data	56	Number of Non-Detect Data	6
		Percent Non-Detects	8.96%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.014	Minimum Detected	-4.269
Maximum Detected	32	Maximum Detected	3.466
Mean of Detected	3.992	Mean of Detected	-0.145
SD of Detected	7.103	SD of Detected	2.049
Minimum Non-Detect	0.26	Minimum Non-Detect	-1.347
Maximum Non-Detect	1.5	Maximum Non-Detect	0.405

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	42
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	25
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	62.69%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.288	Lilliefors Test Statistic	0.0791
5% Lilliefors Critical Value	0.113	5% Lilliefors Critical Value	0.113
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.662	Mean	-0.262
SD	6.855	SD	2.002
95% DL/2 (t) UCL	5.059	95% H-Stat (DL/2) UCL	8.609
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.336
		SD in Log Scale	2.055
		Mean in Original Scale	3.645
		SD in Original Scale	6.863
		95% Percentile Bootstrap UCL	5.053
		95% BCA Bootstrap UCL	5.39

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.416	Data appear Lognormal at 5% Significance Level	
Theta Star	9.594		
nu star	50.76		
A-D Test Statistic	1.146	Nonparametric Statistics	
5% A-D Critical Value	0.834	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.834	Mean	3.649
5% K-S Critical Value	0.122	SD	6.81
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.839
		95% KM (t) UCL	5.049

Assuming Gamma Distribution		95% KM (z) UCL	5.029
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	5.048
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	5.572
Maximum	32	95% KM (BCA) UCL	5.122
Mean	3.634	95% KM (Percentile Bootstrap) UCL	5.011
Median	0.73	95% KM (Chebyshev) UCL	7.306
SD	6.869	97.5% KM (Chebyshev) UCL	8.888
k star	0.221	99% KM (Chebyshev) UCL	12
Theta star	16.44		
Nu star	29.62	Potential UCLs to Use	
AppChi2	18.2	97.5% KM (Chebyshev) UCL	8.888
95% Gamma Approximate UCL	5.916		
95% Adjusted Gamma UCL	5.981		

Note: DL/2 is not a recommended method.

Benzo(b)fluoranthene

General Statistics

Number of Valid Data	67	Number of Detected Data	63
Number of Distinct Detected Data	52	Number of Non-Detect Data	4
		Percent Non-Detects	5.97%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.011	Minimum Detected	-4.51
Maximum Detected	42	Maximum Detected	3.738
Mean of Detected	5.463	Mean of Detected	0.244
SD of Detected	9.453	SD of Detected	2.009
Minimum Non-Detect	0.26	Minimum Non-Detect	-1.347
Maximum Non-Detect	0.32	Maximum Non-Detect	-1.139
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	17
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	50
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	25.37%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.286	Lilliefors Test Statistic	0.0964
5% Lilliefors Critical Value	0.112	5% Lilliefors Critical Value	0.112
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.145	Mean	0.113
SD	9.25	SD	2.017
95% DL/2 (t) UCL	7.03	95% H-Stat (DL/2) UCL	13.75
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	3.178	Mean in Log Scale	0.0843
SD	11.2	SD in Log Scale	2.05
95% MLE (t) UCL	5.46	Mean in Original Scale	5.142
95% MLE (Tiku) UCL	5.487	SD in Original Scale	9.252

95% Percentile Bootstrap UCL	7.107
95% BCA Bootstrap UCL	7.588

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.434
Theta Star	12.57
nu star	54.74
A-D Test Statistic	1.132
5% A-D Critical Value	0.829
K-S Test Statistic	0.829
5% K-S Critical Value	0.12
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1.0000E-9
Maximum	42
Mean	5.137
Median	1.2
SD	9.255
k star	0.264
Theta star	19.46
Nu star	35.38
AppChi2	22.77
95% Gamma Approximate UCL	7.981
95% Adjusted Gamma UCL	8.06

Data Distribution Test with Detected Values Only	
Data appear Lognormal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	5.141
SD	9.183
SE of Mean	1.131
95% KM (t) UCL	7.028
95% KM (z) UCL	7.001
95% KM (jackknife) UCL	7.027
95% KM (bootstrap t) UCL	7.518
95% KM (BCA) UCL	7.243
95% KM (Percentile Bootstrap) UCL	7.19
95% KM (Chebyshev) UCL	10.07
97.5% KM (Chebyshev) UCL	12.2
99% KM (Chebyshev) UCL	16.39
Potential UCLs to Use	
97.5% KM (Chebyshev) UCL	12.2

Note: DL/2 is not a recommended method.

Benzo(k)fluoranthene

General Statistics

Number of Valid Data	67	Number of Detected Data	50
Number of Distinct Detected Data	46	Number of Non-Detect Data	17
		Percent Non-Detects	25.37%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.013	Minimum Detected	-4.343
Maximum Detected	25	Maximum Detected	3.219
Mean of Detected	2.805	Mean of Detected	-0.323
SD of Detected	5.126	SD of Detected	1.808
Minimum Non-Detect	0.24	Minimum Non-Detect	-1.427
Maximum Non-Detect	1.5	Maximum Non-Detect	0.405
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	49
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	18
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	73.13%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.584	Shapiro Wilk Test Statistic	0.976

5% Shapiro Wilk Critical Value	0.947	5% Shapiro Wilk Critical Value	0.947
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.163	Mean	-0.622
SD	4.555	SD	1.67
95% DL/2 (t) UCL	3.091	95% H-Stat (DL/2) UCL	2.04
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.799
		SD in Log Scale	1.781
		Mean in Original Scale	2.125
		SD in Original Scale	4.571
		95% Percentile Bootstrap UCL	3.154
		95% BCA Bootstrap UCL	3.391
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.458	Data appear Lognormal at 5% Significance Level	
Theta Star	6.126		
nu star	45.79		
A-D Test Statistic	1.372	Nonparametric Statistics	
5% A-D Critical Value	0.821	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.821	Mean	2.136
5% K-S Critical Value	0.133	SD	4.533
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.559
		95% KM (t) UCL	3.069
Assuming Gamma Distribution		95% KM (z) UCL	3.056
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.067
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	3.56
Maximum	25	95% KM (BCA) UCL	3.182
Mean	2.315	95% KM (Percentile Bootstrap) UCL	3.091
Median	0.62	95% KM (Chebyshev) UCL	4.574
SD	4.509	97.5% KM (Chebyshev) UCL	5.63
k star	0.426	99% KM (Chebyshev) UCL	7.703
Theta star	5.437		
Nu star	57.05	Potential UCLs to Use	
AppChi2	40.69	97.5% KM (Chebyshev) UCL	5.63
95% Gamma Approximate UCL	3.245		
95% Adjusted Gamma UCL	3.27		

Note: DL/2 is not a recommended method.

Benzo[e]pyrene

General Statistics

Number of Valid Observations	32	Number of Distinct Observations	27
Raw Statistics		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	19	Maximum of Log Data	2.944

Mean	3.669	Mean of log Data	0.502
Median	1.3	SD of log Data	1.374
SD	4.591		
Coefficient of Variation	1.251		
Skewness	1.801		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	5.045	95% H-UCL	8.708
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.316
95% Adjusted-CLT UCL	5.28	97.5% Chebyshev (MVUE) UCL	11.61
95% Modified-t UCL	5.088	99% Chebyshev (MVUE) UCL	16.1
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.7	Data appear Lognormal at 5% Significance Level	
Theta Star	5.239		
MLE of Mean	3.669		
MLE of Standard Deviation	4.385		
nu star	44.82		
Approximate Chi Square Value (.05)	30.47	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	5.004
Adjusted Chi Square Value	29.83	95% Jackknife UCL	5.045
		95% Standard Bootstrap UCL	4.947
Anderson-Darling Test Statistic	0.827	95% Bootstrap-t UCL	5.577
Anderson-Darling 5% Critical Value	0.788	95% Hall's Bootstrap UCL	5.384
Kolmogorov-Smirnov Test Statistic	0.198	95% Percentile Bootstrap UCL	4.995
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	5.42
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	7.207
		97.5% Chebyshev(Mean, Sd) UCL	8.737
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.74
95% Approximate Gamma UCL	5.399		
95% Adjusted Gamma UCL	5.513		
Potential UCL to Use		Use 95% H-UCL	8.708

Benzo[j]fluoranthene

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12

Raw Statistics		Log-transformed Statistics	
Minimum	0.28	Minimum of Log Data	-1.273
Maximum	13	Maximum of Log Data	2.565
Mean	2.104	Mean of log Data	0.0947
Median	0.915	SD of log Data	1.015
SD	3.554		

Coefficient of Variation	1.689
Skewness	3.095

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.513	Shapiro Wilk Test Statistic	0.885
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	3.947	95% H-UCL	4.525
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.106
95% Adjusted-CLT UCL	4.771	97.5% Chebyshev (MVUE) UCL	5.132
95% Modified-t UCL	4.099	99% Chebyshev (MVUE) UCL	7.148

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.731	Data appear Lognormal at 5% Significance Level	
Theta Star	2.879		
MLE of Mean	2.104		
MLE of Standard Deviation	2.461		
nu star	17.54		
Approximate Chi Square Value (.05)	9.059	**Nonparametric Statistics**	
Adjusted Level of Significance	0.029	95% CLT UCL	3.792
Adjusted Chi Square Value	8.145	95% Jackknife UCL	3.947
		95% Standard Bootstrap UCL	3.725
Anderson-Darling Test Statistic	1.292	95% Bootstrap-t UCL	14.64
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	11.33
Kolmogorov-Smirnov Test Statistic	0.298	95% Percentile Bootstrap UCL	3.923
Kolmogorov-Smirnov 5% Critical Value	0.253	95% BCA Bootstrap UCL	5.203
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6.576
		97.5% Chebyshev(Mean, Sd) UCL	8.511
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.31
95% Approximate Gamma UCL	4.074		
95% Adjusted Gamma UCL	4.532		
Potential UCL to Use		Use 95% Chebyshev (MVUE) UCL	4.106

CADMIUM

General Statistics

Number of Valid Data	61	Number of Detected Data	59
Number of Distinct Detected Data	48	Number of Non-Detect Data	2
		Percent Non-Detects	3.28%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.44	Minimum Detected	-0.821
Maximum Detected	220	Maximum Detected	5.394
Mean of Detected	10.73	Mean of Detected	1.154
SD of Detected	32.54	SD of Detected	1.244
Minimum Non-Detect	0.31	Minimum Non-Detect	-1.171
Maximum Non-Detect	0.33	Maximum Non-Detect	-1.109

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	59
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	3.28%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.413	Lilliefors Test Statistic	0.0982
5% Lilliefors Critical Value	0.115	5% Lilliefors Critical Value	0.115
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	10.38	Mean	1.056
SD	32.05	SD	1.336
95% DL/2 (t) UCL	17.24	95% H-Stat (DL/2) UCL	8.726
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	9.643	Mean in Log Scale	1.057
SD	32.44	SD in Log Scale	1.334
95% MLE (t) UCL	16.58	Mean in Original Scale	10.38
95% MLE (Tiku) UCL	15.82	SD in Original Scale	32.05
		95% Percentile Bootstrap UCL	17.94
		95% BCA Bootstrap UCL	21.2
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.503	Data appear Lognormal at 5% Significance Level	
Theta Star	21.33		
nu star	59.37		
A-D Test Statistic	6.445	Nonparametric Statistics	
5% A-D Critical Value	0.814	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.814	Mean	10.39
5% K-S Critical Value	0.122	SD	31.78
Data not Gamma Distributed at 5% Significance Level		SE of Mean	4.104
		95% KM (t) UCL	17.25
Assuming Gamma Distribution		95% KM (z) UCL	17.14
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	17.25
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	28.98
Maximum	220	95% KM (BCA) UCL	18.42
Mean	10.38	95% KM (Percentile Bootstrap) UCL	17.48
Median	2.4	95% KM (Chebyshev) UCL	28.28
SD	32.05	97.5% KM (Chebyshev) UCL	36.03
k star	0.346	99% KM (Chebyshev) UCL	51.23
Theta star	29.96		
Nu star	42.27	Potential UCLs to Use	
AppChi2	28.36	95% KM (Chebyshev) UCL	28.28
95% Gamma Approximate UCL	15.47		
95% Adjusted Gamma UCL	15.62		

Note: DL/2 is not a recommended method.

CHROMIUM

General Statistics

Number of Valid Data	68	Number of Detected Data	67
Number of Distinct Detected Data	66	Number of Non-Detect Data	1
		Percent Non-Detects	1.47%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.2	Minimum Detected	0.788
Maximum Detected	1090	Maximum Detected	6.994
Mean of Detected	101	Mean of Detected	3.787
SD of Detected	197.2	SD of Detected	1.258
Minimum Non-Detect	3.1	Minimum Non-Detect	1.131
Maximum Non-Detect	3.1	Maximum Non-Detect	1.131

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.33	Lilliefors Test Statistic	0.0954
5% Lilliefors Critical Value	0.108	5% Lilliefors Critical Value	0.108
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	99.49	Mean	3.738
SD	196.1	SD	1.313
95% DL/2 (t) UCL	139.2	95% H-Stat (DL/2) UCL	129.8
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	91.71	Mean in Log Scale	3.75
SD	202.6	SD in Log Scale	1.285
95% MLE (t) UCL	132.7	Mean in Original Scale	99.52
95% MLE (Tiku) UCL	129.1	SD in Original Scale	196.1
		95% Percentile Bootstrap UCL	143
		95% BCA Bootstrap UCL	156.2

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.704	Data appear Lognormal at 5% Significance Level	
Theta Star	143.4		
nu star	94.32		
A-D Test Statistic	3.265	Nonparametric Statistics	
5% A-D Critical Value	0.795	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.795	Mean	99.5
5% K-S Critical Value	0.113	SD	194.6
Data not Gamma Distributed at 5% Significance Level		SE of Mean	23.78
		95% KM (t) UCL	139.2
Assuming Gamma Distribution		95% KM (z) UCL	138.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	139.2
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	164.2
Maximum	1090	95% KM (BCA) UCL	146
Mean	99.47	95% KM (Percentile Bootstrap) UCL	140.9

Median	46.1	95% KM (Chebyshev) UCL	203.2
SD	196.1	97.5% KM (Chebyshev) UCL	248
k star	0.522	99% KM (Chebyshev) UCL	336.1
Theta star	190.6		
Nu star	70.97	Potential UCLs to Use	
AppChi2	52.57	95% KM (Chebyshev) UCL	203.2
95% Gamma Approximate UCL	134.3		
95% Adjusted Gamma UCL	135.2		

Note: DL/2 is not a recommended method.

Chrysene

General Statistics

Number of Valid Data	67	Number of Detected Data	63
Number of Distinct Detected Data	55	Number of Non-Detect Data	4
		Percent Non-Detects	5.97%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0087	Minimum Detected	-4.744
Maximum Detected	43	Maximum Detected	3.761
Mean of Detected	5.126	Mean of Detected	0.156
SD of Detected	9.145	SD of Detected	1.989
Minimum Non-Detect	0.24	Minimum Non-Detect	-1.427
Maximum Non-Detect	0.39	Maximum Non-Detect	-0.942

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	19
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	48
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	28.36%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.288	Lilliefors Test Statistic	0.0855
5% Lilliefors Critical Value	0.112	5% Lilliefors Critical Value	0.112
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.828	Mean	0.0311
SD	8.943	SD	1.992
95% DL/2 (t) UCL	6.651	95% H-Stat (DL/2) UCL	11.89
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2.602	Mean in Log Scale	0.00158
SD	11.11	SD in Log Scale	2.024
95% MLE (t) UCL	4.867	Mean in Original Scale	4.825
95% MLE (Tiku) UCL	4.935	SD in Original Scale	8.945
		95% Percentile Bootstrap UCL	6.741
		95% BCA Bootstrap UCL	7.018
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.428	Data appear Lognormal at 5% Significance Level	

Theta Star	11.97		
nu star	53.96		
A-D Test Statistic	1.34	Nonparametric Statistics	
5% A-D Critical Value	0.831	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.831	Mean	4.825
5% K-S Critical Value	0.12	SD	8.878
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.093
		95% KM (t) UCL	6.649
Assuming Gamma Distribution		95% KM (z) UCL	6.623
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.648
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	7.359
Maximum	43	95% KM (BCA) UCL	6.806
Mean	4.82	95% KM (Percentile Bootstrap) UCL	6.619
Median	0.98	95% KM (Chebyshev) UCL	9.591
SD	8.948	97.5% KM (Chebyshev) UCL	11.65
k star	0.262	99% KM (Chebyshev) UCL	15.7
Theta star	18.37		
Nu star	35.16	Potential UCLs to Use	
AppChi2	22.6	97.5% KM (Chebyshev) UCL	11.65
95% Gamma Approximate UCL	7.5		
95% Adjusted Gamma UCL	7.574		

Note: DL/2 is not a recommended method.

COBALT

General Statistics

Number of Valid Data	68	Number of Detected Data	63
Number of Distinct Detected Data	42	Number of Non-Detect Data	5
		Percent Non-Detects	7.35%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.96	Minimum Detected	-0.0408
Maximum Detected	12	Maximum Detected	2.485
Mean of Detected	5.337	Mean of Detected	1.583
SD of Detected	2.152	SD of Detected	0.467
Minimum Non-Detect	0.61	Minimum Non-Detect	-0.494
Maximum Non-Detect	1.6	Maximum Non-Detect	0.47
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	60
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	11.76%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.123	Lilliefors Test Statistic	0.136
5% Lilliefors Critical Value	0.112	5% Lilliefors Critical Value	0.112
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	

Mean	4.988	Mean	1.423
SD	2.418	SD	0.737
95% DL/2 (t) UCL	5.477	95% H-Stat (DL/2) UCL	5.517
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.946	Mean in Log Scale	1.513
SD	2.497	SD in Log Scale	0.515
95% MLE (t) UCL	5.451	Mean in Original Scale	5.085
95% MLE (Tiku) UCL	5.463	SD in Original Scale	2.259
		95% Percentile Bootstrap UCL	5.535
		95% BCA Bootstrap UCL	5.543
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.356	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.997		
nu star	674.8		
A-D Test Statistic	1.112	Nonparametric Statistics	
5% A-D Critical Value	0.753	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.753	Mean	5.021
5% K-S Critical Value	0.112	SD	2.342
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.286
		95% KM (t) UCL	5.498
Assuming Gamma Distribution		95% KM (z) UCL	5.492
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	5.491
Minimum	0.531	95% KM (bootstrap t) UCL	5.51
Maximum	12	95% KM (BCA) UCL	5.521
Mean	5.038	95% KM (Percentile Bootstrap) UCL	5.516
Median	5.15	95% KM (Chebyshev) UCL	6.269
SD	2.337	97.5% KM (Chebyshev) UCL	6.809
k star	3.473	99% KM (Chebyshev) UCL	7.87
Theta star	1.451		
Nu star	472.3	Potential UCLs to Use	
AppChi2	422.9	95% KM (BCA) UCL	5.521
95% Gamma Approximate UCL	5.626		
95% Adjusted Gamma UCL	5.639		

Note: DL/2 is not a recommended method.

COPPER

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	66
Raw Statistics		Log-transformed Statistics	
Minimum	1.9	Minimum of Log Data	0.642
Maximum	525	Maximum of Log Data	6.263
Mean	94.68	Mean of log Data	4.033
Median	68.1	SD of log Data	1.189
SD	105.5		
Coefficient of Variation	1.114		
Skewness	2.603		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.284	Lilliefors Test Statistic	0.235
Lilliefors Critical Value	0.107	Lilliefors Critical Value	0.107
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	116	95% H-UCL	157.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	200.8
95% Adjusted-CLT UCL	120	97.5% Chebyshev (MVUE) UCL	239
95% Modified-t UCL	116.7	99% Chebyshev (MVUE) UCL	314.1
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.064	Data do not follow a Discernable Distribution (0.05)	
Theta Star	88.98		
MLE of Mean	94.68		
MLE of Standard Deviation	91.79		
nu star	144.7		
Approximate Chi Square Value (.05)	117.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0465	95% CLT UCL	115.7
Adjusted Chi Square Value	117.4	95% Jackknife UCL	116
		95% Standard Bootstrap UCL	116.2
Anderson-Darling Test Statistic	2.566	95% Bootstrap-t UCL	126.7
Anderson-Darling 5% Critical Value	0.778	95% Hall's Bootstrap UCL	118.9
Kolmogorov-Smirnov Test Statistic	0.168	95% Percentile Bootstrap UCL	117.6
Kolmogorov-Smirnov 5% Critical Value	0.111	95% BCA Bootstrap UCL	119.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	150.5
		97.5% Chebyshev(Mean, Sd) UCL	174.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	222
95% Approximate Gamma UCL	116.2		
95% Adjusted Gamma UCL	116.7		
Potential UCL to Use		Use 97.5% Chebyshev (Mean, Sd) UCL	174.6

Dibenzo(a,h)anthracene

General Statistics

Number of Valid Data	67	Number of Detected Data	30
Number of Distinct Detected Data	25	Number of Non-Detect Data	37
		Percent Non-Detects	55.22%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0092	Minimum Detected	-4.689
Maximum Detected	4.9	Maximum Detected	1.589
Mean of Detected	0.96	Mean of Detected	-0.8
SD of Detected	1.194	SD of Detected	1.406
Minimum Non-Detect	0.22	Minimum Non-Detect	-1.514
Maximum Non-Detect	8.4	Maximum Non-Detect	2.128
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	67

For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.738	Shapiro Wilk Test Statistic	0.964
5% Shapiro Wilk Critical Value	0.927	5% Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.72	Mean	-1.057
SD	1.056	SD	1.184
95% DL/2 (t) UCL	0.935	95% H-Stat (DL/2) UCL	0.701
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.462
		SD in Log Scale	1.153
		Mean in Original Scale	0.511
		SD in Original Scale	0.891
		95% Percentile Bootstrap UCL	0.697
		95% BCA Bootstrap UCL	0.76
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.728	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.32		
nu star	43.66		
A-D Test Statistic	0.433	Nonparametric Statistics	
5% A-D Critical Value	0.786	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.786	Mean	0.538
5% K-S Critical Value	0.166	SD	0.897
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.115
		95% KM (t) UCL	0.73
Assuming Gamma Distribution		95% KM (z) UCL	0.727
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.728
Minimum	0.0092	95% KM (bootstrap t) UCL	0.799
Maximum	4.9	95% KM (BCA) UCL	0.743
Mean	0.983	95% KM (Percentile Bootstrap) UCL	0.733
Median	0.925	95% KM (Chebyshev) UCL	1.038
SD	0.818	97.5% KM (Chebyshev) UCL	1.255
k star	1.466	99% KM (Chebyshev) UCL	1.68
Theta star	0.671		
Nu star	196.4	Potential UCLs to Use	
AppChi2	165	95% KM (t) UCL	0.73
95% Gamma Approximate UCL	1.17		
95% Adjusted Gamma UCL	1.175		

Note: DL/2 is not a recommended method.

Dibenzo[def,mno]chrysene

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	15

Raw Statistics		Log-transformed Statistics	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	4.5	Maximum of Log Data	1.504
Mean	1.749	Mean of log Data	0.12
Median	1.3	SD of log Data	1.101
SD	1.417		
Coefficient of Variation	0.81		
Skewness	0.747		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.349	95% H-UCL	4.492
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.513
95% Adjusted-CLT UCL	2.381	97.5% Chebyshev (MVUE) UCL	5.618
95% Modified-t UCL	2.36	99% Chebyshev (MVUE) UCL	7.788
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.092	Data appear Normal at 5% Significance Level	
Theta Star	1.602		
MLE of Mean	1.749		
MLE of Standard Deviation	1.674		
nu star	37.12		
Approximate Chi Square Value (.05)	24.17	Nonparametric Statistics	
Adjusted Level of Significance	0.0346	95% CLT UCL	2.315
Adjusted Chi Square Value	23.08	95% Jackknife UCL	2.349
		95% Standard Bootstrap UCL	2.297
Anderson-Darling Test Statistic	0.34	95% Bootstrap-t UCL	2.433
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	2.341
Kolmogorov-Smirnov Test Statistic	0.125	95% Percentile Bootstrap UCL	2.322
Kolmogorov-Smirnov 5% Critical Value	0.214	95% BCA Bootstrap UCL	2.362
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.247
		97.5% Chebyshev(Mean, Sd) UCL	3.895
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5.169
95% Approximate Gamma UCL	2.686		
95% Adjusted Gamma UCL	2.814		
Potential UCL to Use		Use 95% Student's-t UCL	2.349

Dibenzofuran

General Statistics

Number of Valid Data	67	Number of Detected Data	50
Number of Distinct Detected Data	46	Number of Non-Detect Data	17

Percent Non-Detects	25.37%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0099	Minimum Detected	-4.615
Maximum Detected	15	Maximum Detected	2.708
Mean of Detected	1.233	Mean of Detected	-1.673
SD of Detected	2.927	SD of Detected	1.975
Minimum Non-Detect	0.22	Minimum Non-Detect	-1.514
Maximum Non-Detect	0.83	Maximum Non-Detect	-0.186

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	55
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	12
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	82.09%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.469	Shapiro Wilk Test Statistic	0.932
5% Shapiro Wilk Critical Value	0.947	5% Shapiro Wilk Critical Value	0.947
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.976	Mean	-1.654
SD	2.561	SD	1.715
95% DL/2 (t) UCL	1.498	95% H-Stat (DL/2) UCL	0.983
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.922
		SD in Log Scale	1.764
		Mean in Original Scale	0.939
		SD in Original Scale	2.573
		95% Percentile Bootstrap UCL	1.484
		95% BCA Bootstrap UCL	1.63

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.348	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.542		
nu star	34.81		
A-D Test Statistic	3.02	Nonparametric Statistics	
5% A-D Critical Value	0.849	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.849	Mean	0.943
5% K-S Critical Value	0.135	SD	2.553
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.315
		95% KM (t) UCL	1.469
Assuming Gamma Distribution		95% KM (z) UCL	1.461
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.467
Minimum	0.0099	95% KM (bootstrap t) UCL	2.111
Maximum	15	95% KM (BCA) UCL	1.483
Mean	1.2	95% KM (Percentile Bootstrap) UCL	1.528
Median	0.42	95% KM (Chebyshev) UCL	2.317
SD	2.523	97.5% KM (Chebyshev) UCL	2.911

k star	0.447	99% KM (Chebyshev) UCL	4.078
Theta star	2.682		
Nu star	59.93	Potential UCLs to Use	
AppChi2	43.13	97.5% KM (Chebyshev) UCL	2.911
95% Gamma Approximate UCL	1.667		
95% Adjusted Gamma UCL	1.679		

Note: DL/2 is not a recommended method.

Dieldrin

General Statistics

Number of Valid Data	64	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	62
		Percent Non-Detects	96.88%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.017	Minimum Detected	-4.075
Maximum Detected	0.11	Maximum Detected	-2.207
Mean of Detected	0.0635	Mean of Detected	-3.141
SD of Detected	0.0658	SD of Detected	1.32
Minimum Non-Detect	0.0041	Minimum Non-Detect	-5.497
Maximum Non-Detect	0.016	Maximum Non-Detect	-4.135

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	62
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	2
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	96.88%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00511	Mean	-5.708
SD	0.0135	SD	0.578

95% DL/2 (t) UCL	0.00792	95% H-Stat (DL/2) UCL	0.00417
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.0185
5% K-S Critical Value	N/A	SD	0.0115
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.00204
		95% KM (t) UCL	0.0219
Assuming Gamma Distribution		95% KM (z) UCL	0.0218
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0788
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	0.11
Mean	N/A	95% KM (Percentile Bootstrap) UCL	0.11
Median	N/A	95% KM (Chebyshev) UCL	0.0273
SD	N/A	97.5% KM (Chebyshev) UCL	0.0312
k star	N/A	99% KM (Chebyshev) UCL	0.0387
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	0.11
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Heptachlor

General Statistics

Number of Valid Data	59	Number of Detected Data	25
Number of Distinct Detected Data	22	Number of Non-Detect Data	34
		Percent Non-Detects	57.63%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.0000E-4	Minimum Detected	-8.517
Maximum Detected	0.42	Maximum Detected	-0.868
Mean of Detected	0.0374	Mean of Detected	-4.68
SD of Detected	0.0896	SD of Detected	1.606
Minimum Non-Detect	0.0023	Minimum Non-Detect	-6.075
Maximum Non-Detect	0.0084	Maximum Non-Detect	-4.78

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	46
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	13
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	77.97%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.432	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.918	5% Shapiro Wilk Critical Value	0.918
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0169	Mean	-5.637
SD	0.0603	SD	1.349
95% DL/2 (t) UCL	0.03	95% H-Stat (DL/2) UCL	0.00806
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-6.208
		SD in Log Scale	1.736
		Mean in Original Scale	0.0163
		SD in Original Scale	0.0604
		95% Percentile Bootstrap UCL	0.0307
		95% BCA Bootstrap UCL	0.0365
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.433	Data appear Lognormal at 5% Significance Level	
Theta Star	0.0863		
nu star	21.64		
A-D Test Statistic	2.194	Nonparametric Statistics	
5% A-D Critical Value	0.816	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.816	Mean	0.0166
5% K-S Critical Value	0.185	SD	0.0598
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.00796
		95% KM (t) UCL	0.0299
Assuming Gamma Distribution		95% KM (z) UCL	0.0297
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0298
Minimum	2.0000E-4	95% KM (bootstrap t) UCL	0.049
Maximum	0.42	95% KM (BCA) UCL	0.0307
Mean	0.0379	95% KM (Percentile Bootstrap) UCL	0.031
Median	0.034	95% KM (Chebyshev) UCL	0.0513
SD	0.0579	97.5% KM (Chebyshev) UCL	0.0663
k star	0.923	99% KM (Chebyshev) UCL	0.0958
Theta star	0.0411		
Nu star	108.9	Potential UCLs to Use	
AppChi2	85.83	95% KM (Chebyshev) UCL	0.0513
95% Gamma Approximate UCL	0.0482		
95% Adjusted Gamma UCL	0.0484		

Note: DL/2 is not a recommended method.

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Data	67	Number of Detected Data	62
Number of Distinct Detected Data	56	Number of Non-Detect Data	5
		Percent Non-Detects	7.46%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.012	Minimum Detected	-4.423
Maximum Detected	23	Maximum Detected	3.135
Mean of Detected	3.037	Mean of Detected	-0.142
SD of Detected	4.971	SD of Detected	1.809
Minimum Non-Detect	0.26	Minimum Non-Detect	-1.347
Maximum Non-Detect	0.32	Maximum Non-Detect	-1.139

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	20
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	47
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	29.85%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.271	Lilliefors Test Statistic	0.0726
5% Lilliefors Critical Value	0.113	5% Lilliefors Critical Value	0.113
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.821	Mean	-0.279
SD	4.84	SD	1.805
95% DL/2 (t) UCL	3.808	95% H-Stat (DL/2) UCL	5.313
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1.554	Mean in Log Scale	-0.317
SD	6.106	SD in Log Scale	1.847
95% MLE (t) UCL	2.799	Mean in Original Scale	2.817
95% MLE (Tiku) UCL	2.85	SD in Original Scale	4.843
		95% Percentile Bootstrap UCL	3.789
		95% BCA Bootstrap UCL	3.992

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.492	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	6.171		
nu star	61.03		
A-D Test Statistic	1.072	Nonparametric Statistics	
5% A-D Critical Value	0.816	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.816	Mean	2.817
5% K-S Critical Value	0.12	SD	4.807
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.592
		95% KM (t) UCL	3.804
Assuming Gamma Distribution		95% KM (z) UCL	3.791
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.804
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	4.123

Maximum	23	95% KM (BCA) UCL	3.845
Mean	2.811	95% KM (Percentile Bootstrap) UCL	3.803
Median	0.69	95% KM (Chebyshev) UCL	5.397
SD	4.846	97.5% KM (Chebyshev) UCL	6.514
k star	0.259	99% KM (Chebyshev) UCL	8.707
Theta star	10.87		
Nu star	34.65	Potential UCLs to Use	
AppChi2	22.18	95% KM (Chebyshev) UCL	5.397
95% Gamma Approximate UCL	4.39		
95% Adjusted Gamma UCL	4.434		

Note: DL/2 is not a recommended method.

IRON

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	62

Raw Statistics		Log-transformed Statistics	
Minimum	2450	Minimum of Log Data	7.804
Maximum	31000	Maximum of Log Data	10.34
Mean	13773	Mean of log Data	9.398
Median	14200	SD of log Data	0.571
SD	6270		
Coefficient of Variation	0.455		
Skewness	0.255		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.0544	Lilliefors Test Statistic	0.161
Lilliefors Critical Value	0.107	Lilliefors Critical Value	0.107
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	15041	95% H-UCL	16219
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18710
95% Adjusted-CLT UCL	15048	97.5% Chebyshev (MVUE) UCL	20682
95% Modified-t UCL	15045	99% Chebyshev (MVUE) UCL	24557
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.759	Data appear Normal at 5% Significance Level	
Theta Star	3664		
MLE of Mean	13773		
MLE of Standard Deviation	7104		
nu star	511.2		
Approximate Chi Square Value (.05)	459.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0465	95% CLT UCL	15023
Adjusted Chi Square Value	458.7	95% Jackknife UCL	15041
		95% Standard Bootstrap UCL	15039
Anderson-Darling Test Statistic	1.241	95% Bootstrap-t UCL	15023
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	15036
Kolmogorov-Smirnov Test Statistic	0.124	95% Percentile Bootstrap UCL	15032

Kolmogorov-Smirnov 5% Critical Value	0.109	95% BCA Bootstrap UCL	15048
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17087
		97.5% Chebyshev(Mean, Sd) UCL	18521
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21338
95% Approximate Gamma UCL	15313		
95% Adjusted Gamma UCL	15348		
Potential UCL to Use		Use 95% Student's-t UCL	15041

LEAD

General Statistics

Number of Valid Data	68	Number of Detected Data	67
Number of Distinct Detected Data	66	Number of Non-Detect Data	1
		Percent Non-Detects	1.47%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1	Minimum Detected	0
Maximum Detected	509	Maximum Detected	6.232
Mean of Detected	101	Mean of Detected	4.03
SD of Detected	94.88	SD of Detected	1.351
Minimum Non-Detect	1.6	Minimum Non-Detect	0.47
Maximum Non-Detect	1.6	Maximum Non-Detect	0.47

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.177	Lilliefors Test Statistic	0.14
5% Lilliefors Critical Value	0.108	5% Lilliefors Critical Value	0.108
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	99.55	Mean	3.967
SD	94.95	SD	1.437
95% DL/2 (t) UCL	118.8	95% H-Stat (DL/2) UCL	203.8
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	96.48	Mean in Log Scale	3.991
SD	98.76	SD in Log Scale	1.378
95% MLE (t) UCL	116.5	Mean in Original Scale	99.6
95% MLE (Tiku) UCL	115.7	SD in Original Scale	94.9
		95% Percentile Bootstrap UCL	118.7
		95% BCA Bootstrap UCL	120.5
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.953	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	106		
nu star	127.7		
A-D Test Statistic	0.344	Nonparametric Statistics	

5% A-D Critical Value	0.781	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.781	Mean	99.55
5% K-S Critical Value	0.112	SD	94.24
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	11.51
		95% KM (t) UCL	118.8
Assuming Gamma Distribution		95% KM (z) UCL	118.5
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	118.8
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	122.8
Maximum	509	95% KM (BCA) UCL	120.4
Mean	99.54	95% KM (Percentile Bootstrap) UCL	120.1
Median	73.65	95% KM (Chebyshev) UCL	149.7
SD	94.96	97.5% KM (Chebyshev) UCL	171.5
k star	0.634	99% KM (Chebyshev) UCL	214.1
Theta star	157		
Nu star	86.23	Potential UCLs to Use	
AppChi2	65.82	95% KM (Chebyshev) UCL	149.7
95% Gamma Approximate UCL	130.4		
95% Adjusted Gamma UCL	131.2		

Note: DL/2 is not a recommended method.

MANGANESE

General Statistics

Number of Valid Observations	60	Number of Distinct Observations	55

Raw Statistics		Log-transformed Statistics	
Minimum	86.8	Minimum of Log Data	4.464
Maximum	1280	Maximum of Log Data	7.155
Mean	316.2	Mean of log Data	5.657
Median	278	SD of log Data	0.424
SD	176		
Coefficient of Variation	0.557		
Skewness	3.395		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.18	Lilliefors Test Statistic	0.083
Lilliefors Critical Value	0.114	Lilliefors Critical Value	0.114
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	354.2	95% H-UCL	346.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	390.2
95% Adjusted-CLT UCL	364.2	97.5% Chebyshev (MVUE) UCL	423.8
95% Modified-t UCL	355.8	99% Chebyshev (MVUE) UCL	489.7
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.936	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	64.06		
MLE of Mean	316.2		
MLE of Standard Deviation	142.3		

nu star	592.3		
Approximate Chi Square Value (.05)	536.8	Nonparametric Statistics	
Adjusted Level of Significance	0.046	95% CLT UCL	353.6
Adjusted Chi Square Value	535.5	95% Jackknife UCL	354.2
		95% Standard Bootstrap UCL	354
Anderson-Darling Test Statistic	1.274	95% Bootstrap-t UCL	376.4
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	540.9
Kolmogorov-Smirnov Test Statistic	0.104	95% Percentile Bootstrap UCL	355.2
Kolmogorov-Smirnov 5% Critical Value	0.115	95% BCA Bootstrap UCL	366.2
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	415.3
		97.5% Chebyshev(Mean, Sd) UCL	458.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	542.3
95% Approximate Gamma UCL	348.9		
95% Adjusted Gamma UCL	349.7		
Potential UCL to Use		Use 95% Approximate Gamma UCL	348.9

MERCURY

General Statistics

Number of Valid Data	68	Number of Detected Data	58
Number of Distinct Detected Data	40	Number of Non-Detect Data	10
		Percent Non-Detects	14.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.028	Minimum Detected	-3.576
Maximum Detected	2.1	Maximum Detected	0.742
Mean of Detected	0.295	Mean of Detected	-1.711
SD of Detected	0.392	SD of Detected	0.925
Minimum Non-Detect	0.043	Minimum Non-Detect	-3.147
Maximum Non-Detect	0.051	Maximum Non-Detect	-2.976
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	13
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	55
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	19.12%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.309	Lilliefors Test Statistic	0.111
5% Lilliefors Critical Value	0.116	5% Lilliefors Critical Value	0.116
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.255	Mean	-2.005
SD	0.374	SD	1.113
95% DL/2 (t) UCL	0.331	95% H-Stat (DL/2) UCL	0.229
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.204	Mean in Log Scale	-1.984
SD	0.427	SD in Log Scale	1.086

95% MLE (t) UCL	0.291	Mean in Original Scale	0.256
95% MLE (Tiku) UCL	0.289	SD in Original Scale	0.373
		95% Percentile Bootstrap UCL	0.338
		95% BCA Bootstrap UCL	0.345

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.11	Data appear Lognormal at 5% Significance Level	
Theta Star	0.266		
nu star	128.7		
A-D Test Statistic	2.542	Nonparametric Statistics	
5% A-D Critical Value	0.776	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.776	Mean	0.256
5% K-S Critical Value	0.12	SD	0.37
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0453
		95% KM (t) UCL	0.332
Assuming Gamma Distribution		95% KM (z) UCL	0.331
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.332
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	0.377
Maximum	2.1	95% KM (BCA) UCL	0.343
Mean	0.252	95% KM (Percentile Bootstrap) UCL	0.334
Median	0.16	95% KM (Chebyshev) UCL	0.454
SD	0.376	97.5% KM (Chebyshev) UCL	0.539
k star	0.23	99% KM (Chebyshev) UCL	0.707
Theta star	1.095		
Nu star	31.26	Potential UCLs to Use	
AppChi2	19.48	95% KM (Chebyshev) UCL	0.454
95% Gamma Approximate UCL	0.404		
95% Adjusted Gamma UCL	0.408		

Note: DL/2 is not a recommended method.

Methylcyclohexane

General Statistics

Number of Valid Data	67	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	58
		Percent Non-Detects	86.57%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	9.3000E-4	Minimum Detected	-6.98
Maximum Detected	0.021	Maximum Detected	-3.863
Mean of Detected	0.00753	Mean of Detected	-5.343
SD of Detected	0.00702	SD of Detected	1.066
Minimum Non-Detect	0.0051	Minimum Non-Detect	-5.279
Maximum Non-Detect	0.045	Maximum Non-Detect	-3.101
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	67
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.868
5% Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	0.00705
SD	0.00452
95% DL/2 (t) UCL	0.00797
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.96
5% Shapiro Wilk Critical Value	0.829
Data appear Lognormal at 5% Significance Level	
Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	-5.122
SD	0.578
95% H-Stat (DL/2) UCL	0.00771
Log ROS Method	
Mean in Log Scale	-5.955
SD in Log Scale	0.601
Mean in Original Scale	0.00325
SD in Original Scale	0.00317
95% Percentile Bootstrap UCL	0.00393
95% BCA Bootstrap UCL	0.00412

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.902
Theta Star	0.00834
nu star	16.24
A-D Test Statistic	0.277
5% A-D Critical Value	0.739
K-S Test Statistic	0.739
5% K-S Critical Value	0.285
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	9.3000E-4
Maximum	0.021
Mean	0.00767
Median	0.00766
SD	0.00256
k star	7.415
Theta star	0.00103
Nu star	993.6
AppChi2	921.4
95% Gamma Approximate UCL	0.00827
95% Adjusted Gamma UCL	0.00828

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.00351
SD	0.00352
SE of Mean	7.3476E-4
95% KM (t) UCL	0.00474
95% KM (z) UCL	0.00472
95% KM (jackknife) UCL	0.00481
95% KM (bootstrap t) UCL	0.0051
95% KM (BCA) UCL	0.00474
95% KM (Percentile Bootstrap) UCL	0.00483
95% KM (Chebyshev) UCL	0.00672
97.5% KM (Chebyshev) UCL	0.0081
99% KM (Chebyshev) UCL	0.0108
Potential UCLs to Use	
95% KM (t) UCL	0.00474
95% KM (Percentile Bootstrap) UCL	0.00483

Note: DL/2 is not a recommended method.

Naphthalene

General Statistics

Number of Valid Data	67	Number of Detected Data	60
Number of Distinct Detected Data	50	Number of Non-Detect Data	7
		Percent Non-Detects	10.45%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0088	Minimum Detected	-4.733
Maximum Detected	53	Maximum Detected	3.97
Mean of Detected	1.61	Mean of Detected	-2.016
SD of Detected	6.979	SD of Detected	1.991
Minimum Non-Detect	0.24	Minimum Non-Detect	-1.427
Maximum Non-Detect	1.5	Maximum Non-Detect	0.405

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	59
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	8
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	88.06%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.409	Lilliefors Test Statistic	0.129
5% Lilliefors Critical Value	0.114	5% Lilliefors Critical Value	0.114
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.476	Mean	-1.945
SD	6.611	SD	1.907
95% DL/2 (t) UCL	2.824	95% H-Stat (DL/2) UCL	1.353
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.084
		SD in Log Scale	1.894
		Mean in Original Scale	1.449
		SD in Original Scale	6.616
		95% Percentile Bootstrap UCL	3.031
		95% BCA Bootstrap UCL	4.118

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.277	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.815		
nu star	33.23		
A-D Test Statistic	6.237	Nonparametric Statistics	
5% A-D Critical Value	0.873	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.873	Mean	1.453
5% K-S Critical Value	0.125	SD	6.566
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.809
		95% KM (t) UCL	2.802
Assuming Gamma Distribution		95% KM (z) UCL	2.783

Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.801
Minimum	1.0000E-9	95% KM (bootstrap t) UCL	6.949
Maximum	53	95% KM (BCA) UCL	3.056
Mean	1.442	95% KM (Percentile Bootstrap) UCL	2.951
Median	0.058	95% KM (Chebyshev) UCL	4.979
SD	6.617	97.5% KM (Chebyshev) UCL	6.505
k star	0.176	99% KM (Chebyshev) UCL	9.502
Theta star	8.211		
Nu star	23.53	Potential UCLs to Use	
AppChi2	13.49	97.5% KM (Chebyshev) UCL	6.505
95% Gamma Approximate UCL	2.515		
95% Adjusted Gamma UCL	2.546		

Note: DL/2 is not a recommended method.

NICKEL

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	63

Raw Statistics		Log-transformed Statistics	
Minimum	5.7	Minimum of Log Data	1.74
Maximum	447	Maximum of Log Data	6.103
Mean	39.35	Mean of log Data	3.151
Median	22.95	SD of log Data	0.816
SD	73.78		
Coefficient of Variation	1.875		
Skewness	4.439		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.403	Lilliefors Test Statistic	0.174
Lilliefors Critical Value	0.107	Lilliefors Critical Value	0.107
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	54.27	95% H-UCL	40.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	48.21
95% Adjusted-CLT UCL	59.21	97.5% Chebyshev (MVUE) UCL	55.05
95% Modified-t UCL	55.07	99% Chebyshev (MVUE) UCL	68.49
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.058	Data do not follow a Discernable Distribution (0.05)	
Theta Star	37.2		
MLE of Mean	39.35		
MLE of Standard Deviation	38.26		
nu star	143.8		
Approximate Chi Square Value (.05)	117.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0465	95% CLT UCL	54.06
Adjusted Chi Square Value	116.6	95% Jackknife UCL	54.27
		95% Standard Bootstrap UCL	53.54
Anderson-Darling Test Statistic	7.735	95% Bootstrap-t UCL	74.28

Anderson-Darling 5% Critical Value	0.778	95% Hall's Bootstrap UCL	73.01
Kolmogorov-Smirnov Test Statistic	0.282	95% Percentile Bootstrap UCL	55.44
Kolmogorov-Smirnov 5% Critical Value	0.111	95% BCA Bootstrap UCL	63.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	78.35
		97.5% Chebyshev(Mean, Sd) UCL	95.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	128.4
95% Approximate Gamma UCL	48.32		
95% Adjusted Gamma UCL	48.54		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	78.35

OCDD

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	3.4000E-5	Minimum of Log Data	-10.29
Maximum	0.034	Maximum of Log Data	-3.381
Mean	0.00482	Mean of log Data	-6.795
Median	0.0013	SD of log Data	1.975
SD	0.00985		
Coefficient of Variation	2.044		
Skewness	3.115		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.507	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.0102	95% H-UCL	0.19
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0202
95% Adjusted-CLT UCL	0.0127	97.5% Chebyshev (MVUE) UCL	0.0267
95% Modified-t UCL	0.0107	99% Chebyshev (MVUE) UCL	0.0393
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.383	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.0126		
MLE of Mean	0.00482		
MLE of Standard Deviation	0.00778		
nu star	8.429		
Approximate Chi Square Value (.05)	2.986	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.0097
Adjusted Chi Square Value	2.483	95% Jackknife UCL	0.0102
		95% Standard Bootstrap UCL	0.00943
Anderson-Darling Test Statistic	0.446	95% Bootstrap-t UCL	0.0271
Anderson-Darling 5% Critical Value	0.792	95% Hall's Bootstrap UCL	0.0289
Kolmogorov-Smirnov Test Statistic	0.204	95% Percentile Bootstrap UCL	0.0104
Kolmogorov-Smirnov 5% Critical Value	0.271	95% BCA Bootstrap UCL	0.0134

Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0178
		97.5% Chebyshev(Mean, Sd) UCL	0.0234
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0344
95% Approximate Gamma UCL	0.0136		
95% Adjusted Gamma UCL	0.0164		
Potential UCL to Use		Use 95% Adjusted Gamma UCL	0.0164

OCDF

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	3.3000E-6	Minimum of Log Data	-12.62
Maximum	7.0000E-4	Maximum of Log Data	-7.264
Mean	2.2457E-4	Mean of log Data	-9.311
Median	2.2000E-4	SD of log Data	1.769
SD	2.2708E-4		
Coefficient of Variation	1.011		
Skewness	0.898		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.88	Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	3.4866E-4	95% H-UCL	0.00575
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.00114
95% Adjusted-CLT UCL	3.5701E-4	97.5% Chebyshev (MVUE) UCL	0.0015
95% Modified-t UCL	3.5176E-4	99% Chebyshev (MVUE) UCL	0.00219
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.547	Data appear Normal at 5% Significance Level	
Theta Star	4.1073E-4		
MLE of Mean	2.2457E-4		
MLE of Standard Deviation	3.0371E-4		
nu star	12.03		
Approximate Chi Square Value (.05)	5.246	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	3.3719E-4
Adjusted Chi Square Value	4.537	95% Jackknife UCL	3.4866E-4
		95% Standard Bootstrap UCL	3.3207E-4
Anderson-Darling Test Statistic	0.412	95% Bootstrap-t UCL	3.7574E-4
Anderson-Darling 5% Critical Value	0.769	95% Hall's Bootstrap UCL	3.8100E-4
Kolmogorov-Smirnov Test Statistic	0.199	95% Percentile Bootstrap UCL	3.3173E-4
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	3.5191E-4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.2301E-4
		97.5% Chebyshev(Mean, Sd) UCL	6.5214E-4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.0580E-4

95% Approximate Gamma UCL	5.1493E-4		
95% Adjusted Gamma UCL	5.9536E-4		
Potential UCL to Use		Use 95% Student's-t UCL	3.4866E-4

Perylene

General Statistics

Number of Valid Observations	35	Number of Distinct Observations	30

Raw Statistics		Log-transformed Statistics	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	17	Maximum of Log Data	2.833
Mean	2.322	Mean of log Data	0.167
Median	1.2	SD of log Data	1.214
SD	3.199		
Coefficient of Variation	1.378		
Skewness	3.224		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.649	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.934	Shapiro Wilk Critical Value	0.934
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	3.236	95% H-UCL	4.359
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.973
95% Adjusted-CLT UCL	3.526	97.5% Chebyshev (MVUE) UCL	6.092
95% Modified-t UCL	3.285	99% Chebyshev (MVUE) UCL	8.292

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.814	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	2.853		
MLE of Mean	2.322		
MLE of Standard Deviation	2.574		
nu star	56.97		
Approximate Chi Square Value (.05)	40.62	Nonparametric Statistics	
Adjusted Level of Significance	0.0425	95% CLT UCL	3.211
Adjusted Chi Square Value	39.96	95% Jackknife UCL	3.236
		95% Standard Bootstrap UCL	3.215
Anderson-Darling Test Statistic	0.543	95% Bootstrap-t UCL	3.995
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL	6.88
Kolmogorov-Smirnov Test Statistic	0.112	95% Percentile Bootstrap UCL	3.247
Kolmogorov-Smirnov 5% Critical Value	0.154	95% BCA Bootstrap UCL	3.633
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.679
		97.5% Chebyshev(Mean, Sd) UCL	5.698
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7.702
95% Approximate Gamma UCL	3.256		
95% Adjusted Gamma UCL	3.31		

Potential UCL to Use		Use 95% Approximate Gamma UCL	3.256

Total HxCDD

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	11

Raw Statistics		Log-transformed Statistics	
Minimum	4.0000E-6	Minimum of Log Data	-12.43
Maximum	0.01	Maximum of Log Data	-4.605
Mean	0.00108	Mean of log Data	-8.932
Median	8.0000E-5	SD of log Data	2.076
SD	0.00296		
Coefficient of Variation	2.738		
Skewness	3.293		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.397	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.0027	95% H-UCL	0.0377
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.00286
95% Adjusted-CLT UCL	0.0035	97.5% Chebyshev (MVUE) UCL	0.00377
95% Modified-t UCL	0.00285	99% Chebyshev (MVUE) UCL	0.00558
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.296	Data appear Lognormal at 5% Significance Level	
Theta Star	0.00366		
MLE of Mean	0.00108		
MLE of Standard Deviation	0.00199		
nu star	6.515		
Approximate Chi Square Value (.05)	1.908	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.00255
Adjusted Chi Square Value	1.53	95% Jackknife UCL	0.0027
		95% Standard Bootstrap UCL	0.00246
Anderson-Darling Test Statistic	1.14	95% Bootstrap-t UCL	0.0181
Anderson-Darling 5% Critical Value	0.815	95% Hall's Bootstrap UCL	0.0126
Kolmogorov-Smirnov Test Statistic	0.336	95% Percentile Bootstrap UCL	0.00286
Kolmogorov-Smirnov 5% Critical Value	0.275	95% BCA Bootstrap UCL	0.00377
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.00498
		97.5% Chebyshev(Mean, Sd) UCL	0.00666
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.00997
95% Approximate Gamma UCL	0.0037		
95% Adjusted Gamma UCL	0.00461		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	0.00997

VANADIUM

General Statistics

Number of Valid Observations	60	Number of Distinct Observations	55

Raw Statistics		Log-transformed Statistics	
Minimum	2	Minimum of Log Data	0.693
Maximum	31.8	Maximum of Log Data	3.459
Mean	14.46	Mean of log Data	2.469
Median	14.3	SD of log Data	0.721
SD	7.911		
Coefficient of Variation	0.547		
Skewness	0.353		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.0864	Lilliefors Test Statistic	0.17
Lilliefors Critical Value	0.114	Lilliefors Critical Value	0.114
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	16.17	95% H-UCL	18.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22.04
95% Adjusted-CLT UCL	16.19	97.5% Chebyshev (MVUE) UCL	24.99
95% Modified-t UCL	16.17	99% Chebyshev (MVUE) UCL	30.78
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.506	Data appear Normal at 5% Significance Level	
Theta Star	5.769		
MLE of Mean	14.46		
MLE of Standard Deviation	9.133		
nu star	300.7		
Approximate Chi Square Value (.05)	261.6	Nonparametric Statistics	
Adjusted Level of Significance	0.046	95% CLT UCL	16.14
Adjusted Chi Square Value	260.7	95% Jackknife UCL	16.17
		95% Standard Bootstrap UCL	16.12
Anderson-Darling Test Statistic	0.924	95% Bootstrap-t UCL	16.29
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	16.28
Kolmogorov-Smirnov Test Statistic	0.135	95% Percentile Bootstrap UCL	16.15
Kolmogorov-Smirnov 5% Critical Value	0.116	95% BCA Bootstrap UCL	16.15
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	18.91
		97.5% Chebyshev(Mean, Sd) UCL	20.84
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	24.62
95% Approximate Gamma UCL	16.62		
95% Adjusted Gamma UCL	16.68		
Potential UCL to Use		Use 95% Student's-t UCL	16.17

General UCL Statistics for Data Sets with Non-Detects

SPOILS UCLs

User Selected Options	
From File	C:\Documents and Settings\anatracordone\My Documents\EPA-ERT\Onondaga Lake\LeyCreek\macro-s
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1'-Biphenyl, 3,3',4,4'-tetrachloro-

General Statistics

Number of Valid Observations	3	Number of Distinct Observations	3

Warning: This data set only has 3 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable 1,1'-Biphenyl, 3,3',4,4'-tetrachloro- was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Acenaphthylene

General Statistics

Number of Valid Data	12	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	1
		Percent Non-Detects	8.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.015	Minimum Detected	-4.2
Maximum Detected	0.12	Maximum Detected	-2.12
Mean of Detected	0.041	Mean of Detected	-3.462
SD of Detected	0.0372	SD of Detected	0.702
Minimum Non-Detect	0.43	Minimum Non-Detect	-0.844
Maximum Non-Detect	0.43	Maximum Non-Detect	-0.844

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.661	Shapiro Wilk Test Statistic	0.835
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0555	Mean	-3.301
SD	0.0615	SD	0.87
95% DL/2 (t) UCL	0.0874	95% H-Stat (DL/2) UCL	0.109
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	

MLE method failed to converge properly		Mean in Log Scale	-3.462
		SD in Log Scale	0.669
		Mean in Original Scale	0.0402
		SD in Original Scale	0.0356
		95% Percentile Bootstrap UCL	0.0568
		95% BCA Bootstrap UCL	0.0633
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.53	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0268		
nu star	33.66		
A-D Test Statistic	1.139	Nonparametric Statistics	
5% A-D Critical Value	0.739	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.739	Mean	0.041
5% K-S Critical Value	0.258	SD	0.0355
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0112
		95% KM (t) UCL	0.0612
Assuming Gamma Distribution		95% KM (z) UCL	0.0595
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0613
Minimum	0.015	95% KM (bootstrap t) UCL	0.13
Maximum	0.12	95% KM (BCA) UCL	0.0585
Mean	0.0412	95% KM (Percentile Bootstrap) UCL	0.0594
Median	0.028	95% KM (Chebyshev) UCL	0.09
SD	0.0355	97.5% KM (Chebyshev) UCL	0.111
k star	1.699	99% KM (Chebyshev) UCL	0.153
Theta star	0.0242		
Nu star	40.77	Potential UCLs to Use	
AppChi2	27.14	95% KM (Chebyshev) UCL	0.09
95% Gamma Approximate UCL	0.0619		
95% Adjusted Gamma UCL	0.066		

Note: DL/2 is not a recommended method.

ALUMINUM

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	5320	Minimum of Log Data	8.579
Maximum	12700	Maximum of Log Data	9.449
Mean	8083	Mean of log Data	8.97
Median	7725	SD of log Data	0.242
SD	2048		
Coefficient of Variation	0.253		
Skewness	0.978		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.932	Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859

Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9144	95% H-UCL	9287
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10555
95% Adjusted-CLT UCL	9234	97.5% Chebyshev (MVUE) UCL	11627
95% Modified-t UCL	9172	99% Chebyshev (MVUE) UCL	13734
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	13.77	Data appear Normal at 5% Significance Level	
Theta Star	586.8		
MLE of Mean	8083		
MLE of Standard Deviation	2178		
nu star	330.5		
Approximate Chi Square Value (.05)	289.4	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	9055
Adjusted Chi Square Value	283.5	95% Jackknife UCL	9144
		95% Standard Bootstrap UCL	9029
Anderson-Darling Test Statistic	0.251	95% Bootstrap-t UCL	9486
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	9609
Kolmogorov-Smirnov Test Statistic	0.151	95% Percentile Bootstrap UCL	9073
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	9204
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10660
		97.5% Chebyshev(Mean, Sd) UCL	11775
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13966
95% Approximate Gamma UCL	9231		
95% Adjusted Gamma UCL	9422		
Potential UCL to Use		Use 95% Student's-t UCL	9144

ANTIMONY

General Statistics			
Number of Valid Data	12	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	9
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.9	Minimum Detected	0.642
Maximum Detected	4.1	Maximum Detected	1.411
Mean of Detected	2.8	Mean of Detected	0.976
SD of Detected	1.153	SD of Detected	0.394
Minimum Non-Detect	1.1	Minimum Non-Detect	0.0953
Maximum Non-Detect	2.4	Maximum Non-Detect	0.875
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	83.33%

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.91
5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level	

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.951
5% Shapiro Wilk Critical Value	0.767
Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	1.363
SD	1.013
95% DL/2 (t) UCL	1.888
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	

Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	0.131
SD	0.576
95% H-Stat (DL/2) UCL	1.389
Log ROS Method	
Mean in Log Scale	-0.0826
SD in Log Scale	0.69
Mean in Original Scale	1.198
SD in Original Scale	1.093
95% Percentile Bootstrap UCL	1.774
95% BCA Bootstrap UCL	1.85

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A
Data not Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Data Distribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	2.125
SD	0.611
SE of Mean	0.216
95% KM (t) UCL	2.513
95% KM (z) UCL	2.48
95% KM (jackknife) UCL	2.533
95% KM (bootstrap t) UCL	2.634
95% KM (BCA) UCL	4.1
95% KM (Percentile Bootstrap) UCL	4.1
95% KM (Chebyshev) UCL	3.067
97.5% KM (Chebyshev) UCL	3.474
99% KM (Chebyshev) UCL	4.275

Potential UCLs to Use	
95% KM (t) UCL	2.513
95% KM (Percentile Bootstrap) UCL	4.1

Note: DL/2 is not a recommended method.

Aroclor-1242

General Statistics

Number of Valid Data	12	Number of Detected Data	5
Number of Distinct Detected Data	4	Number of Non-Detect Data	7
		Percent Non-Detects	58.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.31	Minimum Detected	-1.171
Maximum Detected	0.71	Maximum Detected	-0.342
Mean of Detected	0.468	Mean of Detected	-0.81
SD of Detected	0.167	SD of Detected	0.358
Minimum Non-Detect	0.046	Minimum Non-Detect	-3.079
Maximum Non-Detect	0.077	Maximum Non-Detect	-2.564

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	5
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	58.33%

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Test Statistic	0.889
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.213	Mean	-2.374
SD	0.247	SD	1.403
95% DL/2 (t) UCL	0.341	95% H-Stat (DL/2) UCL	0.249
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0209	Mean in Log Scale	-1.481
SD	0.444	SD in Log Scale	0.638
95% MLE (t) UCL	0.251	Mean in Original Scale	0.278
95% MLE (Tiku) UCL	0.334	SD in Original Scale	0.196
		95% Percentile Bootstrap UCL	0.372
		95% BCA Bootstrap UCL	0.388

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	4.11	Data appear Normal at 5% Significance Level
Theta Star	0.114	
nu star	41.1	

A-D Test Statistic	0.387	Nonparametric Statistics	
5% A-D Critical Value	0.679	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.679	Mean	0.376
5% K-S Critical Value	0.358	SD	0.124
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.04
		95% KM (t) UCL	0.448
Assuming Gamma Distribution		95% KM (z) UCL	0.442
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.443
Minimum	0.162	95% KM (bootstrap t) UCL	0.476
Maximum	0.71	95% KM (BCA) UCL	0.536
Mean	0.437	95% KM (Percentile Bootstrap) UCL	0.527
Median	0.407	95% KM (Chebyshev) UCL	0.55
SD	0.157	97.5% KM (Chebyshev) UCL	0.626
k star	5.936	99% KM (Chebyshev) UCL	0.774
Theta star	0.0737		
Nu star	142.5	Potential UCLs to Use	
AppChi2	115.9	95% KM (t) UCL	0.448
95% Gamma Approximate UCL	0.538	95% KM (Percentile Bootstrap) UCL	0.527
95% Adjusted Gamma UCL	0.555		

Note: DL/2 is not a recommended method.

Aroclor-1248

General Statistics

Number of Valid Data	12	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	5
		Percent Non-Detects	41.67%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.23	Minimum Detected	-1.47
Maximum Detected	1.7	Maximum Detected	0.531
Mean of Detected	1.024	Mean of Detected	-0.183
SD of Detected	0.58	SD of Detected	0.773
Minimum Non-Detect	0.062	Minimum Non-Detect	-2.781
Maximum Non-Detect	0.099	Maximum Non-Detect	-2.313

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	7
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	41.67%

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.867

5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.613	Mean	-1.483
SD	0.665	SD	1.71
95% DL/2 (t) UCL	0.958	95% H-Stat (DL/2) UCL	1.054
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.359	Mean in Log Scale	-0.972
SD	0.951	SD in Log Scale	1.131
95% MLE (t) UCL	0.852	Mean in Original Scale	0.65
95% MLE (Tiku) UCL	0.924	SD in Original Scale	0.631
		95% Percentile Bootstrap UCL	0.945
		95% BCA Bootstrap UCL	0.96
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.565	Data appear Normal at 5% Significance Level	
Theta Star	0.655		
nu star	21.91		
A-D Test Statistic	0.431	Nonparametric Statistics	
5% A-D Critical Value	0.713	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.713	Mean	0.693
5% K-S Critical Value	0.314	SD	0.567
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.177
		95% KM (t) UCL	1.011
Assuming Gamma Distribution		95% KM (z) UCL	0.984
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.983
Minimum	0.23	95% KM (bootstrap t) UCL	1.004
Maximum	1.7	95% KM (BCA) UCL	1.275
Mean	0.921	95% KM (Percentile Bootstrap) UCL	1.124
Median	0.776	95% KM (Chebyshev) UCL	1.464
SD	0.447	97.5% KM (Chebyshev) UCL	1.798
k star	3.062	99% KM (Chebyshev) UCL	2.453
Theta star	0.301		
Nu star	73.49	Potential UCLs to Use	
AppChi2	54.75	95% KM (t) UCL	1.011
95% Gamma Approximate UCL	1.236	95% KM (Percentile Bootstrap) UCL	1.124
95% Adjusted Gamma UCL	1.294		

Note: DL/2 is not a recommended method.

ARSENIC

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	6.1	Minimum of Log Data	1.808
Maximum	11.9	Maximum of Log Data	2.477

Mean	8.342	Mean of log Data	2.11
Median	8.25	SD of log Data	0.158
SD	1.382		
Coefficient of Variation	0.166		
Skewness	1.336		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9.058	95% H-UCL	9.099
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.998
95% Adjusted-CLT UCL	9.162	97.5% Chebyshev (MVUE) UCL	10.72
95% Modified-t UCL	9.084	99% Chebyshev (MVUE) UCL	12.13
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	32.22	Data appear Normal at 5% Significance Level	
Theta Star	0.259		
MLE of Mean	8.342		
MLE of Standard Deviation	1.47		
nu star	773.3		
Approximate Chi Square Value (.05)	709.8	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	8.998
Adjusted Chi Square Value	700.5	95% Jackknife UCL	9.058
		95% Standard Bootstrap UCL	8.959
Anderson-Darling Test Statistic	0.595	95% Bootstrap-t UCL	9.278
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	13.09
Kolmogorov-Smirnov Test Statistic	0.212	95% Percentile Bootstrap UCL	9.008
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	9.075
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.08
		97.5% Chebyshev(Mean, Sd) UCL	10.83
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.31
95% Approximate Gamma UCL	9.088		
95% Adjusted Gamma UCL	9.209		
Potential UCL to Use		Use 95% Student's-t UCL	9.058

Benzo(a)anthracene

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	0.13	Minimum of Log Data	-2.04
Maximum	2.8	Maximum of Log Data	1.03
Mean	0.702	Mean of log Data	-0.692
Median	0.39	SD of log Data	0.803
SD	0.739		

Coefficient of Variation	1.053
Skewness	2.465

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.671	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.085	95% H-UCL	1.289
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.379
95% Adjusted-CLT UCL	1.214	97.5% Chebyshev (MVUE) UCL	1.686
95% Modified-t UCL	1.11	99% Chebyshev (MVUE) UCL	2.29

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.275	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.55		
MLE of Mean	0.702		
MLE of Standard Deviation	0.621		
nu star	30.59		
Approximate Chi Square Value (.05)	18.96	**Nonparametric Statistics**	
Adjusted Level of Significance	0.029	95% CLT UCL	1.052
Adjusted Chi Square Value	17.57	95% Jackknife UCL	1.085
		95% Standard Bootstrap UCL	1.025
Anderson-Darling Test Statistic	0.763	95% Bootstrap-t UCL	1.89
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	2.723
Kolmogorov-Smirnov Test Statistic	0.244	95% Percentile Bootstrap UCL	1.069
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	1.215
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.631
		97.5% Chebyshev(Mean, Sd) UCL	2.033
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.823
95% Approximate Gamma UCL	1.132		
95% Adjusted Gamma UCL	1.221		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.132

Benzo(a)pyrene

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.12	Minimum of Log Data	-2.12
Maximum	3.2	Maximum of Log Data	1.163
Mean	0.8	Mean of log Data	-0.581
Median	0.465	SD of log Data	0.839
SD	0.855		
Coefficient of Variation	1.069		
Skewness	2.411		

Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.675	Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.243	95% H-UCL	1.549
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.621
95% Adjusted-CLT UCL	1.39	97.5% Chebyshev (MVUE) UCL	1.99
95% Modified-t UCL	1.272	99% Chebyshev (MVUE) UCL	2.716
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.214	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.659		
MLE of Mean	0.8		
MLE of Standard Deviation	0.726		
nu star	29.13		
Approximate Chi Square Value (.05)	17.81	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.206
Adjusted Chi Square Value	16.47	95% Jackknife UCL	1.243
		95% Standard Bootstrap UCL	1.195
Anderson-Darling Test Statistic	0.732	95% Bootstrap-t UCL	2.315
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	3.312
Kolmogorov-Smirnov Test Statistic	0.244	95% Percentile Bootstrap UCL	1.223
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	1.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.876
		97.5% Chebyshev(Mean, Sd) UCL	2.342
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.256
95% Approximate Gamma UCL	1.309		
95% Adjusted Gamma UCL	1.415		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.309

Benzo(b)fluoranthene

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	12
Raw Statistics		Log-transformed Statistics	
Minimum	0.2	Minimum of Log Data	-1.609
Maximum	4.5	Maximum of Log Data	1.504
Mean	1.189	Mean of log Data	-0.146
Median	0.73	SD of log Data	0.794
SD	1.192		
Coefficient of Variation	1.003		
Skewness	2.346		

Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.688	Shapiro Wilk Test Statistic	0.938

Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.807	95% H-UCL	2.186
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.35
95% Adjusted-CLT UCL	2.004	97.5% Chebyshev (MVUE) UCL	2.871
95% Modified-t UCL	1.846	99% Chebyshev (MVUE) UCL	3.895
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.34	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.888		
MLE of Mean	1.189		
MLE of Standard Deviation	1.027		
nu star	32.15		
Approximate Chi Square Value (.05)	20.19	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	1.755
Adjusted Chi Square Value	18.76	95% Jackknife UCL	1.807
		95% Standard Bootstrap UCL	1.733
Anderson-Darling Test Statistic	0.728	95% Bootstrap-t UCL	3.224
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	4.755
Kolmogorov-Smirnov Test Statistic	0.227	95% Percentile Bootstrap UCL	1.811
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	2.07
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.689
		97.5% Chebyshev(Mean, Sd) UCL	3.338
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.613
95% Approximate Gamma UCL	1.893		
95% Adjusted Gamma UCL	2.038		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.893

Benzo(g,h,i)perylene

General Statistics			
Number of Valid Data	12	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	1
		Percent Non-Detects	8.33%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	1.9	Maximum Detected	0.642
Mean of Detected	0.593	Mean of Detected	-0.747
SD of Detected	0.474	SD of Detected	0.701
Minimum Non-Detect	1.2	Minimum Non-Detect	0.182
Maximum Non-Detect	1.2	Maximum Non-Detect	0.182
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.735	Shapiro Wilk Test Statistic	0.945
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85

Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.593	Mean	-0.727
SD	0.451	SD	0.672
95% DL/2 (t) UCL	0.827	95% H-Stat (DL/2) UCL	0.911
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.755
		SD in Log Scale	0.669
		Mean in Original Scale	0.579
		SD in Original Scale	0.454
		95% Percentile Bootstrap UCL	0.814
		95% BCA Bootstrap UCL	0.926
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.796	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.33		
nu star	39.5		
A-D Test Statistic	0.458	**Nonparametric Statistics**	
5% A-D Critical Value	0.737	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.737	Mean	0.582
5% K-S Critical Value	0.258	SD	0.437
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.134
		95% KM (t) UCL	0.822
Assuming Gamma Distribution		95% KM (z) UCL	0.801
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.821
Minimum	0.11	95% KM (bootstrap t) UCL	1.057
Maximum	1.9	95% KM (BCA) UCL	0.822
Mean	0.594	95% KM (Percentile Bootstrap) UCL	0.801
Median	0.475	95% KM (Chebyshev) UCL	1.164
SD	0.452	97.5% KM (Chebyshev) UCL	1.416
k star	1.997	99% KM (Chebyshev) UCL	1.91
Theta star	0.298		
Nu star	47.94	**Potential UCLs to Use**	
AppChi2	33.05	95% KM (Chebyshev) UCL	1.164
95% Gamma Approximate UCL	0.862		
95% Adjusted Gamma UCL	0.914		

Note: DL/2 is not a recommended method.

Benzo(k)fluoranthene

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.07	Minimum of Log Data	-2.659
Maximum	2	Maximum of Log Data	0.693
Mean	0.469	Mean of log Data	-1.184

Median	0.255	SD of log Data	0.904
SD	0.552		
Coefficient of Variation	1.176		
Skewness	2.375		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.662	Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.755	95% H-UCL	0.972
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.972
95% Adjusted-CLT UCL	0.848	97.5% Chebyshev (MVUE) UCL	1.201
95% Modified-t UCL	0.773	99% Chebyshev (MVUE) UCL	1.653
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.039	Data appear Lognormal at 5% Significance Level	
Theta Star	0.452		
MLE of Mean	0.469		
MLE of Standard Deviation	0.46		
nu star	24.93		
Approximate Chi Square Value (.05)	14.56	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.731
Adjusted Chi Square Value	13.36	95% Jackknife UCL	0.755
		95% Standard Bootstrap UCL	0.724
Anderson-Darling Test Statistic	0.768	95% Bootstrap-t UCL	1.466
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	2.129
Kolmogorov-Smirnov Test Statistic	0.265	95% Percentile Bootstrap UCL	0.734
Kolmogorov-Smirnov 5% Critical Value	0.251	95% BCA Bootstrap UCL	0.868
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.163
		97.5% Chebyshev(Mean, Sd) UCL	1.463
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.053
95% Approximate Gamma UCL	0.803		
95% Adjusted Gamma UCL	0.875		
Potential UCL to Use		Use 95% H-UCL	0.972

Benzo[j]fluoranthene

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5
Raw Statistics		Log-transformed Statistics	
Minimum	0.24	Minimum of Log Data	-1.427
Maximum	0.86	Maximum of Log Data	-0.151
Mean	0.468	Mean of log Data	-0.903
Median	0.3	SD of log Data	0.591
SD	0.284		
Coefficient of Variation	0.606		

Skewness	0.806

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.818
Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
95% Student's-t UCL	0.739
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.726
95% Modified-t UCL	0.746
Gamma Distribution Test	
k star (bias corrected)	1.589
Theta Star	0.295
MLE of Mean	0.468
MLE of Standard Deviation	0.371
nu star	15.89
Approximate Chi Square Value (.05)	7.884
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	5.594
Anderson-Darling Test Statistic	0.559
Anderson-Darling 5% Critical Value	0.682
Kolmogorov-Smirnov Test Statistic	0.329
Kolmogorov-Smirnov 5% Critical Value	0.359
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
95% Approximate Gamma UCL	0.943
95% Adjusted Gamma UCL	1.329
Potential UCL to Use	

Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical Value	0.762
Data appear Lognormal at 5% Significance Level	
Assuming Lognormal Distribution	
95% H-UCL	1.262
95% Chebyshev (MVUE) UCL	0.993
97.5% Chebyshev (MVUE) UCL	1.221
99% Chebyshev (MVUE) UCL	1.67
Data Distribution	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
95% CLT UCL	0.677
95% Jackknife UCL	0.739
95% Standard Bootstrap UCL	0.651
95% Bootstrap-t UCL	2.354
95% Hall's Bootstrap UCL	4.029
95% Percentile Bootstrap UCL	0.668
95% BCA Bootstrap UCL	0.668
95% Chebyshev(Mean, Sd) UCL	1.021
97.5% Chebyshev(Mean, Sd) UCL	1.26
99% Chebyshev(Mean, Sd) UCL	1.731
Use 95% Student's-t UCL	0.739

CADMIUM

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	10

Raw Statistics		Log-transformed Statistics	
Minimum	2	Minimum of Log Data	0.693
Maximum	15.2	Maximum of Log Data	2.721
Mean	6.208	Mean of log Data	1.58
Median	4.8	SD of log Data	0.733
SD	4.553		
Coefficient of Variation	0.733		
Skewness	0.964		

Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.852	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	8.569	95% H-UCL	10.96
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.15
95% Adjusted-CLT UCL	8.761	97.5% Chebyshev (MVUE) UCL	14.73
95% Modified-t UCL	8.629	99% Chebyshev (MVUE) UCL	19.8
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.697	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.657		
MLE of Mean	6.208		
MLE of Standard Deviation	4.765		
nu star	40.74		
Approximate Chi Square Value (.05)	27.11	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	8.37
Adjusted Chi Square Value	25.43	95% Jackknife UCL	8.569
		95% Standard Bootstrap UCL	8.252
Anderson-Darling Test Statistic	0.511	95% Bootstrap-t UCL	9.082
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	8.519
Kolmogorov-Smirnov Test Statistic	0.181	95% Percentile Bootstrap UCL	8.542
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	8.7
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.94
		97.5% Chebyshev(Mean, Sd) UCL	14.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	19.28
95% Approximate Gamma UCL	9.329		
95% Adjusted Gamma UCL	9.947		
Potential UCL to Use		Use 95% Approximate Gamma UCL	9.329

Carbazole

General Statistics			
Number of Valid Observations	12	Number of Distinct Observations	11

Raw Statistics		Log-transformed Statistics	
Minimum	0.03	Minimum of Log Data	-3.507
Maximum	0.34	Maximum of Log Data	-1.079
Mean	0.0979	Mean of log Data	-2.565
Median	0.067	SD of log Data	0.664
SD	0.0878		
Coefficient of Variation	0.897		
Skewness	2.33		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.681	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.143	95% H-UCL	0.154
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.175
95% Adjusted-CLT UCL	0.158	97.5% Chebyshev (MVUE) UCL	0.21
95% Modified-t UCL	0.146	99% Chebyshev (MVUE) UCL	0.28
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.721	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.0569		
MLE of Mean	0.0979		
MLE of Standard Deviation	0.0746		
nu star	41.29		
Approximate Chi Square Value (.05)	27.57	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.14
Adjusted Chi Square Value	25.86	95% Jackknife UCL	0.143
		95% Standard Bootstrap UCL	0.137
Anderson-Darling Test Statistic	0.868	95% Bootstrap-t UCL	0.258
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.369
Kolmogorov-Smirnov Test Statistic	0.248	95% Percentile Bootstrap UCL	0.141
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	0.157
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.208
		97.5% Chebyshev(Mean, Sd) UCL	0.256
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.35
95% Approximate Gamma UCL	0.147		
95% Adjusted Gamma UCL	0.156		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.147

Chloroxylenol

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	0.16	Minimum of Log Data	-1.833
Maximum	0.67	Maximum of Log Data	-0.4

Mean	0.342	Mean of log Data	-1.243
Median	0.235	SD of log Data	0.622
SD	0.224		
Coefficient of Variation	0.656		
Skewness	0.934		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.526	95% H-UCL	0.796
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.711
95% Adjusted-CLT UCL	0.529	97.5% Chebyshev (MVUE) UCL	0.872
95% Modified-t UCL	0.532	99% Chebyshev (MVUE) UCL	1.189
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.669	Data appear Normal at 5% Significance Level	
Theta Star	0.205		
MLE of Mean	0.342		
MLE of Standard Deviation	0.264		
nu star	20.03		
Approximate Chi Square Value (.05)	10.87	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	0.492
Adjusted Chi Square Value	8.543	95% Jackknife UCL	0.526
		95% Standard Bootstrap UCL	0.478
Anderson-Darling Test Statistic	0.579	95% Bootstrap-t UCL	1.027
Anderson-Darling 5% Critical Value	0.701	95% Hall's Bootstrap UCL	1.781
Kolmogorov-Smirnov Test Statistic	0.272	95% Percentile Bootstrap UCL	0.488
Kolmogorov-Smirnov 5% Critical Value	0.334	95% BCA Bootstrap UCL	0.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.74
		97.5% Chebyshev(Mean, Sd) UCL	0.913
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.252
95% Approximate Gamma UCL	0.629		
95% Adjusted Gamma UCL	0.801		
Potential UCL to Use		Use 95% Student's-t UCL	0.526

CHROMIUM

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12

Raw Statistics		Log-transformed Statistics	
Minimum	52	Minimum of Log Data	3.951
Maximum	379	Maximum of Log Data	5.938
Mean	152.8	Mean of log Data	4.824
Median	117	SD of log Data	0.654
SD	108.7		
Coefficient of Variation	0.711		
Skewness	1.311		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.825	Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	209.1	95% H-UCL	244.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	279.9
95% Adjusted-CLT UCL	217.1	97.5% Chebyshev (MVUE) UCL	335.6
95% Modified-t UCL	211.1	99% Chebyshev (MVUE) UCL	445.1
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.003	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	76.27		
MLE of Mean	152.8		
MLE of Standard Deviation	107.9		
nu star	48.08		
Approximate Chi Square Value (.05)	33.17	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	204.4
Adjusted Chi Square Value	31.28	95% Jackknife UCL	209.1
		95% Standard Bootstrap UCL	202.3
Anderson-Darling Test Statistic	0.42	95% Bootstrap-t UCL	250.4
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	247.4
Kolmogorov-Smirnov Test Statistic	0.163	95% Percentile Bootstrap UCL	205.8
Kolmogorov-Smirnov 5% Critical Value	0.248	95% BCA Bootstrap UCL	214
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	289.5
		97.5% Chebyshev(Mean, Sd) UCL	348.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	464.9
95% Approximate Gamma UCL	221.5		
95% Adjusted Gamma UCL	234.8		
Potential UCL to Use		Use 95% Approximate Gamma UCL	221.5

COBALT

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10

Raw Statistics		Log-transformed Statistics	
Minimum	5.8	Minimum of Log Data	1.758
Maximum	8.9	Maximum of Log Data	2.186
Mean	7.067	Mean of log Data	1.95
Median	7.1	SD of log Data	0.11
SD	0.791		
Coefficient of Variation	0.112		
Skewness	0.797		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.939	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	7.477	95% H-UCL	7.498
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.041
95% Adjusted-CLT UCL	7.499	97.5% Chebyshev (MVUE) UCL	8.463
95% Modified-t UCL	7.486	99% Chebyshev (MVUE) UCL	9.292
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	67.5	Data appear Normal at 5% Significance Level	
Theta Star	0.105		
MLE of Mean	7.067		
MLE of Standard Deviation	0.86		
nu star	1620		
Approximate Chi Square Value (.05)	1528	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	7.442
Adjusted Chi Square Value	1514	95% Jackknife UCL	7.477
		95% Standard Bootstrap UCL	7.42
Anderson-Darling Test Statistic	0.294	95% Bootstrap-t UCL	7.546
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	7.653
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	7.433
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	7.458
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.062
		97.5% Chebyshev(Mean, Sd) UCL	8.493
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.339
95% Approximate Gamma UCL	7.494		
95% Adjusted Gamma UCL	7.562		
Potential UCL to Use		Use 95% Student's-t UCL	7.477

Dibenzo(a,h)anthracene

General Statistics

Number of Valid Data	12	Number of Detected Data	5

Number of Distinct Detected Data	5	Number of Non-Detect Data	7
		Percent Non-Detects	58.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.024	Minimum Detected	-3.73
Maximum Detected	0.14	Maximum Detected	-1.966
Mean of Detected	0.087	Mean of Detected	-2.611
SD of Detected	0.0483	SD of Detected	0.712
Minimum Non-Detect	0.32	Minimum Non-Detect	-1.139
Maximum Non-Detect	1.3	Maximum Non-Detect	0.262

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	12
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.211	Mean	-1.906
SD	0.2	SD	0.892
95% DL/2 (t) UCL	0.315	95% H-Stat (DL/2) UCL	0.46
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.611
		SD in Log Scale	0.46
		Mean in Original Scale	0.08
		SD in Original Scale	0.0323
		95% Percentile Bootstrap UCL	0.0943
		95% BCA Bootstrap UCL	0.0956
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.378	Data appear Normal at 5% Significance Level	
Theta Star	0.0631		
nu star	13.78		
A-D Test Statistic	0.301	**Nonparametric Statistics**	
5% A-D Critical Value	0.682	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.682	Mean	0.087
5% K-S Critical Value	0.359	SD	0.0432
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0216

		95% KM (t) UCL	0.126
Assuming Gamma Distribution		95% KM (z) UCL	0.122
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.128
Minimum	0.024	95% KM (bootstrap t) UCL	0.149
Maximum	0.14	95% KM (BCA) UCL	0.12
Mean	0.0881	95% KM (Percentile Bootstrap) UCL	0.122
Median	0.0892	95% KM (Chebyshev) UCL	0.181
SD	0.0317	97.5% KM (Chebyshev) UCL	0.222
k star	4.839	99% KM (Chebyshev) UCL	0.302
Theta star	0.0182		
Nu star	116.1	Potential UCLs to Use	
AppChi2	92.26	95% KM (t) UCL	0.126
95% Gamma Approximate UCL	0.111	95% KM (Percentile Bootstrap) UCL	0.122
95% Adjusted Gamma UCL	0.115		

Note: DL/2 is not a recommended method.

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Data	12	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	1
		Percent Non-Detects	8.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.13	Minimum Detected	-2.04
Maximum Detected	1.9	Maximum Detected	0.642
Mean of Detected	0.606	Mean of Detected	-0.708
SD of Detected	0.47	SD of Detected	0.667
Minimum Non-Detect	1.2	Minimum Non-Detect	0.182
Maximum Non-Detect	1.2	Maximum Non-Detect	0.182

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.74	Shapiro Wilk Test Statistic	0.954
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.606	Mean	-0.692
SD	0.448	SD	0.639
95% DL/2 (t) UCL	0.838	95% H-Stat (DL/2) UCL	0.892
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.716
		SD in Log Scale	0.637
		Mean in Original Scale	0.593
		SD in Original Scale	0.45
		95% Percentile Bootstrap UCL	0.825
		95% BCA Bootstrap UCL	0.933

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.921	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.316		
nu star	42.26		
A-D Test Statistic	0.438	Nonparametric Statistics	
5% A-D Critical Value	0.736	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.736	Mean	0.596
5% K-S Critical Value	0.258	SD	0.434
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.133
		95% KM (t) UCL	0.834
Assuming Gamma Distribution		95% KM (z) UCL	0.814
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.833
Minimum	0.13	95% KM (bootstrap t) UCL	1.056
Maximum	1.9	95% KM (BCA) UCL	0.824
Mean	0.608	95% KM (Percentile Bootstrap) UCL	0.816
Median	0.49	95% KM (Chebyshev) UCL	1.173
SD	0.448	97.5% KM (Chebyshev) UCL	1.423
k star	2.138	99% KM (Chebyshev) UCL	1.915
Theta star	0.284		
Nu star	51.32	Potential UCLs to Use	
AppChi2	35.87	95% KM (Chebyshev) UCL	1.173
95% Gamma Approximate UCL	0.87		
95% Adjusted Gamma UCL	0.92		

Note: DL/2 is not a recommended method.

IRON

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11

Raw Statistics		Log-transformed Statistics	
Minimum	10400	Minimum of Log Data	9.25
Maximum	24400	Maximum of Log Data	10.1
Mean	18500	Mean of log Data	9.805
Median	18950	SD of log Data	0.219
SD	3633		
Coefficient of Variation	0.196		
Skewness	-0.61		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.951	Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	20383	95% H-UCL	20996
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23669
95% Adjusted-CLT UCL	20027	97.5% Chebyshev (MVUE) UCL	25893

95% Modified-t UCL	20352	99% Chebyshev (MVUE) UCL	30260

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	18.65	Data appear Normal at 5% Significance Level	
Theta Star	991.8		
MLE of Mean	18500		
MLE of Standard Deviation	4283		
nu star	447.7		
Approximate Chi Square Value (.05)	399.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	20225
Adjusted Chi Square Value	392.7	95% Jackknife UCL	20383
		95% Standard Bootstrap UCL	20117
Anderson-Darling Test Statistic	0.432	95% Bootstrap-t UCL	20240
Anderson-Darling 5% Critical Value	0.732	95% Hall's Bootstrap UCL	20213
Kolmogorov-Smirnov Test Statistic	0.156	95% Percentile Bootstrap UCL	20025
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	20000
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23071
		97.5% Chebyshev(Mean, Sd) UCL	25049
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	28934
95% Approximate Gamma UCL	20725		
95% Adjusted Gamma UCL	21091		
Potential UCL to Use		Use 95% Student's-t UCL	20383

LEAD

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12

Raw Statistics		Log-transformed Statistics	
Minimum	80	Minimum of Log Data	4.382
Maximum	252	Maximum of Log Data	5.529
Mean	144.6	Mean of log Data	4.914
Median	130.5	SD of log Data	0.359
SD	54.08		
Coefficient of Variation	0.374		
Skewness	0.886		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.918	Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	172.7	95% H-UCL	180.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	210.6
95% Adjusted-CLT UCL	174.6	97.5% Chebyshev (MVUE) UCL	239.2
95% Modified-t UCL	173.3	99% Chebyshev (MVUE) UCL	295.4
Gamma Distribution Test		Data Distribution	

k star (bias corrected)	6.386	Data appear Normal at 5% Significance Level	
Theta Star	22.65		
MLE of Mean	144.6		
MLE of Standard Deviation	57.23		
nu star	153.3		
Approximate Chi Square Value (.05)	125.6	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	170.3
Adjusted Chi Square Value	121.8	95% Jackknife UCL	172.7
		95% Standard Bootstrap UCL	169.9
Anderson-Darling Test Statistic	0.243	95% Bootstrap-t UCL	180.1
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL	182.8
Kolmogorov-Smirnov Test Statistic	0.117	95% Percentile Bootstrap UCL	169.3
Kolmogorov-Smirnov 5% Critical Value	0.246	95% BCA Bootstrap UCL	173.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	212.7
		97.5% Chebyshev(Mean, Sd) UCL	242.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	300
95% Approximate Gamma UCL	176.4		
95% Adjusted Gamma UCL	181.9		
Potential UCL to Use		Use 95% Student's-t UCL	172.7

MANGANESE

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8
Raw Statistics		Log-transformed Statistics	
Minimum	188	Minimum of Log Data	5.236
Maximum	465	Maximum of Log Data	6.142
Mean	320.8	Mean of log Data	5.729
Median	326.5	SD of log Data	0.314
SD	96.67		
Coefficient of Variation	0.301		
Skewness	0.111		

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	385.5	95% H-UCL	413.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	477.3

95% Adjusted-CLT UCL	378.4	97.5% Chebyshev (MVUE) UCL	544.9
95% Modified-t UCL	385.7	99% Chebyshev (MVUE) UCL	677.6
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	7.639	Data appear Normal at 5% Significance Level	
Theta Star	41.99		
MLE of Mean	320.8		
MLE of Standard Deviation	116		
nu star	122.2		
Approximate Chi Square Value (.05)	97.69	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0195	95% CLT UCL	377
Adjusted Chi Square Value	92.15	95% Jackknife UCL	385.5
		95% Standard Bootstrap UCL	373.7
Anderson-Darling Test Statistic	0.281	95% Bootstrap-t UCL	388.7
Anderson-Darling 5% Critical Value	0.715	95% Hall's Bootstrap UCL	371.7
Kolmogorov-Smirnov Test Statistic	0.21	95% Percentile Bootstrap UCL	373.9
Kolmogorov-Smirnov 5% Critical Value	0.294	95% BCA Bootstrap UCL	370.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	469.7
		97.5% Chebyshev(Mean, Sd) UCL	534.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	660.8
95% Approximate Gamma UCL	401.3		
95% Adjusted Gamma UCL	425.4		
Potential UCL to Use		Use 95% Student's-t UCL	385.5

MERCURY

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.15	Minimum of Log Data	-1.897
Maximum	0.91	Maximum of Log Data	-0.0943
Mean	0.365	Mean of log Data	-1.161
Median	0.265	SD of log Data	0.556
SD	0.23		
Coefficient of Variation	0.631		
Skewness	1.453		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.819	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.484	95% H-UCL	0.53
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.62
95% Adjusted-CLT UCL	0.504	97.5% Chebyshev (MVUE) UCL	0.732
95% Modified-t UCL	0.489	99% Chebyshev (MVUE) UCL	0.952

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.628	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.139		
MLE of Mean	0.365		
MLE of Standard Deviation	0.225		
nu star	63.08		
Approximate Chi Square Value (.05)	45.81	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.474
Adjusted Chi Square Value	43.57	95% Jackknife UCL	0.484
		95% Standard Bootstrap UCL	0.471
Anderson-Darling Test Statistic	0.607	95% Bootstrap-t UCL	0.557
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	0.502
Kolmogorov-Smirnov Test Statistic	0.256	95% Percentile Bootstrap UCL	0.47
Kolmogorov-Smirnov 5% Critical Value	0.247	95% BCA Bootstrap UCL	0.498
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.655
		97.5% Chebyshev(Mean, Sd) UCL	0.78
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.026
95% Approximate Gamma UCL	0.503		
95% Adjusted Gamma UCL	0.528		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.503

Perylene

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	0.32	Minimum of Log Data	-1.139
Maximum	2.7	Maximum of Log Data	0.993
Mean	0.942	Mean of log Data	-0.448
Median	0.395	SD of log Data	0.913
SD	0.975		
Coefficient of Variation	1.035		
Skewness	1.561		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.73	Shapiro Wilk Test Statistic	0.781
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.744	95% H-UCL	4.597
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.32
95% Adjusted-CLT UCL	1.867	97.5% Chebyshev (MVUE) UCL	2.938
95% Modified-t UCL	1.786	99% Chebyshev (MVUE) UCL	4.153
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.828	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.137		
MLE of Mean	0.942		
MLE of Standard Deviation	1.035		
nu star	9.94		
Approximate Chi Square Value (.05)	3.904	Nonparametric Statistics	
Adjusted Level of Significance	0.0122	95% CLT UCL	1.596
Adjusted Chi Square Value	2.665	95% Jackknife UCL	1.744
		95% Standard Bootstrap UCL	1.536
Anderson-Darling Test Statistic	0.803	95% Bootstrap-t UCL	14.29
Anderson-Darling 5% Critical Value	0.709	95% Hall's Bootstrap UCL	9.003
Kolmogorov-Smirnov Test Statistic	0.371	95% Percentile Bootstrap UCL	1.538
Kolmogorov-Smirnov 5% Critical Value	0.338	95% BCA Bootstrap UCL	1.722
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.677
		97.5% Chebyshev(Mean, Sd) UCL	3.427
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.902
95% Approximate Gamma UCL	2.397		
95% Adjusted Gamma UCL	3.512		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	2.677

Phenanthrene

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	11
Raw Statistics		Log-transformed Statistics	
Minimum	0.14	Minimum of Log Data	-1.966
Maximum	2.4	Maximum of Log Data	0.875
Mean	0.678	Mean of log Data	-0.69
Median	0.425	SD of log Data	0.759
SD	0.657		
Coefficient of Variation	0.969		
Skewness	2.134		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.691	Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.018	95% H-UCL	1.185
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.299
95% Adjusted-CLT UCL	1.114	97.5% Chebyshev (MVUE) UCL	1.58
95% Modified-t UCL	1.037	99% Chebyshev (MVUE) UCL	2.132

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.413	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.479		
MLE of Mean	0.678		
MLE of Standard Deviation	0.57		
nu star	33.91		
Approximate Chi Square Value (.05)	21.59	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	0.989
Adjusted Chi Square Value	20.11	95% Jackknife UCL	1.018
		95% Standard Bootstrap UCL	0.98
Anderson-Darling Test Statistic	0.863	95% Bootstrap-t UCL	1.872
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	2.801
Kolmogorov-Smirnov Test Statistic	0.24	95% Percentile Bootstrap UCL	1
Kolmogorov-Smirnov 5% Critical Value	0.249	95% BCA Bootstrap UCL	1.122
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.504
		97.5% Chebyshev(Mean, Sd) UCL	1.861
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.563
95% Approximate Gamma UCL	1.064		
95% Adjusted Gamma UCL	1.143		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.064

VANADIUM

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics		Log-transformed Statistics	
Minimum	18.4	Minimum of Log Data	2.912
Maximum	26.7	Maximum of Log Data	3.285
Mean	22.38	Mean of log Data	3.1
Median	21.75	SD of log Data	0.131
SD	2.944		
Coefficient of Variation	0.132		
Skewness	0.319		

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Test Statistic	0.95
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	24.35	95% H-UCL	24.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	26.89
95% Adjusted-CLT UCL	24.21	97.5% Chebyshev (MVUE) UCL	28.84
95% Modified-t UCL	24.37	99% Chebyshev (MVUE) UCL	32.68
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	41.78	Data appear Normal at 5% Significance Level	
Theta Star	0.536		
MLE of Mean	22.38		
MLE of Standard Deviation	3.462		
nu star	668.5		
Approximate Chi Square Value (.05)	609.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0195	95% CLT UCL	24.09
Adjusted Chi Square Value	595.2	95% Jackknife UCL	24.35
		95% Standard Bootstrap UCL	23.92
Anderson-Darling Test Statistic	0.286	95% Bootstrap-t UCL	24.45
Anderson-Darling 5% Critical Value	0.715	95% Hall's Bootstrap UCL	24.07
Kolmogorov-Smirnov Test Statistic	0.178	95% Percentile Bootstrap UCL	24
Kolmogorov-Smirnov 5% Critical Value	0.293	95% BCA Bootstrap UCL	24.13
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	26.91
		97.5% Chebyshev(Mean, Sd) UCL	28.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32.73
95% Approximate Gamma UCL	24.54		
95% Adjusted Gamma UCL	25.13		
Potential UCL to Use		Use 95% Student's-t UCL	24.35

SURFACE WATER UCLs

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Documents and Settings\anatracordone\My Documents\EPA-ERT\Onondaga Lake\LeyCreek\macro-s
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ARSENIC

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	0.95	Minimum of Log Data	-0.0513
Maximum	1.8	Maximum of Log Data	0.588
Mean	1.251	Mean of log Data	0.21
Median	1.25	SD of log Data	0.169
SD	0.216		
Coefficient of Variation	0.173		
Skewness	0.645		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.33	95% H-UCL	1.335
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.448
95% Adjusted-CLT UCL	1.333	97.5% Chebyshev (MVUE) UCL	1.533
95% Modified-t UCL	1.331	99% Chebyshev (MVUE) UCL	1.7
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	31.56	Data appear Normal at 5% Significance Level	
Theta Star	0.0396		
MLE of Mean	1.251		
MLE of Standard Deviation	0.223		
nu star	1389		
Approximate Chi Square Value (.05)	1303	Nonparametric Statistics	
Adjusted Level of Significance	0.0386	95% CLT UCL	1.327
Adjusted Chi Square Value	1297	95% Jackknife UCL	1.33
		95% Standard Bootstrap UCL	1.327
Anderson-Darling Test Statistic	0.438	95% Bootstrap-t UCL	1.337
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	1.337
Kolmogorov-Smirnov Test Statistic	0.169	95% Percentile Bootstrap UCL	1.325
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	1.326
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.451
		97.5% Chebyshev(Mean, Sd) UCL	1.538
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.709

95% Approximate Gamma UCL	1.333		
95% Adjusted Gamma UCL	1.339		
Potential UCL to Use		Use 95% Student's-t UCL	1.33

Benzo(b)fluoranthene

General Statistics

Number of Valid Data	11	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	10
		Percent Non-Detects	90.91%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Benzo(b)fluoranthene was not processed!

CHROMIUM

General Statistics

Number of Valid Data	22	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	20
		Percent Non-Detects	90.91%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	3.7	Minimum Detected	1.308
Maximum Detected	8.4	Maximum Detected	2.128
Mean of Detected	6.05	Mean of Detected	1.718
SD of Detected	3.323	SD of Detected	0.58
Minimum Non-Detect	0.91	Minimum Non-Detect	-0.0943
Maximum Non-Detect	2	Maximum Non-Detect	0.693
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	20
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	90.91%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level	

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	1.434
SD	1.665
95% DL/2 (t) UCL	2.045
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	

Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	0.12
SD	0.558
95% H-Stat (DL/2) UCL	1.386
Log ROS Method	
Mean in Log Scale	N/A
SD in Log Scale	N/A
Mean in Original Scale	N/A
SD in Original Scale	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A
Data not Gamma Distributed at 5% Significance Level	

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	3.914
SD	0.979
SE of Mean	0.295
95% KM (t) UCL	4.422
95% KM (z) UCL	4.399
95% KM (jackknife) UCL	7.02
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	8.4
95% KM (Chebyshev) UCL	5.2
97.5% KM (Chebyshev) UCL	5.757
99% KM (Chebyshev) UCL	6.851
Potential UCLs to Use	
95% KM (t) UCL	4.422
95% KM (% Bootstrap) UCL	8.4

Note: DL/2 is not a recommended method.

MANGANESE

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	20

Raw Statistics		Log-transformed Statistics	
Minimum	88.7	Minimum of Log Data	4.485
Maximum	120	Maximum of Log Data	4.787
Mean	97.47	Mean of log Data	4.577
Median	94.65	SD of log Data	0.0753
SD	7.645		
Coefficient of Variation	0.0784		
Skewness	1.372		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.875	Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	100.3	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	104.3
95% Adjusted-CLT UCL	100.7	97.5% Chebyshev (MVUE) UCL	107.2
95% Modified-t UCL	100.4	99% Chebyshev (MVUE) UCL	113

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	155.7	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.626		
MLE of Mean	97.47		
MLE of Standard Deviation	7.813		
nu star	6849		
Approximate Chi Square Value (.05)	6657	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	100.2
Adjusted Chi Square Value	6643	95% Jackknife UCL	100.3
		95% Standard Bootstrap UCL	100.1
Anderson-Darling Test Statistic	0.809	95% Bootstrap-t UCL	101.1
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	101.3
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	100.4
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	100.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	104.6
		97.5% Chebyshev(Mean, Sd) UCL	107.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	113.7
95% Approximate Gamma UCL	100.3		
95% Adjusted Gamma UCL	100.5		
Potential UCL to Use		Use 95% Student's-t UCL	100.3
		or 95% Modified-t UCL	100.4

Naphthalene

General Statistics

Number of Valid Data	11	Number of Detected Data	8
Number of Distinct Detected Data	7	Number of Non-Detect Data	3
		Percent Non-Detects	27.27%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.17	Minimum Detected	-1.772
Maximum Detected	0.41	Maximum Detected	-0.892
Mean of Detected	0.266	Mean of Detected	-1.384
SD of Detected	0.101	SD of Detected	0.369
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.832	Shapiro Wilk Test Statistic	0.852
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.875	Mean	-0.757
SD	1.047	SD	1.118
95% DL/2 (t) UCL	1.447	95% H-Stat (DL/2) UCL	2.745
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.384
		SD in Log Scale	0.335
		Mean in Original Scale	0.264
		SD in Original Scale	0.0907
		95% Percentile Bootstrap UCL	0.308
		95% BCA Bootstrap UCL	0.311

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	5.332	Data appear Normal at 5% Significance Level	
Theta Star	0.0499		
nu star	85.31		
A-D Test Statistic	0.624	Nonparametric Statistics	
5% A-D Critical Value	0.716	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.716	Mean	0.266
5% K-S Critical Value	0.295	SD	0.0942
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0356
		95% KM (t) UCL	0.331
Assuming Gamma Distribution		95% KM (z) UCL	0.325
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.332
Minimum	0.17	95% KM (bootstrap t) UCL	0.347
Maximum	0.41	95% KM (BCA) UCL	0.325

Mean	0.268	95% KM (Percentile Bootstrap) UCL	0.324
Median	0.24	95% KM (Chebyshev) UCL	0.421
SD	0.091	97.5% KM (Chebyshev) UCL	0.489
k star	7.188	99% KM (Chebyshev) UCL	0.621
Theta star	0.0373		
Nu star	158.1	Potential UCLs to Use	
AppChi2	130.1	95% KM (t) UCL	0.331
95% Gamma Approximate UCL	0.326	95% KM (Percentile Bootstrap) UCL	0.324
95% Adjusted Gamma UCL	0.337		

Note: DL/2 is not a recommended method.

Pentachlorophenol

General Statistics

Number of Valid Data	11	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	10
		Percent Non-Detects	90.91%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Pentachlorophenol was not processed!

VANADIUM

General Statistics

Number of Valid Data	18	Number of Detected Data	10
Number of Distinct Detected Data	6	Number of Non-Detect Data	8
		Percent Non-Detects	44.44%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.64	Minimum Detected	-0.446
Maximum Detected	1.5	Maximum Detected	0.405
Mean of Detected	1.181	Mean of Detected	0.138
SD of Detected	0.272	SD of Detected	0.263
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Test Statistic	0.863
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.767	Mean	0.484
SD	0.703	SD	0.442

95% DL/2 (t) UCL	2.055	95% H-Stat (DL/2) UCL	2.208
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.138
		SD in Log Scale	0.244
		Mean in Original Scale	1.179
		SD in Original Scale	0.266
		95% Percentile Bootstrap UCL	1.278
		95% BCA Bootstrap UCL	1.272
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	12.51	Data appear Normal at 5% Significance Level	
Theta Star	0.0944		
nu star	250.1		
A-D Test Statistic	0.551	Nonparametric Statistics	
5% A-D Critical Value	0.725	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.725	Mean	1.181
5% K-S Critical Value	0.266	SD	0.258
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0859
		95% KM (t) UCL	1.33
Assuming Gamma Distribution		95% KM (z) UCL	1.322
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.334
Minimum	0.64	95% KM (bootstrap t) UCL	1.312
Maximum	1.5	95% KM (BCA) UCL	1.307
Mean	1.183	95% KM (Percentile Bootstrap) UCL	1.314
Median	1.239	95% KM (Chebyshev) UCL	1.556
SD	0.258	97.5% KM (Chebyshev) UCL	1.718
k star	15.98	99% KM (Chebyshev) UCL	2.036
Theta star	0.074		
Nu star	575.3	Potential UCLs to Use	
AppChi2	520.6	95% KM (t) UCL	1.33
95% Gamma Approximate UCL	1.307	95% KM (Percentile Bootstrap) UCL	1.314
95% Adjusted Gamma UCL	1.32		

Note: DL/2 is not a recommended method.

Vinyl chloride

General Statistics

Number of Valid Observations	11	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	0.45	Minimum of Log Data	-0.799
Maximum	1.1	Maximum of Log Data	0.0953
Mean	0.64	Mean of log Data	-0.484
Median	0.59	SD of log Data	0.276
SD	0.202		
Coefficient of Variation	0.315		
Skewness	1.618		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.798	Shapiro Wilk Test Statistic	0.875
Shapiro Wilk Critical Value	0.85	Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.75	95% H-UCL	0.757
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.871
95% Adjusted-CLT UCL	0.772	97.5% Chebyshev (MVUE) UCL	0.971
95% Modified-t UCL	0.755	99% Chebyshev (MVUE) UCL	1.169
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	9.833	Data appear Lognormal at 5% Significance Level	
Theta Star	0.0651		
MLE of Mean	0.64		
MLE of Standard Deviation	0.204		
nu star	216.3		
Approximate Chi Square Value (.05)	183.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0278	95% CLT UCL	0.74
Adjusted Chi Square Value	178.3	95% Jackknife UCL	0.75
		95% Standard Bootstrap UCL	0.734
Anderson-Darling Test Statistic	0.741	95% Bootstrap-t UCL	0.908
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	1.376
Kolmogorov-Smirnov Test Statistic	0.259	95% Percentile Bootstrap UCL	0.742
Kolmogorov-Smirnov 5% Critical Value	0.255	95% BCA Bootstrap UCL	0.763
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.905
		97.5% Chebyshev(Mean, Sd) UCL	1.02
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.245
95% Approximate Gamma UCL	0.755		
95% Adjusted Gamma UCL	0.776		
Potential UCL to Use		Use 95% Student's-t UCL	0.75
		or 95% Modified-t UCL	0.755
		or 95% H-UCL	0.757

LOWER LEY CREEK SITE
SYRACUSE, NEW YORK
HUMAN HEALTH RISK ASSESSMENT ADDENDUM

U.S. EPA Work Assignment Number: 0-007
Lockheed Martin Work Order Number: SER0007
U.S. EPA Contract Number: EP-W-09-031

Prepared for:
U.S. EPA/ERT

Prepared by:
Lockheed Martin/SRC/SERAS

_____ _____
Chris Gussman Date
Task Leader

_____ _____
Dennis A. Miller Date
SERAS Program Manager

This page intentionally left blank to facilitate double-sided printing.

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 EXPOSURE ASSESSMENT 2
2.1 Site Conceptual Model 2
2.1.1 Exposure Areas 2
2.1.2 Exposed Populations 2
2.1.3 Exposure Pathways 2
2.2 Selection of Chemicals of Potential Concern 3
2.3 Evaluation of Exposures to Non-Lead Chemicals 3
2.3.1 Exposure Point Concentrations (EPCs) 4
2.3.2 Exposure Parameters 4
2.4 Evaluation of Exposures to Lead 5
2.5 Relative Bioavailability (RBA) 5

3.0 TOXICITY ASSESSMENT 6
3.1 Toxicity Values for Ingestion Exposures 6
3.2 Toxicity Values for Dermal Exposures 6
3.3 Toxicity Values for PCB Mixtures 7

4.0 RISK CHARACTERIZATION 8
4.1 Non-Cancer Summary 8
4.1.1 Recreational Visitor – Adult 8
4.1.2 Recreational Visitor – Older Child (6–<16 years old) 8
4.1.3 Recreational Visitor – Younger Child (<6 years old) 9
4.1.4 Construction Worker – Adult 9
4.2 Cancer Risk Summary 9
4.2.1 Recreational Visitor – Adult 9
4.2.2 Recreational Visitor – Older Child (7–18 years old) 9
4.2.3 Recreational Visitor – Younger Child (1-6 years old) 9
4.2.4 Construction Worker – Adult 10

5.0 UNCERTAINTY ASSESSMENT 11
5.1 Chemicals Not Evaluated 11
5.2 Exposure Pathways Not Evaluated 12
5.3 Exposure Point Concentrations 12
5.4 Chemical Absorption (RBA) 12
5.5 Human Exposure Parameters 13
5.6 Uncertainties in Toxicity Values 13
5.7 Uncertainties in Risk Estimates 13

6.0 REFERENCES 15

7.0 TABLES 17
7.1 Series 1 Tables 18

7.2 Series 2 Tables 21
7.3 Series 3 Tables 32
7.4 Series 4 Tables 36
7.5 Series 5 Tables 46
7.6 Series 6 Tables 48
7.7 Series 7 Tables 50
7.9 Series 9 Tables 68

8.0 FIGURES 77

ACRONYMS AND ABBREVIATIONS

95UCL	95% Upper Confidence Limit
ADAF	age-dependent adjustment factor
ATSDR	Agency for Toxic Substances and Disease Registry
CN	cyanide
COPCs	chemicals of potential concern
CTE	central tendency exposure
EPC	exposure point concentration
ERT	Environmental Response Team
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
MRL	minimal risk level
PCB	polychlorinated biphenyl
PPRTVs	Provisional Peer Reviewed Toxicity Values for Superfund
RAGS	Risk Assessment Guidance for Superfund
RBA	relative bioavailability
RfD	reference dose
RME	reasonable maximum exposure
RSL	regional screening level
SERAS	Scientific Engineering Response and Analytical Services
SF	slope factor
STSC	Superfund Health Risk Technical Support Center
SVOC	semi-volatile organic compound
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

A human health risk assessment (HHRA) was conducted for the Lower Ley Creek Site (USEPA, 2011). The HHRA evaluated surface water, sediment, and fish data collected in 2009, and quantified risks associated with exposure to these media. Since the HHRA was performed, additional sampling was conducted which generated 59 upland soil samples in August 2010 and an additional 44 upland soil samples in late September/early October 2011. The purpose of this document is to evaluate human health risks associated with exposure to these upland soils. This report is structured as an addendum to the original U.S. Environmental Protection Agency (USEPA) (2011) HHRA.

2.0 EXPOSURE ASSESSMENT

This section identifies the potential human exposure pathways and the chemicals of potential concern (COPCs) related to soil exposure at the Lower Ley Creek Site. The soil exposures evaluated in this addendum are in addition to the exposures evaluated in the 2011 HHRA (e.g., direct contact with surface water and sediment).

2.1 Site Conceptual Model

2.1.1 Exposure Areas

For the purposes of this addendum, all soil samples collected during the 2010 and 2011 sampling events are considered as one exposure area. In August 2010, 19 soil boring samples were collected within a swale area just east of location R3-11 (Figure 1). Samples were submitted for analysis of metals, cyanide (CN), and polychlorinated biphenyls (PCBs). Samples were collected at depths of 0–6, 30–36, and 54–60 inches. Soil samples collected in 2011 were all analyzed on-site for PCBs in the Environmental Response Team/Scientific Engineering Response and Analytical Services (ERT/SERAS) Mobile Laboratory. Ten percent of these samples were submitted for full scan analyses (volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], pesticides/PCBs, metals). Only the samples subjected to full scan analyses were utilized in this risk analysis (none of the mobile lab PCB results were used).

2.1.2 Exposed Populations

For the purposes of this addendum, the same receptors evaluated in the 2011 HHRA for exposure to sediment in the Dredge Spoils Area were considered. These include potential recreational users who may visit the site now or in the future and hypothetical future construction workers. A summary of the receptor groups considered for inclusion in this addendum is presented in Table 1.1, along with a brief rationale for their inclusion/exclusion.

2.1.3 Exposure Pathways

Recreational users (both adults and children) and future construction workers are the primary receptor groups evaluated in the 2011 HHRA and in this addendum. Potential soil exposure routes are incidental ingestion and dermal contact. It is assumed that recreational visitors may be exposed primarily to contaminants found within the top 2 feet of soil (subsequently referred to as

"surface soil"), while future construction workers may be exposed to contaminants found within the top 8 feet of soil (subsequently referred to as "subsurface soil").

Although the focus of this addendum is exposure to soils, it is possible that a receptor may be exposed to both soils and sediments at the site. Sediment exposures were evaluated in the 2011 HHRA using primarily soil exposure factors (e.g., incidental ingestion rate in mg/day). To address the potential for cumulative exposures to soil and sediments, in addition to calculating exposure for 100% soil, this addendum also evaluates the following scenarios for apportioning total exposure between soil and sediments:

- 75% soil exposure, 25% sediment exposure
- 50% soil exposure, 50% sediment exposure
- 25% soil exposure, 75% sediment exposure

Additional information on exposure pathways evaluated in this addendum is presented in Table 1.1.

2.2 Selection of Chemicals of Potential Concern

The USEPA Risk Assessment Guidance for Superfund (RAGS) Part D Table 2 series (Tables 2.1 and 2.2 for surface and subsurface soils, respectively) summarizes the analytical data used to identify COPCs for this risk assessment. As noted previously, these data were collected in August 2010 and September/October2011. COPCs are identified based on a screening analysis that uses the USEPA (2011) regional screening levels (RSLs)[1]. Similar to the 2011 HHRA, chemicals were selected as COPCs if their maximum detected concentration is greater than the relevant RSL and their detection frequency is greater than 5%. In addition, all chemicals classified as category A/known human carcinogens were selected as COPCs. Additional information about the screening process and decision criteria used to select COPCs are provided in the tables and associated footnotes.

2.3 Evaluation of Exposures to Non-Lead Chemicals

[1] The most recent update of the USEPA Regional Screening Level Table from April 2012 was used for this addendum.

The same approach for ingestion and dermal exposures as outlined in Section 3.3.1 of the 2011 HHRA was followed for this addendum.

2.3.1 Exposure Point Concentrations (EPCs)

USEPA (1992) recommends that the 95% upper confidence limit (95UCL) of the arithmetic mean at each exposure point be used when calculating exposure and risk at that location. The appropriate approach to calculate a 95UCL depends on a number of factors, including the number of data points available, the shape of the distribution of the values, and the degree of censoring (i.e., samples below the detection limit) (USEPA 2002). Because of the complexity of this process, USEPA (2010) developed a software application called ProUCL v4.1 to assist in the estimation of 95UCL values. ProUCL calculates 95UCLs for a data set using several different strategies and recommends which 95UCL is preferred based on the properties of the data set. A minimum of five samples and distinct detected values is required to calculate 95UCLs in ProUCL. If the minimum data requirements for ProUCL are not met, the exposure point concentration (EPC) is set equal to the maximum detected value. If ProUCL provides more than one "recommended" 95UCL to use (e.g., Chebyshev or Bootstrap), the higher recommended value is used as the EPC.

The USEPA RAGS D Table 3 series (Tables 3.1 and 3.2 for surface and subsurface soils, respectively) summarizes the EPCs used in this addendum. Appendix A includes the output files generated by the ProUCL software.

2.3.2 Exposure Parameters

As described in the 2011 HHRA, both central tendency exposure (CTE) and reasonable maximum exposure (RME) are evaluated in this addendum. The same exposure parameters used in the 2011 HHRA to evaluate recreational exposure to sediments in the Dredge Spoils Area were used in this addendum to evaluate recreational exposure to soils. Similarly, exposure parameters for future construction workers were the same as those used in the 2011 HHRA for sediments in the Dredge Spoils Area, except that longer exposure frequencies were assumed for soils than sediments. The USEPA RAGS Part D Table 4 Series Tables (Tables 4.1 through 4.7) summarize the exposure factors used to quantify risks in this addendum.

2.4 Evaluation of Exposures to Lead

As described in the 2011 HHRA, potential health effects of lead are evaluated differently from other compounds in accordance with USEPA (1994, 2003a) guidance. The EPC for lead is calculated as the arithmetic mean of the detected concentrations for each dataset. The arithmetic mean lead concentrations in surface soils (122 mg/kg, Table 3.1) and subsurface soils (99 mg/kg, Table 3.2) are less than the USEPA RSLs for residential (400 mg/kg) and commercial/industrial (800 mg/kg) land uses. As such, lead is not considered a COPC for this assessment and is not evaluated further in this addendum.

2.5 Relative Bioavailability (RBA)

An accurate assessment of human exposure to ingested chemicals requires knowledge of the amount of chemical absorbed from the gastrointestinal tract into the body from site media compared to the amount of absorption that occurred in the toxicity studies used to derive the toxicity factors. This ratio (amount absorbed from site media compared to the amount absorbed in toxicity tests) is referred to as Relative Bioavailability (RBA).

Accounting for RBA is particularly important for ingested metals. In general, metals in soil or sediment exist in the form of mineral particles that are not rapidly solubilized in gastrointestinal fluids when ingested, while toxicity studies often utilize readily soluble forms of the test chemical. In the absence of data to the contrary, USEPA (1989) recommends assuming equal bioavailability of a chemical in soil, diet and water (i.e., RBA = 1.0). Data are limited or absent for most chemicals (aside from lead). Therefore, RBA values are set to 100% for this assessment. This is considered to be a conservative (i.e., health-protective) assumption.

3.0 TOXICITY ASSESSMENT

3.1 Toxicity Values for Ingestion Exposures

USEPA (2003b) describes the recommended hierarchy for selecting toxicity values for use in human health risk assessment at Superfund sites. Generally, the first preference is for USEPA consensus values as listed in the Integrated Risk Information System (IRIS), an electronic database containing human health assessments for various chemicals (available online at http://www.epa.gov/iris/). If values are not available from IRIS, then the next preference is to seek Provisional Peer Reviewed Toxicity Values for Superfund (PPRTVs) developed by USEPA's Superfund Health Risk Technical Support Center (STSC). If PPRTVs are not available, toxicity values may be obtained from other sources, such as the Agency for Toxic Substances and Disease Registry's (ATSDR) minimal risk levels (MRLs) (available online at http://www.atsdr.cdc.gov/mrls/index.asp), California EPA's Toxicity Criteria Database (available online at http://www.oehha.ca.gov/risk/ChemicalDB/index.asp), and USEPA's Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997).

These toxicity values used in this addendum are compiled from the "Regional Screening Levels for Chemical Contaminants at Superfund Sites" tables (USEPA 2012) that are developed and maintained by the Department of Energy Oak Ridge National Laboratory under an interagency agreement with USEPA.

Tables 5.1 and 6.1 summarize the non-cancer and cancer oral toxicity values used for evaluating human health risks from chemicals in soils at the Lower Ley Creek Site for this addendum. There are several COPCs for which toxicity values are not available. As appropriate, these COPCs were evaluated qualitatively in Section 5.

3.2 Toxicity Values for Dermal Exposures

Oral toxicity factors are expressed in terms of toxicity per unit dose of chemical ingested, rather than in terms of toxicity per unit amount of chemical absorbed. However, the equations for characterizing dermal contact with chemicals provide exposure values that are based on absorbed dose rather than ingested dose. Thus, oral reference dose (RfD) and slope factor (SF) values must be adjusted for use in evaluating dermal exposures as follows:

$$RfD(dermal) = RfD(oral) \cdot \text{Oral absorption fraction}$$

$$SF(dermal) = SF(oral) / \text{Oral absorption fraction}$$

Table 5-1 lists the absorption fractions (ABS_{GI}) used to adjust oral toxicity values for use in assessing dermal exposure, as recommended by USEPA (2004). If chemical-specific absorption fractions were not available, a value of 1.0 was assumed consistent with USEPA (2004) guidance.

3.3 Toxicity Values for PCB Mixtures

PCBs consist of 209 individual congeners. Aroclors are commercial mixtures of PCB congeners that contain many of the individual congeners in varying ratios. When Aroclors are released into the environment, the original congener composition of the PCB mixture changes due to differential fate and transport processes. Chemical analyses of environmental samples often report PCB concentrations in terms of the Aroclor mixture(s) they most closely resemble. USEPA has developed RfDs for some (but not all) Aroclors, and when corresponding RfDs are available, the Aroclor-specific concentration data were compared to the Aroclor-specific RfD to assess potential non-cancer effects as described previously. However, RfD values are not available for the Aroclors identified as COPCs in soils for this assessment (Aroclors 1248 and 1260). For the purposes of this addendum, the RfD for Aroclor 1254 (2E-05 mg/kg-day) is used as a surrogate for higher chlorinated Aroclors to assess the non-cancer risk associated with direct contact exposure to Aroclors 1248 and 1260 in soil. The cancer potency of PCB mixtures is assessed using the USEPA SF of 2 $(mg/kg\text{-}day)^{-1}$, which is applied to the total PCB (total Aroclor) concentration data to assess PCB risks.

4.0 RISK CHARACTERIZATION

The non-cancer and cancer approaches for characterizing human health risks are the same as described in Section 5 of the 2011 HHRA. Additionally, chemicals identified as having a mutagenic mode of action for carcinogenesis were evaluated in accordance with USEPA (2005) by applying age-dependent adjustment factors (ADAFs) as described in the 2011 HHRA.

USEPA RAGS D Series 7 Tables (Tables 7.1 through 7.5) summarize the cancer risks and non-cancer hazard quotients (HQs) for the CTE and RME receptors evaluated in this addendum based on direct contact exposure to upland soils.

For non-carcinogenic effects, an initial estimate of the total non-cancer risk is derived simply by summing the HQ values across all chemicals to calculate a hazard index (HI). If the HI is less than 1, non-cancer risks are not considered to be significant. If the HI is greater than 1, then it may be appropriate to examine individual chemical HQs and only sum HQs for COPCs that affect the same target tissue or organ system (e.g., the liver). This approach would produce HIs for chemicals that affect the same target organs and have the same mode of action, consistent with USEPA (1989) guidance because chemicals that only cause toxicity in different tissues are not likely to produce additive effects. Target-organ-specific Hi values for risks from direct contact with upland soils are presented in the RAGS D Series 9 Tables for those chemicals for which target organ information was readily available.

4.1 Non-Cancer Summary

4.1.1 Recreational Visitor – Adult

The total HI for the adult recreational visitor is equal to 1 for the RME scenario and less than 1 for the CTE scenario, with an HI value of 0.4.

4.1.2 Recreational Visitor – Older Child (6-<16 years old)

The total HI for the older child recreational visitor is greater than 1 for the RME scenario, with an HI value of 11. The HI value for the CTE older child recreational visitor is 0.5. Dermal exposure to Aroclor 1248 is the primary risk driver contributing to the exceedance for the RME receptor.

4.1.3 Recreational Visitor – Younger Child (<6 years old)

The total HI for the younger child recreational visitor is greater than 1 for both the RME and CTE scenarios, with HI values of 24 and 2, respectively. For the RME scenario, the exceedance is primarily due to direct contact (ingestion and dermal contact) with Aroclor 1248 in the soil. For the CTE scenario, the exceedance is primarily due to exposure via ingestion of soil, with Aroclor 1248 as the primary risk driver and to a lesser extent chromium and cadmium. However, because Aroclor 1248, chromium, and cadmium do not act on the same target tissues, evaluated independently, no target organ HI exceeds 1 (see Table 9.3b).

4.1.4 Construction Worker – Adult

The total HI for the adult construction worker is greater than 1 for both the RME and CTE scenarios, with HI values of 7 and 2, respectively. The exceedances are primary due to direct contact (ingestion and dermal contact) with Aroclor 1248 in soil.

4.2 Cancer Risk Summary

4.2.1 Recreational Visitor – Adult

The total cancer risk for the adult recreational visitor is 1E-05 for the CTE scenario and 1E-04 for the RME scenario. The primary risk drivers are chromium via ingestion and benzo(a)pyrene via dermal exposure to soil.

4.2.2 Recreational Visitor – Older Child (7-18 years old)

The total cancer risk for the older child recreational visitor is 3E-05 for the CTE scenario and 8E-04 for the RME scenario. The primary risk driver is benzo(a)pyrene via dermal exposure to soil.

4.2.3 Recreational Visitor – Younger Child (1-6 years old)

The total cancer risk for the young child recreational visitor is 1E-04 for the CTE scenario and 2E-03 for the RME scenario. The primary risk driver is benzo(a)pyrene via ingestion and dermal exposures to soil, and to a lesser extent dibenzo(a,h)anthracene via dermal exposure.

4.2.4 Construction Worker – Adult

The total cancer risk for the adult construction worker is 1E-05 for the CTE scenario and 4E-05 for the RME scenario. The primary risk driver is chromium via ingestion of soil.

4.3 Risks from exposure to both soils and sediments

Cancer risks and non-cancer HQs associated with exposure to sediments are summarized in Section 5 of the 2011 HHRA. Cancer risks and non-cancer HQs for exposure to upland soils at the site are summarized above in Sections 4.1 and 4.2. However, as described in Section 2, it is likely that recreational visitors to the site may be exposed to both upland soils and creek sediments. Appendix B tables B.1 through B.4 summarize the cancer risks and non-cancer HQs for the CTE and RME recreational receptors based on varying proportions of exposure to soils and sediments as outlined in Section 2.

Exposure to only soils or only sediments results in cancer risk estimates above 1E-04 for the RME older child and the RME young child, and non-cancer HI estimates greater than 1 for the RME older child and both the CTE and RME young child (see Table B.1). These exceedances remain consistent for all of the combined soil/sediment exposure percentages.

5.0 UNCERTAINTY ASSESSMENT

Quantitative evaluation of human health risks due to environmental contamination is frequently limited by uncertainty regarding a number of key inputs, including chemical concentrations in the environment, the true level of human contact with contaminated media, and the true dose-response relationships for non-cancer and cancer effects in humans. This uncertainty is usually addressed by making assumptions or estimates for uncertain parameters based on available information. Because of these assumptions and estimates, the results of risk calculations are themselves uncertain, and it is important for risk managers and the public to keep this in mind when interpreting the results of a risk assessment. The following sections review the main sources of uncertainty in the risk calculations performed for the Lower Ley Creek Site within this addendum.

5.1 Chemicals Not Evaluated

As discussed above, exposure and risk were quantified only for a selected subset (the COPCs) of chemicals detected in environmental media. None of the soil samples evaluated in this addendum were evaluated for dioxins, furans, or PCB congeners. However, as demonstrated in the 2011 HHRA, human health risks associated with exposures to these chemicals in sediment were below a level of concern. Thus, omission of dioxins and dioxin-like chemicals in this analysis likely does not significantly impact total risks.

As described in Section 2, lead was not retained as a COPC as the mean lead concentrations in surface samples (122 mg/kg) and sub-surface samples (99 mg/kg) were well below the residential screening level of 400 mg/kg. There were 2 of 52 samples that had lead concentrations above the residential screening level (463 and 575 mg/kg). These samples were collected at sampling points 1 (at a depth of 1-2 feet) and 2 (at a depth of 0-1 feet) near Highway 81 as shown in Figure 2, and may thus be due to non-Lower Ley Creek-site-related sources of lead in the area. Therefore, while omission of lead might underestimate total risk, this is not a significant source of uncertainty. (Note: unlike other COPCs, the evaluation of lead risks is based on average rather than RME concentrations, and the average lead concentration is below a level of concern.)

While omission of other chemicals might tend to underestimate total risks, this is not a significant source of uncertainty because the chemicals that were excluded were present at concentrations well below a level of concern.

Additionally, toxicity factors are needed to quantify risks from exposure to chemicals detected in environmental media. Toxicity factors are not available for some of the chemicals detected in the soil at the Lower Ley Creek Site. The omission of these chemicals might tend to underestimate total risks.

5.2 Exposure Pathways Not Evaluated

As discussed above, humans may be exposed to site-related chemicals by a number of pathways, but not all of these pathways were evaluated quantitatively in this risk assessment (see Table 1.1). In most cases, this is because the contribution of the pathway omitted is believed to be minor compared to one or more other pathways that were evaluated. In these cases, omission of the minor pathways will result in a small underestimation of exposure and risk, but the magnitude of this underestimation is not expected to be significant.

For example, VOC contents of sediments and surface water are low, whereby off-gassing from exposed sediment or surface water is expected to be minor compared to presumptive oral exposure. Therefore, the inhalation pathway is not evaluated in this risk assessment.

5.3 Exposure Point Concentrations

USEPA (1989, 1992) recommends that the EPC estimate be based on the 95UCL of the mean. This approach ensures that the “true” EPC is unlikely to be greater than the estimated EPC used in risk calculations. At this site, the data for soils are of sufficient quantity and quality that the 95UCL of the mean is similar to, or only moderately larger than, the sample mean, so this source of uncertainty is relatively minor.

5.4 Chemical Absorption (RBA)

The risk from an ingested chemical depends on how much of the ingested chemical is absorbed from the gastrointestinal tract into the body. This issue is especially important for metals in soil and/or sediment, because some of the metals may exist in poorly absorbable forms, and failure to account for this may result in a substantial overestimation of exposure and risk. In the absence of data, the default approach is to assume that the RBA is 100% for all metals. Use of this default assumption is likely to overestimate the true risk with the magnitude of the error depending on the true RBA value.

5.5 Human Exposure Parameters

Many of the required exposure parameters used to calculate exposure doses/intakes are not known with certainty and must be estimated from limited data or knowledge. For example, the amount of soil, sediment, and surface water ingested by recreational visitors are estimates often based on professional judgment. In general, when exposure data were limited or absent, the exposure parameters were chosen in a way that was intended to be conservative (health-protective). This approach is intended to produce results that are more likely to overestimate than underestimate actual exposure and risk.

5.6 Uncertainties in Toxicity Values

Toxicity information for many chemicals is often limited. Consequently, there are varying degrees of uncertainty associated with toxicity values (i.e., cancer SFs, RfDs). For example, uncertainties can arise from the following sources:

- Extrapolation from animal studies to humans
- Extrapolation from high dose to low dose
- Extrapolation from continuous exposure to intermittent exposure
- Limited or inconsistent toxicity studies

USEPA intentionally uses conservative approaches to develop toxicity factors to ensure that any uncertainties are more likely to result in an overestimation rather than an underestimation of risk.

Since RfD values are not currently available for Aroclors 1248 or 1260, the RfD for Aroclor 1254 was used as a surrogate representative of higher chlorinated Aroclors.

5.7 Uncertainties in Risk Estimates

Because risk estimates for a chemical are derived by combining uncertain estimates of exposure and toxicity (see above), the risk estimates for each chemical are more uncertain than either the exposure estimate or the toxicity estimate alone. Additional uncertainty arises from the issue of how to combine risk estimates across different chemicals. In some cases, the effects caused by one chemical do not influence the effects caused by other chemicals. In other cases, the effects of one chemical may interact with effects of other chemicals, causing responses that are approximately additive, greater than additive (synergistic), or less than additive (antagonistic).

In most cases, available toxicity data are not sufficient to define what type of interaction is expected, so USEPA generally assumes that effects are additive for carcinogens that act on all target organs/tissues and for non-carcinogens that act on the same target organ/tissue.

The purpose of this addendum was to evaluate risk from direct contact with upland soils. The 2011 HHRA previously evaluated risk from direct contact with sediments. However, it is likely that visitors to the site will be exposed to both soils and sediments during recreational activities. Therefore, risk estimates based on assuming 100% exposure to soils or 100% exposure to sediments may not reflect actual risks. To address this possibility, risk estimates were calculated by apportioning exposure between soils and sediments at various rates (see Section 2). As shown in Appendix B (Tables B.1 through B.4), risk estimates are above a level of concern for the older child and young child RME scenarios independent of how exposure is apportioned between soils and sediments.

6.0 REFERENCES

USEPA (U.S. Environmental Protection Agency). (1989) Risk assessment guidance for Superfund (RAGS). Vol I. Human health evaluation manual (part A). U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA (U.S. Environmental Protection Agency). (1992) Supplemental guidance to RAGS: calculating the concentration term. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. 9285.7-081.

USEPA (U.S. Environmental Protection Agency). (1994) Guidance manual for the integrated exposure uptake biokinetic model for lead in children. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. Publication Number 9285.7-15-1. EPA/540/R-93/081.

USEPA (U.S. Environmental Protection Agency). (1997) Health effects assessment summary tables. FY 1997 Update. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Washington, DC. EPA-540-R-97-036.

USEPA (U.S. Environmental Protection Agency). (2002) Calculating upper confidence limits for exposure point concentrations at hazardous waste sites. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response.OSWER 9285.6-10.

USEPA (U.S. Environmental Protection Agency). (2003a) Recommendations of the technical review workgroup for lead for an interim approach to assessing risks associated with adult exposures to lead in soil. EPA-540-R-03-001.

USEPA (U.S. Environmental Protection Agency). (2003b) Human health toxicity values in Superfund risk assessments. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. OSWER Directive 9285.7-53.

USEPA (U.S. Environmental Protection Agency). (2004) Risk assessment guidance for Superfund (RAGS). Vol 1: human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Final. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA/540/R/99/005.

USEPA (U.S. Environmental Protection Agency). (2005) Supplemental guidance for assessing susceptibility from early-life exposure to carcinogens. U.S. Environmental Protection Agency, Washington, DC. EPA/630/R-03/003F. Available online at http://epa.gov/ttn/atw/childrens_supplement_final.pdf (accessed September 2012)

USEPA (U.S. Environmental Protection Agency). (2010) ProUCL Version 4.1 User Guide (Draft). EPA/600/R-07/041. Available online at http://www.epa.gov/osp/hstl/tsc/software.htm (accessed September 2012)

USEPA (U.S. Environmental Protection Agency). (2011) Draft report Lower Ley Creek Site human health risk assessment. Syracuse, New York. Prepared for U.S. EPA/ERT by Lockheed Martin/SERAS.

USEPA (U.S. Environmental Protection Agency). (2012) Regional screening levels for chemical contaminants at Superfund sites. Summary tables. Last updated April 2012; accessed May 2012. Available online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/ (accessed September 2012)

7 TABLES

7.1 Series 1 Tables

TABLE 1.1
SELECTION OF EXPOSURE PATHWAYS
Lower Ley Creek[a] Human Health Risk Assessment Addendum

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Soil	Upland soils to a depth of 2 feet[b]	Lower Ley Creek	Resident	Adult	Dermal Ingestion	On-Site	None	Residential populations are not evaluated in the RA due to lack of current residential use and unlikely future development for residential use.
						Inhalation	On-Site	None	No residential structures exist or are likely to be built in the future and concentrations of VOCs in soil are low, indicating that the inhalation pathway is unlikely.
					Child [c] (< 6 yrs)	Dermal Ingestion	On-Site	None	Residential populations are not evaluated in the RA due to lack of current residential use and unlikely future development for residential use.
					(6-16 yrs)	Inhalation	On-Site	None	No residential structures exist or are likely to be built in the future and concentrations of VOCs in soil are low, indicating that the inhalation pathway is unlikely.
				Recreational visitor	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated soil during hiking or other recreational activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of soils is low; off-gassing from exposed soil is expected to be negligible.
					Child [c] (< 6 yrs)	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated soils during hiking or other recreational activities is possible, and therefore is quantified in the risk assessment.
					(6-16 yrs)	Inhalation	On-Site	None	VOC content of soils is low; off-gassing from exposed soil is expected to be negligible.
		Upland soils to a depth of 8 feet[b]		Construction worker (future)	Adult	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated soils during construction activities is possible; oral and dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of soils is low; off-gassing from excavated soil is expected to be negligible.
	Soil and sediment[d]	Upland soils to a depth of	Lower Ley Creek	Recreational visitor	Adult	Dermal	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated soil and sediment during hiking or other recreational activities is possible; oral and

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
		2 feet and sediments to a depth of 12 inches	(soils) and Dredge Spoils Area (sediments)			Ingestion			dermal pathways are quantified in the risk assessment.
						Inhalation	On-Site	None	VOC content of soils is low; off-gassing from exposed soil is expected to be negligible.
					Child [c] (< 6 yrs)	Dermal Ingestion	On-Site	Quantitative	Dermal contact with and incidental ingestion of contaminated soils and sediments during hiking or other recreational activities is possible, and therefore is quantified in the risk assessment.
					(6-16 yrs)	Inhalation	On-Site	None	VOC content of soils is low; off-gassing from exposed soil is expected to be negligible.

[a] In accordance with NYCRR Part 895.3, Ley Creek would be considered a Class B stream, and therefore considered a protected stream. Access to this site is unrestricted, and the property is next to a public thoroughfare.

[b] Exposure to the soils in Lower Ley Creek will be evaluated based on collection depth for individual receptors; it is assumed that recreational visitors will be exposed to surface soils (soil samples collected from the top 2 feet), and potential future construction workers will be exposed to subsurface soils (soil samples collected from the top 8 feet).

[c] Separate risks will be evaluated for a young child (<6 years) and an older child (6-16 years).

7.2 Series 2 Tables

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-2 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil[a]		COPC Flag	Rationale for Selection[b]
75-34-3	1,1 Dichloroethane							0 / 28	0.003 / 0.03		3.3	C	N	ND
630-20-6	1,1,1,2-Tetrachloroethane							0 / 27	0.003 / 0.02		1.9	C	N	ND
71-55-6	1,1,1-Trichloroethane							0 / 28	0.003 / 0.03		870	NC	N	ND
79-34-5	1,1,2,2-Tetrachloroethane							0 / 27	0.003 / 0.02		0.56	C	N	ND
79-00-5	1,1,2-Trichloroethane							0 / 28	0.003 / 0.03		1.1	C	N	ND
75-35-4	1,1-Dichloroethene							0 / 28	0.003 / 0.03		24	NC	N	ND
563-58-6	1,1-Dichloropropene							0 / 28	0.003 / 0.03				N	ND
87-61-6	1,2,3-Trichlorobenzene							0 / 27	0.003 / 0.02		4.9	NC	N	ND
96-18-4	1,2,3-Trichloropropane							0 / 27	0.003 / 0.02		0.005	C	N	ND
120-82-1	1,2,4-Trichlorobenzene							0 / 55	0.003 / 2.19		22	C	N	ND
95-63-6	1,2,4-Trimethylbenzene							0 / 27	0.003 / 0.02		6.2	NC	N	ND
96-12-8	1,2-Dibromo-3-Chloropropane							0 / 27	0.003 / 0.02		0.0054	C	N	ND
106-93-4	1,2-Dibromoethane							0 / 28	0.003 / 0.03		0.034	C	N	ND
95-50-1	1,2-Dichlorobenzene							0 / 55	0.003 / 2.19		190	NC	N	ND
107-06-2	1,2-Dichloroethane							0 / 28	0.003 / 0.03		0.43	C	N	ND
78-87-5	1,2-Dichloropropane							0 / 28	0.003 / 0.03		0.94	C	N	ND
108-67-8	1,3,5-Trimethylbenzene							0 / 27	0.003 / 0.02		78	NC	N	ND
541-73-1	1,3-Dichlorobenzene							0 / 55	0.003 / 2.19				N	ND
142-28-9	1,3-Dichloropropane							0 / 28	0.003 / 0.03		160	NC	N	ND
106-46-7	1,4-Dichlorobenzene	0.0015	J	0.14	J	mg/kg	LLCD17	2 / 55		0.14	2.4	C	N	BSL
594-20-7	2,2-Dichloropropane							0 / 28	0.003 / 0.03				N	ND
95-95-4	2,4,5-Trichlorophenol							0 / 28	0.183 / 2.19		610	NC	N	ND
88-06-2	2,4,6-Trichlorophenol							0 / 28	0.183 / 2.19		44	C	N	ND
120-83-2	2,4-Dichlorophenol							0 / 28	0.183 / 2.19		18	NC	N	ND
105-67-9	2,4-Dimethylphenol							0 / 28	0.183 / 2.19		120	NC	N	ND
51-28-5	2,4-Dinitrophenol							0 / 28	0.183 / 2.19		12	NC	N	ND
121-14-2	2,4-Dinitrotoluene							0 / 28	0.183 / 2.19		1.6	C	N	ND
606-20-2	2,6-Dinitrotoluene							0 / 28	0.183 / 2.19		6.1	NC	N	ND
78-93-3	2-Butanone	0.00449		0.38	J	mg/kg	LLCD27	27 / 28		0.38	2800	NC	N	BSL
91-58-7	2-Chloronaphthalene							0 / 28	0.183 / 2.19		630	NC	N	ND
95-57-8	2-Chlorophenol							0 / 28	0.183 / 2.19		39	NC	N	ND
95-49-8	2-Chlorotoluene							0 / 27	0.003 / 0.015		160	NC	N	ND
591-78-6	2-Hexanone							0 / 27	0.003 / 0.015		21	NC	N	ND
91-57-6	2-Methylnaphthalene	0.0765	J	2.51		mg/kg	LLCD02	11 / 28		2.51	23	NC	N	BSL
95-48-7	2-Methylphenol							0 / 28	0.183 / 2.19		310	NC	N	ND
88-74-4	2-Nitroaniline							0 / 28	0.183 / 2.19		61	NC	N	ND
88-75-5	2-Nitrophenol							0 / 28	0.183 / 2.19				N	ND
91-94-1	3,3'-Dichlorobenzidine							0 / 28	0.183 / 2.19		1.1	C	N	ND
99-09-2	3-Nitroaniline							0 / 28	0.183 / 2.19				N	ND
534-52-1	4,6-Dinitro-2-methylphenol							0 / 9	0.187 / 1.28		0.49	NC	N	ND

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-2 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil[a]		COPC Flag	Rationale for Selection[b]
101-55-3	4-Bromophenyl-phenylether							0 / 28	0.183 / 2.19				N	ND
59-50-7	4-Chloro-3-methylphenol							0 / 28	0.183 / 2.19		610	NC	N	ND
106-47-8	4-Chloroaniline							0 / 28	0.183 / 2.19		2.4	C	N	ND
7005-72-3	4-Chlorophenyl-phenylether							0 / 28	0.183 / 2.19				N	ND
106-43-4	4-Chlorotoluene							0 / 27	0.003 / 0.015		160	NC	N	ND
108-10-1	4-Methyl-2-Pentanone							0 / 27	0.003 / 0.015		530	NC	N	ND
106-44-5	4-Methylphenol	0.0549	J	0.05	J	mg/kg	LLCD17	1 / 28		0.05	610	NC	N	BSL
100-01-6	4-Nitroaniline	0.0648	J	0.06	J	mg/kg	LLCD17	1 / 28		0.06	24	C	N	BSL
100-02-7	4-Nitrophenol							0 / 28	0.183 / 2.19				N	ND
83-32-9	Acenaphthene	0.0751	J	2.25	J	mg/kg	LLCD02	11 / 28		2.25	340	NC	N	BSL
208-96-8	Acenaphthylene	0.0667	J	7.84		mg/kg	LLCD02	22 / 28		7.84	170	NC[d]	N	BSL
67-64-1	Acetone	0.0324		2.03	J	mg/kg	LLCD27	28 / 28		2.03	6100	NC	N	BSL
309-00-2	Aldrin							0 / 33	0.0181 / 0.0833		0.029	C	N	ND
319-84-6	Alpha-BHC							0 / 33	0.0181 / 0.0833		0.077	C	N	ND
5103-71-9	Alpha-Chlordane	0.00797	J	0.0493		mg/kg	LLCD29	5 / 33		0.0493			N	NV
7429-90-5	Aluminum	3890		15300		mg/kg	LLCD01	33 / 33		15300	7700	NC	Y	ASL
120-12-7	Anthracene	0.137	J	14.9		mg/kg	LLCD02	22 / 28		14.9	1700	NC	N	BSL
7440-36-0	Antimony	0.991		19.6		mg/kg	LLCD14	9 / 33		19.6	3.1	NC	Y	ASL
7440-38-2	Arsenic	2.59		17.4		mg/kg	LLCD02	33 / 33		17.4	0.39	C	Y	ASL
7440-39-3	Barium	20.6		431	J	mg/kg	LLCD13	33 / 33		431	1500	NC	N	BSL
71-43-2	Benzene	0.00119	J	0.06		mg/kg	LLCD17	6 / 28		0.06	1.1	C	Y	HC
56-55-3	Benzo(a)anthracene	0.0816	J	36.2		mg/kg	LLCD02	25 / 28		36.2	0.15	C	Y	ASL
50-32-8	Benzo(a)pyrene	0.0593	J	27.4		mg/kg	LLCD02	27 / 28		27.4	0.015	C	Y	ASL
205-99-2	Benzo(b)fluoranthene	0.0636	J	29.1		mg/kg	LLCD02	26 / 28		29.1	0.15	C	Y	ASL
191-24-2	Benzo(g,h,i)perylene	0.0963	J	16		mg/kg	LLCD02	25 / 28		16	170	NC[d]	N	BSL
207-08-9	Benzo(k)fluoranthene	0.0895	J	20.9		mg/kg	LLCD02	25 / 28		20.9	1.5	C	Y	ASL
100-51-6	Benzyl alcohol							0 / 28	0.183 / 2.19		610	NC	N	ND
7440-41-7	Beryllium	0.22	J	3.61		mg/kg	LLCD28	32 / 33		3.61	16	NC	N	BSL
319-85-7	Beta-BHC							0 / 33	0.018 / 0.0833		0.27	C	N	ND
111-91-1	Bis-(2-chloroethoxy) methane							0 / 28	0.183 / 2.19		18	NC	N	ND
111-44-4	Bis-(2-chloroethyl) ether							0 / 28	0.183 / 2.19		0.21	C	N	ND
108-60-1	Bis-(2-chloroisopropyl) ether							0 / 28	0.183 / 2.19		4.6	C	N	ND
117-81-7	Bis-(2-ethylhexyl) phthalate	0.0547	J	0.71	J	mg/kg	LLCD28	13 / 28		0.71	35	C	N	BSL
108-86-1	Bromobenzene							0 / 27	0.003 / 0.015		30	NC	N	ND
75-27-4	Bromodichloromethane							0 / 28	0.003 / 0.0326		0.27	C	N	ND
75-25-2	Bromoform							0 / 28	0.011 / 0.06		62	C	N	ND
74-83-9	Bromomethane	0.00158	J	0.002	J	mg/kg	LLCD40	1 / 27		0.002	0.73	NC	N	BSL
85-68-7	Butylbenzylphthalate	1.1	J	1.1	J	mg/kg	LLCD28	1 / 28		1.1	260	C	N	BSL
7440-43-9	Cadmium	0.067	J	337		mg/kg	LLCD28	25 / 33		337	7	NC	Y	ASL
7440-70-2	Calcium	1150	J	189000		mg/kg	LLCD17	28 / 33		189000			N	EN

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-2 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil[a]		COPC Flag	Rationale for Selection[b]
86-74-8	Carbazole	0.0575	J	3.23		mg/kg	LLCD02	18 / 28		3.23			N	FD
75-15-0	Carbon Disulfide	0.0125	J	0.05		mg/kg	LLCD35	5 / 28		0.05	82	NC	N	BSL
56-23-5	Carbon Tetrachloride							0 / 28	0.003 / 0.0326		0.61	C	N	ND
108-90-7	Chlorobenzene							0 / 27	0.003 / 0.015		29	NC	N	ND
75-00-3	Chloroethane							0 / 27	0.003 / 0.0326		1500	NC	N	ND
67-66-3	Chloroform							0 / 28	0.003 / 0.0326		0.29	C	N	ND
74-87-3	Chloromethane							0 / 27	0.003 / 0.0326		12	NC	N	ND
7440-47-3	Chromium	8.1		1320	J	mg/kg	LLCD28	33 / 33		1320	0.29	C[c]	Y	ASL
218-01-9	Chrysene	0.0659	J	36.7		mg/kg	LLCD02	26 / 28		36.7	15	C	Y	ASL
156-59-2	cis-1,2-Dichloroethene	0.00252	J	0.003	J	mg/kg	LLCD28	3 / 28		0.003	16	NC	N	BSL
10061-01-5	cis-1,3-Dichloropropene							0 / 28	0.003 / 0.0326				N	ND
7440-48-4	Cobalt	3.61		12.2		mg/kg	LLCD35	33 / 33		12.2	2.3	NC	Y	ASL
7440-50-8	Copper	13.3		731		mg/kg	LLCD28	33 / 33		731	310	NC	Y	ASL
57-12-5	Cyanide	0.25	J-	0.6	J-	mg/kg	T3A	5 / 5		0.6	4.7	NC	N	BSL
319-86-8	Delta-BHC							0 / 33	0.018 / 0.0833				N	ND
53-70-3	Dibenzo(a,h)anthracene	0.103	J	6.4		mg/kg	LLCD02	20 / 28		6.4	0.015	C	Y	ASL
132-64-9	Dibenzofuran	0.0613	J	2.24		mg/kg	LLCD02	10 / 28		2.24	7.8	NC	N	BSL
124-48-1	Dibromochloromethane							0 / 28	0.011 / 0.131		0.68	C	N	ND
74-95-3	Dibromomethane							0 / 28	0.003 / 0.0326		2.5	NC	N	ND
75-71-8	Dichlorodifluoromethane							0 / 27	0.003 / 0.0326		9.4	NC	N	ND
60-57-1	Dieldrin							0 / 33	0.018 / 0.0833		0.03	C	N	ND
84-66-2	Diethylphthalate							0 / 28	0.183 / 2.19		4900	NC	N	ND
131-11-3	Dimethylphthalate							0 / 28	0.183 / 2.19				N	ND
84-74-2	Di-n-butylphthalate	0.103	J	0.157	J	mg/kg	LLCD25	2 / 28		0.157	610	NC	N	BSL
117-84-0	Di-n-octylphthalate							0 / 28	0.183 / 2.19				N	ND
959-98-8	Endosulfan (I)							0 / 33	0.018 / 0.0833				N	ND
33213-65-9	Endosulfan (II)							0 / 33	0.018 / 0.0833				N	ND
1031-07-8	Endosulfan sulfate							0 / 33	0.018 / 0.0833				N	ND
72-20-8	Endrin	0.0219	J	0.084		mg/kg	LLCD35	4 / 33		0.084	1.8	NC	N	BSL
7421-93-4	Endrin aldehyde							0 / 33	0.018 / 0.0833				N	ND
53494-70-5	Endrin ketone							0 / 33	0.018 / 0.0833				N	ND
100-41-4	Ethylbenzene							0 / 27	0.003 / 0.015		5.4	C	N	ND
206-44-0	Fluoranthene	0.102	J	61.4		mg/kg	LLCD02	27 / 28		61.4	230	NC	N	BSL
86-73-7	Fluorene	0.0519	J	3.76		mg/kg	LLCD02	14 / 28		3.76	230	NC	N	BSL
58-89-9	Gamma-BHC							0 / 33	0.018 / 0.0833		0.52	C	N	ND
5103-74-2	Gamma-Chlordane	0.0106	J	0.035	J	mg/kg	LLCD32	4 / 33		0.035			N	NV
76-44-8	Heptachlor							0 / 33	0.018 / 0.0833		0.11	C	N	ND
1024-57-3	Heptachlor epoxide							0 / 33	0.018 / 0.0833		0.053	C	N	ND
118-74-1	Hexachlorobenzene							0 / 28	0.183 / 2.19		0.3	C	N	ND
87-68-3	Hexachlorobutadiene							0 / 55	0.003 / 2.19		6.2	C	N	ND

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-2 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil[a]		COPC Flag	Rationale for Selection[b]
77-47-4	Hexachlorocyclopentadiene							0 / 28	0.183 / 2.19		37	NC	N	ND
67-72-1	Hexachloroethane							0 / 28	0.183 / 2.19		12	C	N	ND
193-39-5	Indeno(1,2,3-cd)pyrene	0.0809	J	14.3		mg/kg	LLCD02	25 / 28		14.3	0.15	C	Y	ASL
7439-89-6	Iron	10400	J	31100	J	mg/kg	LLCD02	33 / 33		31100	5500	NC	Y	ASL
78-59-1	Isophorone	0.0502	J	0.05	J	mg/kg	LLCD40	1 / 28		0.05	510	C	N	BSL
98-82-8	Isopropylbenzene							0 / 27	0.003 / 0.015		210	NC	N	ND
7439-92-1	Lead	5.09		575		mg/kg	LLCD02	33 / 33		575	40	NC	Y	ASL
7439-95-4	Magnesium	2390		32000		mg/kg	T4A	33 / 33		32000			N	EN
7439-96-5	Manganese	140		554		mg/kg	LLCD44	33 / 33		554	180	NC	Y	ASL
7439-97-6	Mercury	0.018	J	4.11		mg/kg	LLCD28	32 / 33		4.11	1	NC	Y	ASL
72-43-5	Methoxychlor	0.0085	J	0.0085	J	mg/kg	LLCD38	1 / 26		0.0085	31	NC	N	BSL
1634-04-4	Methyl tert-Butyl Ether							0 / 28	0.003 / 0.0326		43	C	N	ND
75-09-2	Methylene Chloride	0.00369	J	0.004	J	mg/kg	LLCD17	1 / 28		0.004	56	C	N	BSL
91-20-3	Naphthalene	0.00112	J	3.68		mg/kg	LLCD02	12 / 55		3.68	3.6	C	Y	ASL
104-51-8	n-Butylbenzene							0 / 27	0.003 / 0.015		390	NC	N	ND
7440-02-0	Nickel	10.3		434		mg/kg	LLCD27	33 / 33		434	150	NC	Y	ASL
98-95-3	Nitrobenzene							0 / 28	0.183 / 2.19		4.8	C	N	ND
621-64-7	N-Nitroso-di-n-propylamine							0 / 28	0.183 / 2.19		0.069	C	N	ND
86-30-6	N-Nitrosodiphenylamine							0 / 28	0.183 / 2.19		99	C	N	ND
103-65-1	n-Propylbenzene							0 / 27	0.003 / 0.015		340	NC	N	ND
95-47-6	o-Xylene							0 / 27	0.003 / 0.015		69	NC	N	ND
179601-23-1	p&m-Xylene	0.00263	J	0.003	J	mg/kg	LLCD17	1 / 27		0.003			N	NV
72-54-8	p,p'-D D D	0.00526	J	0.008	J	mg/kg	LLCD34	2 / 33		0.008	2	C	N	BSL
72-55-9	p,p'-D D E	0.0171	J	0.492		mg/kg	LLCD27	14 / 33		0.492	1.4	C	N	BSL
50-29-3	p,p'-D D T	0.00664	J	0.216	J	mg/kg	LLCD35	5 / 26		0.216	1.7	C	N	BSL
12674-11-2	PCB-1016 (Aroclor 1016)							0 / 33	0.045 / 0.208		0.39	NC	N	ND
11104-28-2	PCB-1221 (Aroclor 1221)							0 / 33	0.091 / 0.417		0.14	C	N	ND
11141-16-5	PCB-1232 (Aroclor 1232)							0 / 33	0.045 / 0.208		0.14	C	N	ND
53469-21-9	PCB-1242 (Aroclor 1242)							0 / 33	0.045 / 0.208		0.22	C	N	ND
12672-29-6	PCB-1248 (Aroclor 1248)	0.0263	J	86.1		mg/kg	LLCD27	18 / 33		86.1	0.22	C	Y	ASL
11097-69-1	PCB-1254 (Aroclor 1254)							0 / 33	0.045 / 0.208		0.22	C	N	ND
11096-82-5	PCB-1260 (Aroclor 1260)	0.0266	J	2.94	J	mg/kg	LLCD38	22 / 33		2.94	0.22	C	Y	ASL
11100-14-4	PCB-1268 (Aroclor 1268)							0 / 33	0.045 / 0.208				N	ND
87-86-5	Pentachlorophenol							0 / 27	0.183 / 2.19		0.89	C	N	ND
85-01-8	Phenanthrene	0.119	J	28.2		mg/kg	LLCD02	25 / 28		28.2	170	NC[d]	N	BSL
108-95-2	Phenol	0.0476	J	0.0476	J	mg/kg	LLCD40	1 / 28		0.05	1800	NC	N	BSL
99-87-6	p-Isopropyltoluene							0 / 27	0.003 / 0.015				N	ND
7440-09-7	Potassium	545	J+	3890		mg/kg	LLCD01	33 / 33		3890			N	EN
129-00-0	Pyrene	0.0969	J	62.2	J	mg/kg	LLCD02	26 / 28		62.2	170	NC	N	BSL
135-98-8	sec-Butylbenzene							0 / 27	0.003 / 0.015				N	ND

Table 2.1
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-2 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Detection Limits	Screening Concentration	EPA RSL Residential Soil[a]		COPC Flag	Rationale for Selection[b]
7782-49-2	Selenium	2.4	J	5.2		mg/kg	1500	6 / 33		5.2	39	NC	N	BSL
7440-22-4	Silver	1.44		136		mg/kg	LLCD28	10 / 33		136	39	NC	Y	ASL
7440-23-5	Sodium	41.2	J+	978	J	mg/kg	LLCD27	28 / 28		978			N	EN
100-42-5	Styrene							0 / 27	0.003 / 0.015		630	NC	N	ND
98-06-6	tert-Butylbenzene							0 / 27	0.003 / 0.015				N	ND
127-18-4	Tetrachloroethene	0.00128	J	0.00384	J	mg/kg	LLCD35	4 / 27			22	C	N	BSL
7440-28-0	Thallium							0 / 33	0.926 / 6.03		0.078	NC	N	ND
108-88-3	Toluene	0.00128	J	0.0183		mg/kg	LLCD28	15 / 27		0.02	500	NC	N	BSL
8001-35-2	Toxaphene							0 / 33	0.453 / 2.08		0.44	C	N	ND
156-60-5	trans-1,2-Dichloroethene							0 / 28	0.003 / 0.033		15	NC	N	ND
10061-02-6	trans-1,3-Dichloropropene							0 / 28	0.003 / 0.033				N	ND
79-01-6	Trichloroethene	0.00191	J	0.00918		mg/kg	LLCD35	5 / 28		0.009	0.91	C	Y	HC
75-69-4	Trichlorofluoromethane							0 / 27	0.003 / 0.033		79	NC	N	ND
7440-62-2	Vanadium	8.6		34.9		mg/kg	LLCD27	33 / 33		34.9	39	NC	N	BSL
75-01-4	Vinyl Chloride							0 / 27	0.003 / 0.033		0.06	C	N	ND
7440-66-6	Zinc	24.4		2180		mg/kg	LLCD28	33 / 33		2180	2300	NC	N	BSL

[a] USEPA Regional Screening Levels (RSLs) for soil exposure by oral, dermal and inhalation routes (Updated April 2012; accessed May 2012). RSL correspond to 1E-06 cancer risk or a hazard quotient of 0.1, whichever is lower.

[b] Selection Rationale Codes:

ASL: Above screening level
BSL = Below screening level
HC = Known human carcinogen (Category A)
ND = Not detected
EN = Essential nutrient
NV = No toxicity value or RSL; this chemical cannot be evaluated quantitatively in the risk assessment
FD = Frequent detection, but no toxicity value; this chemical cannot be evaluated quantitatively in the risk assessment

[c]The default screening value is for hexavalent chromium

[d]The default screening value is for pyrene

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-8 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Reporting Limits	Screening Concentration	EPA RSL Commercial/ Industrial Soil[a]		COPC Flag	Rationale for Selection[b]
75-34-3	1,1 Dichloroethane							0 / 34	0.003 / 0.038		17	C	N	ND
630-20-6	1,1,1,2-Tetrachloroethane							0 / 32	0.003 / 0.038		9.3	C	N	ND
71-55-6	1,1,1-Trichloroethane							0 / 34	0.003 / 0.038		3800	NC	N	ND
79-34-5	1,1,2,2-Tetrachloroethane							0 / 32	0.003 / 0.038		2.8	C	N	ND
79-00-5	1,1,2-Trichloroethane							0 / 34	0.003 / 0.038		5.3	C	N	ND
75-35-4	1,1-Dichloroethene							0 / 34	0.003 / 0.038		110	NC	N	ND
563-58-6	1,1-Dichloropropene							0 / 34	0.003 / 0.038				N	ND
87-61-6	1,2,3-Trichlorobenzene							0 / 32	0.003 / 0.038		49	NC	N	ND
96-18-4	1,2,3-Trichloropropane							0 / 32	0.003 / 0.038		0.095	C	N	ND
120-82-1	1,2,4-Trichlorobenzene							0 / 66	0.003 / 2.190		99	C	N	ND
95-63-6	1,2,4-Trimethylbenzene							0 / 32	0.003 / 0.038		26	NC	N	ND
96-12-8	1,2-Dibromo-3-Chloropropane							0 / 32	0.003 / 0.038		0.069	C	N	ND
106-93-4	1,2-Dibromoethane							0 / 34	0.003 / 0.038		0.17	C	N	ND
95-50-1	1,2-Dichlorobenzene							0 / 66	0.003 / 2.190		980	NC	N	ND
107-06-2	1,2-Dichloroethane							0 / 34	0.003 / 0.038		2.2	C	N	ND
78-87-5	1,2-Dichloropropane							0 / 34	0.003 / 0.038		4.7	C	N	ND
108-67-8	1,3,5-Trimethylbenzene							0 / 32	0.003 / 0.038		1000	NC	N	ND
541-73-1	1,3-Dichlorobenzene							0 / 66	0.003 / 2.190				N	ND
142-28-9	1,3-Dichloropropane							0 / 34	0.003 / 0.038		2000	NC	N	ND
106-46-7	1,4-Dichlorobenzene	0.002	J	0.14	J	mg/kg	LLCD17	2 / 66		0.14	12	C	N	BSL
594-20-7	2,2-Dichloropropane							0 / 34	0.003 / 0.038				N	ND
95-95-4	2,4,5-Trichlorophenol							0 / 34	0.183 / 2.190		6200	NC	N	ND
88-06-2	2,4,6-Trichlorophenol							0 / 34	0.183 / 2.190		160	C	N	ND
120-83-2	2,4-Dichlorophenol							0 / 34	0.183 / 2.190		180	NC	N	ND
105-67-9	2,4-Dimethylphenol							0 / 34	0.183 / 2.190		1200	NC	N	ND
51-28-5	2,4-Dinitrophenol							0 / 34	0.183 / 2.190		120	NC	N	ND
121-14-2	2,4-Dinitrotoluene							0 / 34	0.183 / 2.190		5.5	C	N	ND
606-20-2	2,6-Dinitrotoluene							0 / 34	0.183 / 2.190		62	NC	N	ND
78-93-3	2-Butanone	0.004		0.38	J	mg/kg	LLCD27	32 / 34		0.38	20000	NC	N	BSL
91-58-7	2-Chloronaphthalene							0 / 34	0.183 / 2.190		8200	NC	N	ND
95-57-8	2-Chlorophenol							0 / 34	0.183 / 2.190		510	NC	N	ND
95-49-8	2-Chlorotoluene							0 / 32	0.003 / 0.038		2000	NC	N	ND
591-78-6	2-Hexanone							0 / 32	0.003 / 0.038		140	NC	N	ND
91-57-6	2-Methylnaphthalene	0.08	J	2.51		mg/kg	LLCD02	11 / 34		2.51	220	NC	N	BSL
95-48-7	2-Methylphenol							0 / 34	0.183 / 2.190		3100	NC	N	ND
88-74-4	2-Nitroaniline							0 / 34	0.183 / 2.190		600	NC	N	ND
88-75-5	2-Nitrophenol							0 / 34	0.183 / 2.190				N	ND
91-94-1	3,3'-Dichlorobenzidine							0 / 34	0.183 / 2.190		3.8	C	N	ND
99-09-2	3-Nitroaniline							0 / 34	0.183 / 2.190				N	ND
534-52-1	4,6-Dinitro-2-methylphenol							0 / 15	0.187 / 1.280		4.9	NC	N	ND

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-8 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Reporting Limits	Screening Concentration	EPA RSL Commercial/ Industrial Soil[a]		COPC Flag	Rationale for Selection[b]
101-55-3	4-Bromophenyl-phenylether							0 / 34	0.183 / 2.190				N	ND
59-50-7	4-Chloro-3-methylphenol							0 / 34	0.183 / 2.190		6200	NC	N	ND
106-47-8	4-Chloroaniline							0 / 34	0.183 / 2.190		8.6	C	N	ND
7005-72-3	4-Chlorophenyl-phenylether							0 / 34	0.183 / 2.190				N	ND
106-43-4	4-Chlorotoluene							0 / 32	0.003 / 0.038		2000	NC	N	ND
108-10-1	4-Methyl-2-Pentanone							0 / 32	0.003 / 0.038		5300	NC	N	ND
106-44-5	4-Methylphenol	0.05	J	0.05	J	mg/kg	LLCD17	1 / 34		0.05	6200	NC	N	BSL
100-01-6	4-Nitroaniline	0.06	J	0.06	J	mg/kg	LLCD17	1 / 34		0.06	86	C	N	BSL
100-02-7	4-Nitrophenol							0 / 34	0.183 / 2.190				N	ND
83-32-9	Acenaphthene	0.08	J	2.25	J	mg/kg	LLCD02	11 / 34		2.25	3300	NC	N	BSL
208-96-8	Acenaphthylene	0.07	J	7.84		mg/kg	LLCD02	24 / 34		7.84	1700	NC[d]	N	BSL
67-64-1	Acetone	0.03		2.03	J	mg/kg	LLCD27	34 / 34		2.03	63000	NC	N	BSL
309-00-2	Aldrin							0 / 37	0.018 / 0.088		0.1	C	N	ND
319-84-6	Alpha-BHC							0 / 37	0.018 / 0.088		0.27	C	N	ND
5103-71-9	Alpha-Chlordane	0.01	J	0.05		mg/kg	LLCD29	5 / 37		0.05			N	NV
7429-90-5	Aluminum	1100		15300		mg/kg	LLCD01	52 / 52		15300	99000	NC	N	BSL
120-12-7	Anthracene	0.132	J	14.9		mg/kg	LLCD02	24 / 34		14.9	17000	NC	N	BSL
7440-36-0	Antimony	0.991		19.6		mg/kg	LLCD14	9 / 52		19.6	41	NC	N	BSL
7440-38-2	Arsenic	2.59		17.4		mg/kg	LLCD02	50 / 52		17.4	1.6	C	Y	ASL
7440-39-3	Barium	20.6		814		mg/kg	T4A	52 / 52		814	19000	NC	N	BSL
71-43-2	Benzene	0.001	J	0.06		mg/kg	LLCD17	8 / 34		0.06	5.4	C	Y	HC
56-55-3	Benzo(a)anthracene	0.08	J	36.2		mg/kg	LLCD02	27 / 34		36.2	2.1	C	Y	ASL
50-32-8	Benzo(a)pyrene	0.06	J	27.4		mg/kg	LLCD02	30 / 34		27.4	0.21	C	Y	ASL
205-99-2	Benzo(b)fluoranthene	0.06	J	29.1		mg/kg	LLCD02	28 / 34		29.1	2.1	C	Y	ASL
191-24-2	Benzo(g,h,i)perylene	0.10	J	16		mg/kg	LLCD02	27 / 34		16	1700	NC[d]	N	BSL
207-08-9	Benzo(k)fluoranthene	0.09	J	20.9		mg/kg	LLCD02	27 / 34		20.9	21	C	N	BSL
100-51-6	Benzyl alcohol							0 / 34	0.183 / 2.190		6200	NC	N	ND
7440-41-7	Beryllium	0.22	J	3.61		mg/kg	LLCD28	49 / 52		3.61	200	NC	N	BSL
319-85-7	Beta-BHC							0 / 37	0.018 / 0.088		0.96	C	N	ND
111-91-1	Bis-(2-chloroethoxy) methane							0 / 34	0.183 / 2.190		180	NC	N	ND
111-44-4	Bis-(2-chloroethyl) ether							0 / 34	0.183 / 2.190		1	C	N	ND
108-60-1	Bis-(2-chloroisopropyl) ether							0 / 34	0.183 / 2.190		22	C	N	ND
117-81-7	Bis-(2-ethylhexyl) phthalate	0.05	J	1.33		mg/kg	LLCD49	18 / 34		1.33	120	C	N	BSL
108-86-1	Bromobenzene							0 / 32	0.003 / 0.038		180	NC	N	ND
75-27-4	Bromodichloromethane							0 / 34	0.003 / 0.038		1.4	C	N	ND
75-25-2	Bromoform							0 / 34	0.011 / 0.151		220	C	N	ND
74-83-9	Bromomethane	0.002	J	0.002	J	mg/kg	LLCD40	1 / 33		0.002	3.2	NC	N	BSL
85-68-7	Butylbenzylphthalate	1.1	J	1.1	J	mg/kg	LLCD28	1 / 34		1.1	910	C	N	BSL
7440-43-9	Cadmium	0.062	J	337		mg/kg	LLCD28	39 / 52		337	80	NC	Y	ASL
7440-70-2	Calcium	1150	J	282000		mg/kg	LLCD27	34 / 52		282000			N	EN

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-8 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Reporting Limits	Screening Concentration	EPA RSL Commercial/ Industrial Soil[a]		COPC Flag	Rationale for Selection[b]
86-74-8	Carbazole	0.0575	J	3.23		mg/kg	LLCD02	18 / 34		3.23			N	FD
75-15-0	Carbon Disulfide	0.01	J	0.05		mg/kg	LLCD35	6 / 34		0.05	370	NC	N	BSL
56-23-5	Carbon Tetrachloride							0 / 34	0.003 / 0.038		3	C	N	ND
108-90-7	Chlorobenzene							0 / 32	0.003 / 0.038		140	NC	N	ND
75-00-3	Chloroethane							0 / 33	0.003 / 0.038		6100	NC	N	ND
67-66-3	Chloroform							0 / 34	0.003 / 0.038		1.5	C	N	ND
74-87-3	Chloromethane							0 / 33	0.003 / 0.038		50	NC	N	ND
7440-47-3	Chromium	7.04		1320	J	mg/kg	LLCD28	52 / 52		1320	5.6	C[c]	Y	ASL
218-01-9	Chrysene	0.07	J	36.7		mg/kg	LLCD02	29 / 34		36.7	210	C	N	BSL
156-59-2	cis-1,2-Dichloroethene	0.003	J	0.003	J	mg/kg	LLCD28	3 / 34		0.003	200	NC	N	BSL
10061-01-5	cis-1,3-Dichloropropene							0 / 34	0.003 / 0.038				N	ND
7440-48-4	Cobalt	1.65		12.7		mg/kg	T4A	52 / 52		12.7	30	NC	N	BSL
7440-50-8	Copper	13.3		1050		mg/kg	1500	52 / 52		1050	4100	NC	N	BSL
57-12-5	Cyanide	0.12	J-	1.9	J-	mg/kg	T4A	15 / 15		1.9	61	NC	N	BSL
319-86-8	Delta-BHC							0 / 37	0.018 / 0.088				N	ND
53-70-3	Dibenzo(a,h)anthracene	0.08	J	6.4		mg/kg	LLCD02	22 / 34		6.4	0.21	C	Y	ASL
132-64-9	Dibenzofuran	0.06	J	2.24		mg/kg	LLCD02	10 / 34		2.24	100	NC	N	BSL
124-48-1	Dibromochloromethane							0 / 34	0.011 / 0.151		3.3	C	N	ND
74-95-3	Dibromomethane							0 / 34	0.003 / 0.038		11	NC	N	ND
75-71-8	Dichlorodifluoromethane							0 / 33	0.003 / 0.038		40	NC	N	ND
60-57-1	Dieldrin							0 / 37	0.018 / 0.088		0.11	C	N	ND
84-66-2	Diethylphthalate							0 / 34	0.183 / 2.190		49000	NC	N	ND
131-11-3	Dimethylphthalate							0 / 34	0.183 / 2.190				N	ND
84-74-2	Di-n-butylphthalate	0.10	J	0.16	J	mg/kg	LLCD25	2 / 34		0.16	6200	NC	N	BSL
117-84-0	Di-n-octylphthalate							0 / 34	0.183 / 2.190				N	ND
959-98-8	Endosulfan (I)							0 / 37	0.018 / 0.088				N	ND
33213-65-9	Endosulfan (II)							0 / 37	0.018 / 0.088				N	ND
1031-07-8	Endosulfan sulfate							0 / 37	0.018 / 0.088				N	ND
72-20-8	Endrin	0.02	J	0.08		mg/kg	LLCD35	4 / 37		0.08	18	NC	N	BSL
7421-93-4	Endrin aldehyde							0 / 37	0.018 / 0.088				N	ND
53494-70-5	Endrin ketone							0 / 37	0.018 / 0.088				N	ND
100-41-4	Ethylbenzene							0 / 32	0.003 / 0.038		27	C	N	ND
206-44-0	Fluoranthene	0.10	J	61.4		mg/kg	LLCD02	30 / 34		61.4	2200	NC	N	BSL
86-73-7	Fluorene	0.05	J	3.76		mg/kg	LLCD02	15 / 34		3.76	2200	NC	N	BSL
58-89-9	Gamma-BHC							0 / 37	0.018 / 0.088		2.1	C	N	ND
5103-74-2	Gamma-Chlordane	0.01	J	0.03	J	mg/kg	LLCD32	4 / 37		0.03			N	NV
76-44-8	Heptachlor							0 / 37	0.018 / 0.088		0.38	C	N	ND
1024-57-3	Heptachlor epoxide							0 / 37	0.018 / 0.088		0.19	C	N	ND
118-74-1	Hexachlorobenzene							0 / 34	0.183 / 2.190		1.1	C	N	ND
87-68-3	Hexachlorobutadiene							0 / 66	0.003 / 2.190		22	C	N	ND

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-8 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Reporting Limits	Screening Concentration	EPA RSL Commercial/ Industrial Soil[a]		COPC Flag	Rationale for Selection[b]
77-47-4	Hexachlorocyclopentadiene							0 / 34	0.183 / 2.190		370	NC	N	ND
67-72-1	Hexachloroethane							0 / 34	0.183 / 2.190		43	C	N	ND
193-39-5	Indeno(1,2,3-cd)pyrene	0.08	J	14.3		mg/kg	LLCD02	27 / 34		14.3	2.1	C	Y	ASL
7439-89-6	Iron	6640	J	31100	J	mg/kg	LLCD02	52 / 52		31100	72000	NC	N	BSL
78-59-1	Isophorone	0.05	J	0.05	J	mg/kg	LLCD40	1 / 34		0.05	1800	C	N	BSL
98-82-8	Isopropylbenzene							0 / 32	0.003 / 0.038		1100	NC	N	ND
7439-92-1	Lead	3.9		575		mg/kg	LLCD02	52 / 52		575	40	NC	Y	ASL
7439-95-4	Magnesium	2390		32000		mg/kg	T4A	52 / 52		32000			N	EN
7439-96-5	Manganese	123		682		mg/kg	T4A	52 / 52		682	2300	NC	N	BSL
7439-97-6	Mercury	0.01	J	4.11		mg/kg	LLCD28	48 / 52		4.11	4.3	NC	N	BSL
72-43-5	Methoxychlor	0.009	J	0.009	J	mg/kg	LLCD38	1 / 30		0.009	310	NC	N	BSL
1634-04-4	Methyl tert-Butyl Ether							0 / 34	0.003 / 0.038		220	C	N	ND
75-09-2	Methylene Chloride	0.004	J	0.004	J	mg/kg	LLCD17	1 / 34		0.004	960	C	N	BSL
91-20-3	Naphthalene	0.00112	J	3.68		mg/kg	LLCD02	12 / 66		3.68	18	C	N	BSL
104-51-8	n-Butylbenzene							0 / 32	0.003 / 0.038		5100	NC	N	ND
7440-02-0	Nickel	10.3		434		mg/kg	LLCD27	52 / 52		434	2000	NC	N	BSL
98-95-3	Nitrobenzene							0 / 34	0.183 / 2.190		24	C	N	ND
621-64-7	N-Nitroso-di-n-propylamine							0 / 34	0.183 / 2.190		0.25	C	N	ND
86-30-6	N-Nitrosodiphenylamine							0 / 34	0.183 / 2.190		350	C	N	ND
103-65-1	n-Propylbenzene							0 / 32	0.003 / 0.038		2100	NC	N	ND
95-47-6	o-Xylene							0 / 32	0.003 / 0.038		300	NC	N	ND
179601-23-1	p&m-Xylene	0.003	J	0.005	J	mg/kg	LLCD25	3 / 32		0.005			N	NV
72-54-8	p,p'-D D D	0.005	J	0.008	J	mg/kg	LLCD34	2 / 37		0.008	7.2	C	N	BSL
72-55-9	p,p'-D D E	0.0171	J	0.492		mg/kg	LLCD27	14 / 37		0.492	5.1	C	N	BSL
50-29-3	p,p'-D D T	0.007	J	0.216	J	mg/kg	LLCD35	5 / 30		0.216	7	C	N	BSL
12674-11-2	PCB-1016 (Aroclor 1016)							0 / 37	0.045 / 0.219		21	NC	N	ND
11104-28-2	PCB-1221 (Aroclor 1221)							0 / 37	0.091 / 0.439		0.54	C	N	ND
11141-16-5	PCB-1232 (Aroclor 1232)							0 / 37	0.045 / 0.219		0.54	C	N	ND
53469-21-9	PCB-1242 (Aroclor 1242)							0 / 37	0.045 / 0.219		0.74	C	N	ND
12672-29-6	PCB-1248 (Aroclor 1248)	0.03	J	86.1		mg/kg	LLCD27	19 / 37		86.1	0.74	C	Y	ASL
11097-69-1	PCB-1254 (Aroclor 1254)							0 / 37	0.045 / 0.219		0.74	C	N	ND
11096-82-5	PCB-1260 (Aroclor 1260)	0.03	J	2.94	J	mg/kg	LLCD38	22 / 37		2.94	0.74	C	Y	ASL
11100-14-4	PCB-1268 (Aroclor 1268)							0 / 37	0.045 / 0.219				N	ND
87-86-5	Pentachlorophenol							0 / 32	0.183 / 2.190		2.7	C	N	ND
85-01-8	Phenanthrene	0.119	J	28.2		mg/kg	LLCD02	28 / 34		28.2	1700	NC[d]	N	BSL
108-95-2	Phenol	0.05	J	0.05	J	mg/kg	LLCD40	1 / 34		0.05	18000	NC	N	BSL
99-87-6	p-Isopropyltoluene							0 / 32	0.003 / 0.038				N	ND
7440-09-7	Potassium	259		3890		mg/kg	LLCD01	52 / 52		3890			N	EN
129-00-0	Pyrene	0.10	J	62.2	J	mg/kg	LLCD02	29 / 34		62.2	1700	NC	N	BSL
135-98-8	sec-Butylbenzene							0 / 32	0.003 / 0.038				N	ND

Table 2.2
Occurrence, Distribution and Selection of Contaminants of Potential Concern
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-8 feet depth interval
Exposure Point: Lower Ley Creek

CAS Registry Number	Analyte	Minimum Detected Value	Minimum Qualifier	Maximum Detected Value	Maximum Qualifier	Units	Location of Maximum	Detection Frequency	Range of Reporting Limits	Screening Concentration	EPA RSL Commercial/ Industrial Soil[a]		COPC Flag	Rationale for Selection[b]
7782-49-2	Selenium	2.4	J	7.5		mg/kg	1500	19 / 52		7.5	510	NC	N	BSL
7440-22-4	Silver	1		136		mg/kg	LLCD28	15 / 52		136	510	NC	N	BSL
7440-23-5	Sodium	41.2	J+	978	J	mg/kg	LLCD27	34 / 34		978			N	EN
100-42-5	Styrene							0 / 32	0.003 / 0.038		3600	NC	N	ND
98-06-6	tert-Butylbenzene							0 / 32	0.003 / 0.038				N	ND
127-18-4	Tetrachloroethene	0.001	J	0.004	J	mg/kg	LLCD35	4 / 32			110	C	N	BSL
7440-28-0	Thallium							0 / 52	0.926 / 6.030		1	NC	N	ND
108-88-3	Toluene	0.001	J	0.02		mg/kg	LLCD28	17 / 32		0.02	4500	NC	N	BSL
8001-35-2	Toxaphene							0 / 37	0.453 / 2.190		1.6	C	N	ND
156-60-5	trans-1,2-Dichloroethene							0 / 34	0.003 / 0.038		69	NC	N	ND
10061-02-6	trans-1,3-Dichloropropene							0 / 34	0.003 / 0.038				N	ND
79-01-6	Trichloroethene	0.002	J	0.009		mg/kg	LLCD35	5 / 34		0.009	6.4	C	Y	HC
75-69-4	Trichlorofluoromethane							0 / 33	0.003 / 0.038		340	NC	N	ND
7440-62-2	Vanadium	3.6		34.9		mg/kg	LLCD27	52 / 52		34.9	520	NC	N	BSL
75-01-4	Vinyl Chloride							0 / 33	0.003 / 0.038		1.7	C	N	ND
7440-66-6	Zinc	23		2180		mg/kg	LLCD28	52 / 52		2180	31000	NC	N	BSL

[a] Screening toxicity values for sediment are USEPA Regional Screening Levels (RSLs) for soil exposure by oral, dermal and inhalation routes (May 2012). RSL correspond to 1E-06 cancer risk or a hazard quotient of 0.1, whichever is lower.

[b] Selection Rationale Codes:

ASL: Above screening level
BSL = Below screening level
HC = Known human carcinogen (Group A)
ND = Not detected
EN = Essential nutrient
NV = No toxicity value or RSL; this chemical cannot be evaluated quantitatively in the risk assessment
FD = Frequent detection, but no toxicity value; this chemical cannot be evaluated quantitatively in the risk assessment

[c] The default screening value is for hexavalent chromium

[d] The default screening value is for pyrene

7.3 Series 3 Tables

Table 3.1
Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-2 feet depth interval
Exposure Point: Lower Ley Creek

Analyte	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration (mg/kg)	Standard Deviation (mg/kg)	95% UCL[a] (mg/kg)	UCL Statistic[a]	Selected Exposure Point Concentrations for both RME and CTE risks		
							Value	Units	Rationale[a]
Aluminum	15,300		8,897	2,878	9,746	95% Student's-t UCL	9,746	mg/kg	UCL-P
Antimony	19.6		5.68	5.87	3.46	95% KM (t) UCL	3.46	mg/kg	UCL-NP
Arsenic	17.4		8.18	4.63	9.75	95% Approximate Gamma UCL	9.75	mg/kg	UCL-P
Benzene	0.057		0.013	0.022	0.008	95% KM (t) UCL	0.008	mg/kg	UCL-NP
Benzo(a)anthracene	36.2		3.34	7.08	11.0	97.5% KM (Chebyshev) UCL	11.0	mg/kg	UCL-NP
Benzo(a)pyrene	27.4		2.81	5.17	6.92	95% KM (Chebyshev) UCL	6.92	mg/kg	UCL-NP
Benzo(b)fluoranthene	29.1		2.99	5.61	7.29	95% KM (Chebyshev) UCL	7.29	mg/kg	UCL-NP
Benzo(k)fluoranthene	20.9		2.51	4.15	5.55	95% KM (Chebyshev) UCL	5.55	mg/kg	UCL-NP
Cadmium	337		21.8	68.9	122	99% KM (Chebyshev) UCL	122	mg/kg	UCL-NP
Chromium	1,320	J	163	330	414	95% Chebyshev (Mean, Sd) UCL	414	mg/kg	UCL-NP
Chrysene	36.7		3.57	7.25	11.6	97.5% KM (Chebyshev) UCL	11.6	mg/kg	UCL-NP
Cobalt	12.2		7.35	1.95	7.93	95% Student's-t UCL	7.93	mg/kg	UCL-NP
Copper	731		139	179	222	95% H-UCL	222	mg/kg	UCL-NP
Dibenzo(a,h)anthracene	6.40		0.90	1.36	1.72	95% KM (Chebyshev) UCL	1.72	mg/kg	UCL-NP
Indeno(1,2,3-cd)pyrene	14.3		1.87	2.78	3.90	95% KM (Chebyshev) UCL	3.90	mg/kg	UCL-NP
Iron	31,100	J	18,515	5,752	20,211	95% Student's-t UCL	20,211	mg/kg	UCL-NP
Lead	575		122	132	168	95% Approximate Gamma UCL	168	mg/kg	UCL-P
Manganese	554		334	101	364	95% Student's-t UCL	364	mg/kg	UCL-P
Mercury	4.11		0.58	0.82	1.18	95% KM (Chebyshev) UCL	1.18	mg/kg	UCL-NP
Naphthalene	3.68		0.59	1.03	0.27	95% KM (t) UCL	0.27	mg/kg	UCL-NP
Nickel	434		53.4	78.2	113	95% Chebyshev (Mean, Sd) UCL	113	mg/kg	UCL-NP
PCB-1248 (Aroclor 1248)	86.1		12.4	22.2	11.86	95% KM (BCA) UCL	11.86	mg/kg	UCL-NP
PCB-1260 (Aroclor 1260)	2.94	J	0.74	0.90	0.74	95% KM (BCA) UCL	0.74	mg/kg	UCL-NP
Silver	136		23.0	41.6	18	95% KM (BCA) UCL	18	mg/kg	UCL-NP
Trichloroethene	0.0092		0.0061	0.0031	0.0078	95% KM (Percentile Bootstrap) UCL	0.0078	mg/kg	UCL-NP

[a]Based on recommendations from ProUCL, version 4.1.00 software (Singh et al., 2009); includes non-detects treated per recommendations for each statistical method:

UCL = Upper confidence limit; UCL-P = Parametric UCL; UCL-NP = Nonparametric UCL
KM (t) = UCL based on Kaplan_meier method using the t-distrubtion cutoff values
KM (BCA) = UCL based on the Kaplan-Meier Method using the bias-corrected accelerated bootstrap method
KM (Percentile Bootstrap) = UCL based on the Kaplan-Meier estimates using the percentile bootstrap method
KM (Chebyshev) = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
Chebyshev (Mean, Sd) = UCL based on Chebyshev (Mean, Standard Deviation)
Student's t = UCL based on Student's t-distribution
Approximate Gamma = UCL based on approximate gamma distribution

Max = Maximum detected values are used in quantitiative risk assessment when data are insufficient to generate a UCL or the recommended UCL exceeds the maximum detected value.
NV = No values were generated by ProUCL due to insufficient samples
NA = Not applicable

Table 3.2
Exposure Point Concentration Summary - Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Soil at 0-8 feet depth interval
Exposure Point: Lower Ley Creek

Analyte	Maximum Detected Concentration (mg/kg)	Qualifier	Arithmetic Mean Detected Concentration (mg/kg)	Standard Deviation (mg/kg)	95% UCL[a] (mg/kg)	UCL Statistic[a]	Selected Exposure Point Concentrations for both RME and CTE risks		
							Value	Units	Rationale[a]
Arsenic	17.4		7.66	4.16	10.01	95% KM (Chebyshev) UCL	10.01	mg/kg	UCL-NP
Benzene	0.057		0.010	0.019	0.008	95% KM (BCA) UCL	0.008	mg/kg	UCL-NP
Benzo(a)anthracene	36.2		3.13	6.85	9.2	97.5% KM (Chebyshev) UCL	9.2	mg/kg	UCL-NP
Benzo(a)pyrene	27.4		2.58	4.95	5.82	95% KM (Chebyshev) UCL	5.82	mg/kg	UCL-NP
Benzo(b)fluoranthene	29.1		2.82	5.44	6.13	95% KM (Chebyshev) UCL	6.13	mg/kg	UCL-NP
Cadmium	337		14.4	55.7	78	99% KM (Chebyshev) UCL	78	mg/kg	UCL-NP
Chromium	1,320	J	112	270	275	95% Chebyshev (Mean, Sd) UCL	275	mg/kg	UCL-NP
Dibenzo(a,h)anthracene	6.40		0.83	1.31	0.96	95% KM (BCA) UCL	0.96	mg/kg	UCL-NP
Indeno(1,2,3-cd)pyrene	14.3		1.75	2.71	3.31	95% KM (Chebyshev) UCL	3.31	mg/kg	UCL-NP
Lead	575		99	120	131	95% Approximate Gamma UCL	131	mg/kg	UCL-P
PCB-1248 (Aroclor 1248)	86.1		11.9	21.7	11.41	95% KM (BCA) UCL	11.41	mg/kg	UCL-NP
PCB-1260 (Aroclor 1260)	2.94	J	0.74	0.90	0.68	95% KM (BCA) UCL	0.68	mg/kg	UCL-NP
Trichloroethene	0.0092		0.0061	0.0031	0.0078	95% KM (Percentile Bootstrap) UCL	0.0078	mg/kg	UCL-NP

[a]Based on recommendations from ProUCL, version 4.1.00 software (Singh et al., 2009); includes non-detects treated per recommendations for each statistical method:

UCL = Upper confidence limit; UCL-P = Parametric UCL; UCL-NP = Nonparametric UCL
KM (t) = UCL based on Kaplan_meier method using the t-distrubtion cutoff values
KM (BCA) = UCL based on the Kaplan-Meier Method using the bias-corrected accelerated bootstrap method
KM (Percentile Bootstrap) = UCL based on the Kaplan-Meier estimates using the percentile bootstrap method
KM (Chebyshev) = UCL based upon Kaplan-Meier estimates using the Chebyshev inequality
Chebyshev (Mean, Sd) = UCL based on Chebyshev (Mean, Standard Deviation)
Student's t = UCL based on Student's t-distribution
Approximate Gamma = UCL based on approximate gamma distribution
Max = Maximum detected values are used in quantitiative risk assessment when data are insufficient to generate a UCL or the recommended UCL exceeds the maximum detected value.
NV = No values were generated by ProUCL due to insufficient samples
NA = Not applicable

7.4 Series 4 Tables

Table 4.1
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface soil, 0-2 feet depth
Exposure Points: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Adult (>16)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic Daily Intake (CDI) (mg/kg-day)=
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 1989	3,285	USEPA, 1989	CS x CF x IR x FI x EF x ED / (BW x AT)
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	
	ED	Exposure duration	years	30	USEPA, 1991a	9	USEPA, 1991a	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	FI	Fraction ingested	-	1	NYSDEC and NYSDOL,	1	NYSDEC and NYSDOL,	
	IR	Ingestion rate	mg soil/day	100	USEPA, 1991a	50	USEPA, 1991a	
Dermal	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	Chronic Daily Intake (CDI) (mg/kg-day)=
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	SA	Skin surface area available for contact	cm^2/event	5,700	USEPA, 2004	5,700	USEPA, 2004	
	AF	soil/soil-to-skin adherence factor	mg/cm^2	0.3	Agency consensus	0.15	Agency consensus	
	EF	Exposure frequency	events/year	143	BPJ[a]	72	BPJ[a]	
	ED	Exposure duration	years	30	USEPA, 2004	9	USEPA, 2004	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	10,950	USEPA, 2004	3,285	USEPA, 2004	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific; see Table 4.7	USEPA, 2004	Chemical-specific; see Table 4.7	USEPA, 2004	

NA - not applicable

[a] Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CTE assumes half of RME

Table 4.2
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil, 0-2 feet depth
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Younger Child (< 6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 1989	2,190	USEPA, 1989	See Supplemental Table B4.5A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	15	USEPA, 1997; Table 7-3	15	USEPA, 1997; Table 7-3	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	
	ED	Exposure duration	years	6	USEPA, 1991a	6	USEPA, 1991a	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	FI	Fraction ingested	-	1	NYSDEC, 1998a	1	NYSDEC, 1998a	
	IR	Ingestion rate	mg soil/day	200	USEPA, 1991a	100	USEPA, 1991a	
Dermal	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Table 4.7	USEPA, 2004	Chemical-specific, see Table 4.7	USEPA, 2004	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	AF	soil/soil-to-skin adherence factor	mg/cm^2	2.8	TAMS, 2002b	0.2	USEPA, 2004, Exhibit C-3	See Supplemental Table B4.5A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	2,190	USEPA, 2004	2,190	USEPA, 2004	
	BW	Body weight	kg	15	USEPA, 1997	15	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	
	ED	Exposure duration	years	6	USEPA, 2004	6	USEPA, 2004	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	SA	Skin surface area available for contact	cm^2/event	2,800	USEPA, 2004	2,800	USEPA, 2004	

NA - not applicable

[a] Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CTE assumes half of RME

Table 4.2A
Values Used for Chronic Daily Intake Calculation (Carcinogens with a Mutagenic Mode of Action)
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil, 0-2 feet depth
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Younger Child (< 6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Oral	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	Chronic daily intake (CDI) (mg/kg-day) = $\{[IR\text{-}S\text{-}Adj_{(0<2)} \times 10] + [IR\text{-}S\text{-}Adj_{(2<6)} \times 3]\} \times CS \times EF \times CF \times 1/AT$
	IR-S-Adj	Age Adjusted Ingestion Rate of Soil	mg-yr/day-kg	39.7 (0<2 yrs); 49.8 (2 <6 yrs)	calculated from values in Table 4.5	19.8 (0<2 yrs); 24.9 (2 <6 yrs)	calculated from values in Table 4.6	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	
Dermal	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	Dermally Absorbed Dose (DAD, mg/kg-day) = $\{[SSAF\text{-}Adj_{(0<2)} \times 10] + [SSAF\text{-}adj_{(2<6)} \times 3]\} \times ABS \times CS \times CF \times EF \times 1/AT$
	SSAF-Adj (<6)	Age Adjusted Soil to Skin Adherence Factor	mg-yr/day-kg	1702.7 (0<2 yrs); 2375.3 (2 <6 yrs)	calculated from values in Table 4.5	103.2 (0<2 yrs); 144.0 (2 <6 yrs)	calculated from values in Table 4.6	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Table 4.7	USEPA, 2004	Chemical-specific, see Table 4.7	USEPA, 2004	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	

NA - not applicable

[b] Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CTE assumes half of RME

Table 4.3
Values Used for Daily Intake Calculation
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil, 0-2 feet depth
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16) [a]

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 1989	2,920	USEPA, 1989	See Supplemental Table B4.6A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	
	ED	Exposure duration [a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	EF	Exposure frequency	days/year	143	BPJ[b]	72	BPJ[b]	
	FI	Fraction ingested	-	1	NYSDEC, 1998a	1	NYSDEC, 1998a	
	IR	Ingestion rate	mg soil/day	100	USEPA, 1991a	50	USEPA, 1991a	
Dermal	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Table 4.7	USEPA, 2004	Chemical-specific, see Table 4.7	USEPA, 2004	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	AF	soil/soil-to-skin adherence factor	mg/cm^2	3.3	USEPA, 2004, Exhibit C-3	0.2	USEPA, 2004, Exhibit C-3	See Supplemental Table B4.6A for equations and inputs specific to chemicals of potential concern that are carcinogenic by a mutagenic mode of action; these additional calculations are necessary to accommodate the ADAFs (Age-defined adaptation factors) required by EPA (2005) guidance on early childhood susceptibility to cancer
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	3,650	USEPA, 2004	2,920	USEPA, 2004	
	BW	Body weight	kg	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	58	USEPA, 1997, tables 7-6, 7-7; average of male and female	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	
	ED	Exposure duration [a]	years	10	USEPA, 1997; USEPA, 2005	8	USEPA, 1997; USEPA, 2005	
	EF	Exposure frequency	days/year	143	BPJ[b]	72	BPJ[b]	
	SA	Skin surface area available for contact	cm^2/event	5,400	USEPA, 1997, 2004	5,400	USEPA, 1997,	

NA - not applicable

[a] The receptor age and exposure durations are modified from earlier EPA (1997a) guidance, based age categories for age-dependent adjustment factors (ADAFs) that are required from EPA (2005) supplemental guidance for assessing susceptibility from early-life exposure to carcinogens; CTE for ED is approximately 75% of the RME value in parallel with EPA, 1991 recommendations of 12 and 9 years for RME and CTE, respectively.

[b] Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CTE assumes half of RME

Table 4.3A
Values Used for Chronic Daily Intake Calculation (Carcinogens with a Mutagenic Mode of Action)
Lower Ley Creek

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil, 0-2 feet depth
Exposure Point: Lower Ley Creek
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Oral	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	Chronic daily intake (CDI) (mg/kg-day) = CS x IR-S-Adj$_{(6-16)}$ x 3 x EF x CF x 1/AT
	IR-S-Adj	Age Adjusted Ingestion Rate of Soil	mg-yr/day-kg	28.1	calculated from values in Table B4.16	14	calculated from values in Table B4.16	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	
Dermal	CS	Chemical concentration in soil	mg/kg	See Table 3.1	NA	See Table 3.1	NA	Dermally Absorbed Dose (DAD, mg/kg-day) = CS x SSAF-Adj$_{(6-16)}$ x 3 x ABS x CF x EF x 1/AT
	SSAF-Adj	Age Adjusted Soil to Skin Adherence Factor	mg-yr/day-kg	3574.9	calculated from values in Table B4.16	216.7	calculated from values in Table B4.16	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Table 4.7	USEPA, 2004	Chemical-specific, see Table 4.7	USEPA, 2004	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	EF	Exposure frequency	days/year	143	BPJ[a]	72	BPJ[a]	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	

NA - not applicable

[b] Based on best professional judgement (BPJ); RME assumes exposure 3 times/wk during the 39 weeks of Spring, Summer and Fall months and 2 times/wk during the 13 weeks of Winter; CTE assumes half of RME

Table 4.4
Values Used for Daily Intake Calculations
Lower Ley Creek

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface soil, 0-8 feet depth
Exposure Point: Lower Ley Creek
Receptor Population: Construction worker
Receptor Age: Adult (>16)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	AT	Averaging time - carcinogens	days	25,550	USEPA, 1989	25,550	USEPA, 1989	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x IR x FI x EF x ED / (BW x AT)
	AT	Averaging time - non-carcinogens	days	730	USEPA, 1989	730	USEPA, 1989	
	BW	Body weight	kg	70	USEPA, 1997	70	USEPA, 1997	
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	CS	Chemical concentration in soil	mg/kg	See Table 3.2	NA	See Table 3.2	NA	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	EF	Exposure frequency	days/year	250	BPJ[a]	125	BPJ[a]	
	FI	Fraction ingested	-	1	BPJ[a]	1	BPJ[a]	
	IR	Ingestion rate	mg soil/day	330	USEPA, 2001b	330	USEPA, 2001b	
Dermal	CS	Chemical concentration in soil	mg/kg	See Table 3.2	NA	See Table 3.2	NA	Chronic daily intake (CDI) (mg/kg-day) = CS x CF x SA x AF x EF x ED x ABS / (BW x AT)
	CF	Conversion factor	kg/mg	0.000001	unit conversion	0.000001	unit conversion	
	SA	Skin surface area available for contact	cm^2/event	5,700	USEPA, 2004	5,700	USEPA, 2004	
	AF	soil/soil-to-skin adherence factor	mg/cm^2	0.9[b]	USEPA, 2004	0.2[b]	USEPA, 2004	
	EF	Exposure frequency	days/year	250	BPJ[a]	125	BPJ[a]	
	ED	Exposure duration	years	2	BPJ[a]	2	BPJ[a]	
	BW	Body weight	kg	70	USEPA, 2004	70	USEPA, 2004	
	AT	Averaging time - carcinogens	days	25,550	USEPA, 2004	25,550	USEPA, 2004	
	AT	Averaging time - non-carcinogens	days	730	USEPA, 2004	730	USEPA, 2004	
	ABS	Dermal absorption factor - all COPCs	unitless	Chemical-specific, see Table 4.7	USEPA, 2004	Chemical-specific, see Table 4.7	USEPA, 2004	

NA - not applicable
[a]Based on best professional judgment (BPJ)
[b]AF for construction worker based on 95th percentile (for RME) and geometric mean (CTE) for utility workers (USEPA, 2004, Exhibit 3-3)

Table 4.5
Age-Adjusted Exposure Factors for soil Exposures (RME)
Lower Ley Creek

				Dermal		Age-Adjusted Exposure Factors			
Age (year)	ED (year)	BW [1] (kg)	Soil IR-S [2] (mg/day)	Soil SSAF [3] (mg/cm^2-event)	Exposed SA [4] (cm^2)	Total SA [5] (cm^2)	Age Group	IR-S-Adj (mg-yr/day-kg)	SSAF-Adj (mg-yr/day-kg)
0	1	9.1	200	3.3	2625	5910	0-< 2 yrs	39.7	1702.7
1	1	11.3	200	3.3	2571	5910			
2	1	13.3	200	3.3	2434	5910	2-< 6 yrs	49.8	2375.3
3	1	15.3	200	3.3	2893	6565			
4	1	17.4	200	3.3	3175	7185			
5	1	19.7	200	3.3	3255	7860			
6	1	22.6	100	3.3	2949	8545	6-<16 yrs	28.1	3574.9
7	1	24.9	100	3.3	3182	9265			
8	1	28.1	100	3.3	3434	10000			
9	1	31.5	100	3.3	3657	10650			
10	1	36.3	100	3.3	3819	11750			
11	1	41.1	100	3.3	4111	12650			
12	1	45.3	100	3.3	4453	13700			
13	1	50.4	100	3.3	4916	14750			
14	1	56	100	3.3	5205	15800			
15	1	58.1	100	3.3	5386	16350			
16	1	62.6	100	0.3	5534	16800	>16 yrs	20.7	352.3
17	1	63.2	100	0.3	5641	17150			
18	1	65.1	100	0.3	5700	18000			
19	1	66	100	0.3	5700	18000			
20	1	67.2	100	0.3	5700	18000			
21	1	67.2	100	0.3	5700	18000			
22	1	67.2	100	0.3	5700	18000			
23	1	67.2	100	0.3	5700	18000			
24	1	67.2	100	0.3	5700	18000			
25	1	71.5	100	0.3	5700	18000			
26	1	71.5	100	0.3	5700	18000			
27	1	71.5	100	0.3	5700	18000			
28	1	71.5	100	0.3	5700	18000			
29	1	71.5	100	0.3	5700	18000			

Equations and Definitions:

IR-S-Adj (mg-yr/day-kg) = Σ [(ED * IR-S)/BW] SSAF-Adj (mg-yr/day-kg) = Σ [(ED * EV * SSAF * SA)/BW]

ED - Exposure duration BW - Body Weight IR-S - Ingestion rate for soil

SA - Skin surface area EV - Event frequency = 1/day SSAF - Soil-to-skin adherence factor

References

[1] EPA 1997. Exposure factors handbook. Tables 7-2 (adults) and 7-3 (children), mean. Values are man of male and female. Source National Center of Health Statistics (NCHS).

[2] EPA 1991. Standard default exposure factors. Default for resident child and adult.

[3]As assumed in previous tables.

[4] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Calculated from Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6, 6-7 and 6-8. Surface area of head, forearms, hands, lower legs and feet (for child < 6 years); feet excluded from surface area calculation for > 6 years. Surface area for > 18 is recommended default for adult

[5] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6 and 6-7. Total body surface area (50th percentile).

Table 4.6
Age-Adjusted Exposure Factors for soil Exposure (CTE)
Lower Ley Creek

			Oral	Dermal			Age-Adjusted Exposure Factors		
Age (year)	ED (year)	BW [1] (kg)	Soil IR-S [2] (mg/day)	Soil SSAF [3] (mg/cm^2-event)	Exposed SA [4] (cm^2)	Total SA [5] (cm^2)	Age Group	IR-S-Adj (mg-yr/day-kg)	SSAF-Adj (mg-yr/day-kg)
0	1	9.1	100	0.2	2625	5910	0-< 2 yrs	19.8	103.2
1	1	11.3	100	0.2	2571	5910			
2	1	13.3	100	0.2	2434	5910	2-< 6 yrs	24.9	144.0
3	1	15.3	100	0.2	2893	6565			
4	1	17.4	100	0.2	3175	7185			
5	1	19.7	100	0.2	3255	7860			
6	1	22.6	50	0.2	2949	8545	6-<16 yrs	14.0	216.7
7	1	24.9	50	0.2	3182	9265			
8	1	28.1	50	0.2	3434	10000			
9	1	31.5	50	0.2	3657	10650			
10	1	36.3	50	0.2	3819	11750			
11	1	41.1	50	0.2	4111	12650			
12	1	45.3	50	0.2	4453	13700			
13	1	50.4	50	0.2	4916	14750			
14	1	56	50	0.2	5205	15800			
15	1	58.1	50	0.2	5386	16350			
16	1	62.6	50	0.15	5534	16800	>16 yrs	10.3	176.1
17	1	63.2	50	0.15	5641	17150			
18	1	65.1	50	0.15	5700	18000			
19	1	66	50	0.15	5700	18000			
20	1	67.2	50	0.15	5700	18000			
21	1	67.2	50	0.15	5700	18000			
22	1	67.2	50	0.15	5700	18000			
23	1	67.2	50	0.15	5700	18000			
24	1	67.2	50	0.15	5700	18000			
25	1	71.5	50	0.15	5700	18000			
26	1	71.5	50	0.15	5700	18000			
27	1	71.5	50	0.15	5700	18000			
28	1	71.5	50	0.15	5700	18000			
29	1	71.5	50	0.15	5700	18000			

Equations and Definitions:

IR-S-Adj (mg-yr/day-kg) = Σ [(ED * IR-S)/BW] SSAF-Adj (mg-yr/day-kg) = Σ [(ED * EV * SSAF * SA)/BW

ED - Exposure duration BW - Body Weight IR-S - Ingestion rate for soil

SA - Skin surface area EV - Event frequency = 1/day SSAF - Soil-to-skin adherence factor

References:

[1] EPA 1997. Exposure factors handbook. Tables 7-2 (adults) and 7-3 (children), mean. Values are man of male and female. Source National Center of Health Statistics (NCHS).

[2] EPA 1991. Standard default exposure factors. Default for resident child and adult.

[3]As assumed in previous tables.

[4] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Calculated from Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6, 6-7 and 6-8. Surface area of head, forearms, hands, lower legs and feet (for child < 6 years); feet excluded from surface area calculation for > 6 years. Surface area for > 18 is recommended default for

[5] EPA 2004. Risk assessment guidance for Superfund Volume I: Human health evaluation manual (part E, supplemental guidance for dermal risk assessment). Exhibit C-1 - Body part-specific surface area calculations (children). Data from exposure factors handbook, Tables 6-6 and 6-7. Total body surface area (50th percentile).

Table 4.7
Dermal Absorption Factors for COPCs in Soils at Lower Ley Creek[a]

COPC	CAS RN	Dermal Absorption Factor (ABS)	Assess Quantitatively?
Aluminum	7429-90-5		No
Antimony	7440-36-0		No
Arsenic	7440-38-2	0.03	Yes
Benzene	71-43-2		No
Benzo(a)anthracene	56-55-3	0.13	Yes
Benzo(a)pyrene	50-32-8	0.13	Yes
Benzo(b)fluoranthene	205-99-2	0.13	Yes
Benzo(k)fluoranthene	207-08-9	0.13	Yes
Cadmium	7440-43-9	0.001	Yes
Chromium	7440-47-3		No
Chrysene	218-01-9	0.13	Yes
Cobalt	7440-48-4		No
Copper	7440-50-8		No
Dibenzo(a,h)anthracene	53-70-3	0.13	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	0.13	Yes
Iron	7439-89-6		No
Manganese	7439-96-5		No
Mercury	7439-97-6		No
Naphthalene	91-20-3	0.13	Yes
Nickel	7440-02-0		No
PCB-1248 (Aroclor 1248)	12672-29-6	0.14	Yes
PCB-1260 (Aroclor 1260)	11096-82-5	0.14	Yes
Silver	7440-22-4		No
Trichloroethene	79-01-6		No

[a] Source is USEPA Regional Screening Level Table, April 2012; blank entries have no listed ABS values; chemicals with no ABS are not evaluated quantitatively.

7.5 Series 5 Tables

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Lower Ley Creek

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal[1]		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	Source(s)	
			Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Aluminum	7429-90-5	Chronic	1.0E+00	mg/kg-day	1	1.0E+00	mg/kg-day	CNS	300/1	P	10/23/2006
Antimony	7440-36-0	Chronic	4.0E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	Blood	1000/1	I	2/1/1991
Arsenic	7440-38-2	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Skin	3/1	I	2/1/1993
Benzene	71-43-2	Chronic	4.0E-03	mg/kg-day	1	4.0E-03	mg/kg-day	Blood	300/1	I	4/17/2003
Benzo(a)anthracene	56-55-3	--	--	--	1	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	--	--	--	1	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	--	--	--	1	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	--	--	--	1	--	--	--	--	--	--
Cadmium	7440-43-9	Chronic	1.0E-03	mg/kg-day	0.025	2.5E-05	mg/kg-day	kidney	10/1	I	2/1/1994
Chromium (VI)	18540-29-9	Chronic	3.0E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	GI	300/3	I	9/3/1998
Chrysene	218-01-9	--	--	--	1	--	--	--	--	--	--
Cobalt	7440-48-4	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	thyroid	3000/1	P	8/25/2008
Copper	7440-50-8		4.0E-02	mg/kg-day	1	4.0E-02	mg/kg-day	GI		H	
Dibenzo(a,h)anthracene	53-70-3	--	--	--	1	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	1	--	--	--	--	--	--
Iron	7439-89-6	Chronic	7.0E-01	mg/kg-day	1	7.0E-01	mg/kg-day	GI	1.5	P	9/11/2006
Manganese (non-diet)	7439-96-5	Chronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	CNS	1/1	S	5/1/1996
Mercuric Chloride	7487-94-7	Chronic	3.0E-04	mg/kg-day	0.07	2.1E-05	mg/kg-day	immune	1000/1	I	5/1/1995
Naphthalene	91-20-3	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	↓ body weight	3000/1	I	9/17/1998
Nickel	7440-02-0	Chronic	2.0E-02	mg/kg-day	0.04	8.0E-04	mg/kg-day	↓ body/liver/heart weights	300/1	I	12/1/1996
PCB-1248 (Aroclor 1248)[2]	12672-29-6	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	systemic	300/1	I	11/1/1996
PCB-1260 (Aroclor 1260)[2]	11096-82-5	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	systemic	300/1	I	11/1/1996
Silver	7440-22-4	Chronic	5.0E-03	mg/kg-day	0.04	2.0E-04	mg/kg-day	Skin	3/1	I	12/1/1996
Trichloroethene	79-01-6	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Immune, developmental, heart	Multiple (10; 100; 1,000)	I	9/28/2011

Sources: A = ATSDR, H = HEAST, I = IRIS, P = PPRTV, X = PPRTV Appendix, S = EPA Regional Screening Level User's Guide

Toxicity values based on USEPA Regional Screening Level (RSL) Table (Updated April 2012; accessed May 2012).

(1)Absorbed Reference Doses for Dermal were derived using the Oral Reference Dose as follows: $RFD_{ABS} = RfD_o * ABS_{GI}$ (Equation 4.3 from USEPA 2004)

7.6 Series 6 Tables

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Lower Ley Creek

Chemical of Potential Concern	CAS	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[(1)]		Weight of Evidence/Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Dates(s) (MM/DD/YYYY)
Aluminum	7429-90-5	--	--	1	--	--		--	
Antimony	7440-36-0	--	--	0.15	--	--		--	
Arsenic	7440-38-2	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	I	4/10/1998
Benzene	71-43-2	5.5E-02	$(mg/kg\text{-}day)^{-1}$	1	5.5E-02	$(mg/kg\text{-}day)^{-1}$	A	I	1/19/2000
Benzo(a)anthracene	56-55-3	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	E	3/1/1994
Benzo(a)pyrene	50-32-8	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	I	11/1/1994
Benzo(b)fluoranthene	205-99-2	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	E	3/1/1994
Benzo(k)fluoranthene	207-08-9	7.3E-02	$(mg/kg\text{-}day)^{-1}$	1	7.3E-02	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	E	3/1/1994
Cadmium	7440-43-9	--	--	0.025	--	--		--	
Chromium (VI) [(3)]	18540-29-9	5.0E-01	$(mg/kg\text{-}day)^{-1}$	0.025	2.0E+01	--	Likely to be carcinogenic to humans	J	4/8/2009
Chrysene	218-01-9	7.3E-03	$(mg/kg\text{-}day)^{-1}$	1	7.3E-03	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	E	3/1/1994
Cobalt	7440-48-4	--	--	1	--	--		--	
Copper	7440-50-8	--	--	1	--	--		--	
Dibenzo(a,h)anthracene	53-70-3	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	E	3/1/1994
Indeno(1,2,3-cd)pyrene	193-39-5	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2[(2)]	E	3/1/1994
Iron	7439-89-6	--	--	1	--	--		--	
Manganese	7439-96-5	--	--	0.04	--	--		--	
Mercury	7439-97-6	--	--	0.07	--	--		--	
Naphthalene	91-20-3	--	--	1	--	--		--	
Nickel	7440-02-0	--	--	0.04	--	--		--	
PCB-1248 (Aroclor 1248)	12672-29-6	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	S	6/1/1997
PCB-1260 (Aroclor 1260)	11096-82-5	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	S	6/1/1997
Silver	7440-22-4	--	--	0.04	--	--		--	
Trichloroethene	79-01-6	4.6E-02	$(mg/kg\text{-}day)^{-1}$	1	4.6E-02	$(mg/kg\text{-}day)^{-1}$	Carcinogenic to humans [(3)]	I	9/28/2011

-- Not Available

Toxicity values based on USEPA Regional Screening Level (RSL) Table (Updated April 2012; accessed May 2012).

(1)Absorbed Cancer Slope Factors for Dermal were derived using the Oral Cancer Slope Factors as follows: $SF_{ABS} = SF_o / ABS_{GI}$ (Equation 4.2 from USEPA 2004)

(2)These chemicals demonstrate a mutagenic mode of action (MOA) and will be evaluated in accordance with USEPA 2005.

(3) An oral slope factor is included in the USEPA RSL Table for Cr(VI) based on a value derived in a 2009 New Jersey Department of Environmental Protection (NJDEP) document. NJDEP classifies Cr(VI) as "likely to be carcinogenic to humans" and demonstrates a mutagenic MOA. However, the current IRIS assessment classifies Cr(VI) as Group D by the oral route. The 2011 HHRA calculated risks using the oral slope factor of 0.5 $(mg/kg\text{-}day)^{-1}$ for Cr(VI). Therefore, chromium is also evaluated as a carcinogen by the oral route for this assessment.

Sources:

C = Cal EPA

E = Environmental Criteria and Assessment Office

I = IRIS

J = New Jersey

P = PPRTV

Weight of Evidence/Cancer Guideline Description

A = Human carcinogen. Sufficient evidence of cancer in humans.

B2 = Probably human carcinogen. Sufficieint evidence of cancer in animals, but lack of data or insufficient data from humans.

D = Cannot be evaluated. No evidence or inadequate evidence of cancer in animals or humans.

NC = Not classified

7.7 Series 7 Tables

TABLE 7.1a.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5	1E+04	mg/kg	1.8E-04	(mg/kg-day)				1.4E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-03
				Antimony	7440-36-0	3E+00	mg/kg	6.3E-08	(mg/kg-day)				4.9E-07	(mg/kg-day)	4.0E-04	(mg/kg-day)	1E-03
				Arsenic	7440-38-2	1E+01	mg/kg	1.8E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-07	1.4E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-03
				Benzene	71-43-2	8E-03	mg/kg	1.5E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	8E-12	1.2E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	3E-07
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.5E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	1.3E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-07	9.7E-07	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	1.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.0E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.0E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-09	7.8E-07	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	2.2E-06	(mg/kg-day)				1.7E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-02
				Chromium	7440-47-3	4E+02	mg/kg	7.5E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	4E-06	5.8E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-02
				Chrysene	218-01-9	1E+01	mg/kg	2.1E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	2E-09	1.6E-06	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	1.4E-07	(mg/kg-day)				1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Copper	7440-50-8	2E+02	mg/kg	4.0E-06	(mg/kg-day)				3.1E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	8E-04
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	3.1E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-07	2.4E-07	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	7.1E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-08	5.5E-07	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	3.7E-04	(mg/kg-day)				2.8E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-03
				Manganese	7439-96-5	4E+02	mg/kg	6.6E-06	(mg/kg-day)				5.1E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-03
				Mercury	7439-97-6	1E+00	mg/kg	2.1E-08	(mg/kg-day)				1.7E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	6E-04
				Naphthalene	91-20-3	3E-01	mg/kg	4.9E-09	(mg/kg-day)				3.8E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-06
				Nickel	7440-02-0	1E+02	mg/kg	2.0E-06	(mg/kg-day)				1.6E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	8E-04
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-07	1.7E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	8E-02
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.3E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-08	1.0E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E-03
				Silver	7440-22-4	2E+01	mg/kg	3.3E-07	(mg/kg-day)				2.6E-06	(mg/kg-day)	5.0E-03	(mg/kg-day)	5E-04
				Trichloroethene	79-01-6	8E-03	mg/kg	1.4E-10	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	7E-12	1.1E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-06
			Exp. Route Total									6E-06					1E-01
			Dermal	Aluminum	7429-90-5	1E+04	mg/kg	NA	NA				NA	NA			
				Antimony	7440-36-0	3E+00	mg/kg	NA	NA				NA	NA			
				Arsenic	7440-38-2	1E+01	mg/kg	9.1E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-07	7.0E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	4.4E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	3.4E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	2.8E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-06	2.2E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	2.9E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	2.3E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	2.2E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-08	1.7E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	3.8E-08	(mg/kg-day)				2.9E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	7E-06
				Chromium	7440-47-3	4E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9	1E+01	mg/kg	4.7E-07	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	3E-09	3.6E-06	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	NA	NA				NA	NA			
				Copper	7440-50-8	2E+02	mg/kg	NA	NA				NA	NA			
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	6.9E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	5E-07	5.4E-07	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	1.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	1.2E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	NA	NA				NA	NA			
				Manganese	7439-96-5	4E+02	mg/kg	NA	NA				NA	NA			
				Mercury	7439-97-6	1E+00	mg/kg	NA	NA				NA	NA			
				Naphthalene	91-20-3	3E-01	mg/kg	1.1E-08	(mg/kg-day)				8.4E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-06
				Nickel	7440-02-0	1E+02	mg/kg	NA	NA				NA	NA			
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	5.1E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-06	4.0E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	3.2E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-08	2.5E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E-02
				Silver	7440-22-4	2E+01	mg/kg	NA	NA				NA	NA			

TABLE 7.1a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									4E-06					2E-01
		Exposure Point Total										1E-05					4E-01
	Exposure Medium Total											1E-05					4E-01
Medium Total												1E-05					4E-01

TABLE 7.1b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5	1E+04	mg/kg	2.3E-03	(mg/kg-day)				5.5E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	5E-03
				Antimony	7440-36-0	3E+00	mg/kg	8.3E-07	(mg/kg-day)				1.9E-06	(mg/kg-day)	4.0E-04	(mg/kg-day)	5E-03
				Arsenic	7440-38-2	1E+01	mg/kg	2.3E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	4E-06	5.5E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Benzene	71-43-2	8E-03	mg/kg	2.0E-09	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	1E-10	4.6E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	1E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	6.2E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	1.7E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-05	3.9E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	1.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	4.1E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.3E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-07	3.1E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	2.9E-05	(mg/kg-day)				6.8E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	7E-02
				Chromium	7440-47-3	4E+02	mg/kg	9.9E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	5E-05	2.3E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	8E-02
				Chrysene	218-01-9	1E+01	mg/kg	2.8E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	2E-08	6.5E-06	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	1.9E-06	(mg/kg-day)				4.4E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-02
				Copper	7440-50-8	2E+02	mg/kg	5.3E-05	(mg/kg-day)				1.2E-04	(mg/kg-day)	4.0E-02	(mg/kg-day)	3E-03
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	4.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-06	9.6E-07	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	9.4E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-07	2.2E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	4.8E-03	(mg/kg-day)				1.1E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-02
				Manganese	7439-96-5	4E+02	mg/kg	8.7E-05	(mg/kg-day)				2.0E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	8E-03
				Mercury	7439-97-6	1E+00	mg/kg	2.8E-07	(mg/kg-day)				6.6E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-03
				Naphthalene	91-20-3	3E-01	mg/kg	6.4E-08	(mg/kg-day)				1.5E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	7E-06
				Nickel	7440-02-0	1E+02	mg/kg	2.7E-05	(mg/kg-day)				6.3E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	3E-03
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.8E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-06	6.6E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.8E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-07	4.1E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-02
				Silver	7440-22-4	2E+01	mg/kg	4.4E-06	(mg/kg-day)				1.0E-05	(mg/kg-day)	5.0E-03	(mg/kg-day)	2E-03
				Trichloroethene	79-01-6	8E-03	mg/kg	1.9E-09	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	9E-11	4.4E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	9E-06
			Exp. Route Total									8E-05					6E-01
			Dermal	Aluminum	7429-90-5	1E+04	mg/kg	NA	NA				NA	NA			
				Antimony	7440-36-0	3E+00	mg/kg	NA	NA				NA	NA			
				Arsenic	7440-38-2	1E+01	mg/kg	1.2E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-06	2.8E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	9E-03
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	5.9E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-06	1.4E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	3.7E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-05	8.6E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	3.9E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	9.1E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	3.0E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-07	6.9E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	5.0E-07	(mg/kg-day)				1.2E-06	(mg/kg-day)	1.0E-03	(mg/kg-day)	3E-05
				Chromium	7440-47-3	4E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9	1E+01	mg/kg	6.2E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	5E-08	1.4E-05	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	NA	NA				NA	NA			
				Copper	7440-50-8	2E+02	mg/kg	NA	NA				NA	NA			
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	9.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-06	2.1E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	2.1E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	4.9E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	NA	NA				NA	NA			
				Manganese	7439-96-5	4E+02	mg/kg	NA	NA				NA	NA			
				Mercury	7439-97-6	1E+00	mg/kg	NA	NA				NA	NA			
				Naphthalene	91-20-3	3E-01	mg/kg	1.4E-07	(mg/kg-day)				3.3E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-05
				Nickel	7440-02-0	1E+02	mg/kg	NA	NA				NA	NA			
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	6.8E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-05	1.6E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	8E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	4.2E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	8E-07	9.9E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E-02
				Silver	7440-22-4	2E+01	mg/kg	NA	NA				NA	NA			

TABLE 7.1b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									6E-05					9E-01
		Exposure Point Total										1E-04					1E+00
	Exposure Medium Total											1E-04					1E+00
Medium Total												1E-04					1E+00

TABLE 7.2a.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5	1E+04	mg/kg	1.9E-04	(mg/kg-day)				1.7E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	2E-03
				Antimony	7440-36-0	3E+00	mg/kg	6.7E-08	(mg/kg-day)				5.9E-07	(mg/kg-day)	4.0E-04	(mg/kg-day)	1E-03
				Arsenic	7440-38-2	1E+01	mg/kg	1.9E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-07	1.7E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	6E-03
				Benzene	71-43-2	8E-03	mg/kg	1.6E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	9E-12	1.4E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	4E-07
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	1.3E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	9E-07	1.9E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	8.2E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	6E-06	1.2E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	8.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-07	1.2E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	6.6E-07	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	5E-08	9.4E-07	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	2.4E-06	(mg/kg-day)				2.1E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-02
				Chromium	7440-47-3	4E+02	mg/kg	8.0E-06	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	4E-06	7.0E-05	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-02
				Chrysene	218-01-9	1E+01	mg/kg	1.4E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	1E-08	2.0E-06	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	1.5E-07	(mg/kg-day)				1.3E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Copper	7440-50-8	2E+02	mg/kg	4.3E-06	(mg/kg-day)				3.8E-05	(mg/kg-day)	4.0E-02	(mg/kg-day)	9E-04
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	2.0E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-06	2.9E-07	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	4.6E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	6.6E-07	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	3.9E-04	(mg/kg-day)				3.4E-03	(mg/kg-day)	7.0E-01	(mg/kg-day)	5E-03
				Manganese	7439-96-5	4E+02	mg/kg	7.1E-06	(mg/kg-day)				6.2E-05	(mg/kg-day)	2.4E-02	(mg/kg-day)	3E-03
				Mercury	7439-97-6	1E+00	mg/kg	2.3E-08	(mg/kg-day)				2.0E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-04
				Naphthalene	91-20-3	3E-01	mg/kg	5.2E-09	(mg/kg-day)				4.6E-08	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-06
				Nickel	7440-02-0	1E+02	mg/kg	2.2E-06	(mg/kg-day)				1.9E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-03
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.3E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-07	2.0E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.4E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-08	1.3E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E-03
				Silver	7440-22-4	2E+01	mg/kg	3.6E-07	(mg/kg-day)				3.1E-06	(mg/kg-day)	5.0E-03	(mg/kg-day)	6E-04
				Trichloroethene	79-01-6	8E-03	mg/kg	9.3E-10	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	4E-11	1.3E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-06
			Exp. Route Total									1E-05					2E-01
			Dermal	Aluminum	7429-90-5	1E+04	mg/kg	NA	NA				NA	NA			
				Antimony	7440-36-0	3E+00	mg/kg	NA	NA				NA	NA			
				Arsenic	7440-38-2	1E+01	mg/kg	1.2E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-07	1.1E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-03
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	2.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	5.2E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	1.6E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-05	3.3E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	1.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	3.5E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.3E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-07	2.7E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	5.1E-08	(mg/kg-day)				4.5E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-05
				Chromium	7440-47-3	4E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9	1E+01	mg/kg	2.8E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	2E-08	5.6E-06	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	NA	NA				NA	NA			
				Copper	7440-50-8	2E+02	mg/kg	NA	NA				NA	NA			
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	4.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-06	8.2E-07	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	9.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	7E-07	1.9E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	NA	NA				NA	NA			
				Manganese	7439-96-5	4E+02	mg/kg	NA	NA				NA	NA			
				Mercury	7439-97-6	1E+00	mg/kg	NA	NA				NA	NA			
				Naphthalene	91-20-3	3E-01	mg/kg	1.5E-08	(mg/kg-day)				1.3E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	6E-06
				Nickel	7440-02-0	1E+02	mg/kg	NA	NA				NA	NA			
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	7.0E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-06	6.1E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	4.3E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	9E-08	3.8E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-02
				Silver	7440-22-4	2E+01	mg/kg	NA	NA				NA	NA			

TABLE 7.2a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									2E-05					3E-01
		Exposure Point Total										3E-05					5E-01
	Exposure Medium Total											3E-05					5E-01
Medium Total												3E-05					5E-01

TABLE 7.2b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5	1E+04	mg/kg	9.4E-04	(mg/kg-day)				6.6E-03	(mg/kg-day)	1.0E+00	(mg/kg-day)	7E-03
				Antimony	7440-36-0	3E+00	mg/kg	3.3E-07	(mg/kg-day)				2.3E-06	(mg/kg-day)	4.0E-04	(mg/kg-day)	6E-03
				Arsenic	7440-38-2	1E+01	mg/kg	9.4E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-06	6.6E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Benzene	71-43-2	8E-03	mg/kg	8.0E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	4E-11	5.6E-09	(mg/kg-day)	4.0E-03	(mg/kg-day)	1E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	5.2E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-06	7.4E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	3.3E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-05	4.7E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	3.4E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	4.9E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	2.6E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-07	3.7E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	1.2E-05	(mg/kg-day)				8.2E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	8E-02
				Chromium	7440-47-3	4E+02	mg/kg	4.0E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-05	2.8E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	9E-02
				Chrysene	218-01-9	1E+01	mg/kg	5.5E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	4E-08	7.9E-06	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	7.6E-07	(mg/kg-day)				5.4E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Copper	7440-50-8	2E+02	mg/kg	2.1E-05	(mg/kg-day)				1.5E-04	(mg/kg-day)	4.0E-02	(mg/kg-day)	4E-03
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	8.1E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	6E-06	1.2E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	1.8E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	2.6E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	2.0E-03	(mg/kg-day)				1.4E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-02
				Manganese	7439-96-5	4E+02	mg/kg	3.5E-05	(mg/kg-day)				2.5E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	1E-02
				Mercury	7439-97-6	1E+00	mg/kg	1.1E-07	(mg/kg-day)				8.0E-07	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-03
				Naphthalene	91-20-3	3E-01	mg/kg	2.6E-08	(mg/kg-day)				1.8E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	9E-06
				Nickel	7440-02-0	1E+02	mg/kg	1.1E-05	(mg/kg-day)				7.6E-05	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-03
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	1.1E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	8.0E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	7.1E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	5.0E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-02
				Silver	7440-22-4	2E+01	mg/kg	1.8E-06	(mg/kg-day)				1.2E-05	(mg/kg-day)	5.0E-03	(mg/kg-day)	2E-03
				Trichloroethene	79-01-6	8E-03	mg/kg	3.7E-09	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	2E-10	5.3E-09	(mg/kg-day)	5.0E-04	(mg/kg-day)	1E-05
			Exp. Route Total									6E-05					7E-01
			Dermal	Aluminum	7429-90-5	1E+04	mg/kg	NA	NA				NA	NA			
				Antimony	7440-36-0	3E+00	mg/kg	NA	NA				NA	NA			
				Arsenic	7440-38-2	1E+01	mg/kg	5.0E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	8E-06	3.5E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-01
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	8.6E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-05	1.7E-04	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	5.4E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-04	1.1E-04	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	5.7E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-05	1.1E-04	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	4.3E-05	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-06	8.7E-05	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	2.1E-06	(mg/kg-day)				1.5E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	4E-04
				Chromium	7440-47-3	4E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9	1E+01	mg/kg	9.1E-05	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	7E-07	1.8E-04	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	NA	NA				NA	NA			
				Copper	7440-50-8	2E+02	mg/kg	NA	NA				NA	NA			
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	1.3E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-04	2.7E-05	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	3.0E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-05	6.1E-05	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	NA	NA				NA	NA			
				Manganese	7439-96-5	4E+02	mg/kg	NA	NA				NA	NA			
				Mercury	7439-97-6	1E+00	mg/kg	NA	NA				NA	NA			
				Naphthalene	91-20-3	3E-01	mg/kg	6.0E-07	(mg/kg-day)				4.2E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-04
				Nickel	7440-02-0	1E+02	mg/kg	NA	NA				NA	NA			
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.9E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-05	2.0E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.8E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-06	1.2E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E-01
				Silver	7440-22-4	2E+01	mg/kg	NA	NA				NA	NA			

TABLE 7.2b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									7E-04					1E+01
		Exposure Point Total										8E-04					1E+01
	Exposure Medium Total											8E-04					1E+01
Medium Total												8E-04					1E+01

TABLE 7.3a.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5	1E+04	mg/kg	1.1E-03	(mg/kg-day)				1.3E-02	(mg/kg-day)	1.0E+00	(mg/kg-day)	1E-02
				Antimony	7440-36-0	3E+00	mg/kg	3.9E-07	(mg/kg-day)				4.6E-06	(mg/kg-day)	4.0E-04	(mg/kg-day)	1E-02
				Arsenic	7440-38-2	1E+01	mg/kg	1.1E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	2E-06	1.3E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	4E-02
				Benzene	71-43-2	8E-03	mg/kg	9.3E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	5E-11	1.1E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	3E-06
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	8.4E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-06	1.4E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	5.3E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-05	9.1E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	5.6E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-06	9.6E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	4.3E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	3E-07	7.3E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	1.4E-05	(mg/kg-day)				1.6E-04	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-01
				Chromium	7440-47-3	4E+02	mg/kg	4.7E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	2E-05	5.4E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	2E-01
				Chrysene	218-01-9	1E+01	mg/kg	8.9E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	7E-08	1.5E-05	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	8.9E-07	(mg/kg-day)				1.0E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	3E-02
				Copper	7440-50-8	2E+02	mg/kg	2.5E-05	(mg/kg-day)				2.9E-04	(mg/kg-day)	4.0E-02	(mg/kg-day)	7E-03
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	1.3E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-05	2.3E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	3.0E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	5.1E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	2.3E-03	(mg/kg-day)				2.7E-02	(mg/kg-day)	7.0E-01	(mg/kg-day)	4E-02
				Manganese	7439-96-5	4E+02	mg/kg	4.1E-05	(mg/kg-day)				4.8E-04	(mg/kg-day)	2.4E-02	(mg/kg-day)	2E-02
				Mercury	7439-97-6	1E+00	mg/kg	1.3E-07	(mg/kg-day)				1.6E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-03
				Naphthalene	91-20-3	3E-01	mg/kg	3.0E-08	(mg/kg-day)				3.5E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	2E-05
				Nickel	7440-02-0	1E+02	mg/kg	1.3E-05	(mg/kg-day)				1.5E-04	(mg/kg-day)	2.0E-02	(mg/kg-day)	7E-03
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	1.3E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-06	1.6E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	8E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	8.3E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-07	9.7E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E-02
				Silver	7440-22-4	2E+01	mg/kg	2.1E-06	(mg/kg-day)				2.4E-05	(mg/kg-day)	5.0E-03	(mg/kg-day)	5E-03
				Trichloroethene	79-01-6	8E-03	mg/kg	6.0E-09	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	3E-10	1.0E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	2E-05
			Exp. Route Total									9E-05					1E+00
			Dermal	Aluminum	7429-90-5	1E+04	mg/kg	NA	NA				NA	NA			
				Antimony	7440-36-0	3E+00	mg/kg	NA	NA				NA	NA			
				Arsenic	7440-38-2	1E+01	mg/kg	1.8E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	3E-07	2.2E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	7E-03
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	5.9E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-06	1.1E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	3.7E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-05	6.6E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	3.9E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-06	7.0E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	3.0E-06	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	2E-07	5.3E-06	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	7.7E-08	(mg/kg-day)				9.0E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	2E-05
				Chromium	7440-47-3	4E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9	1E+01	mg/kg	6.2E-06	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	5E-08	1.1E-05	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	NA	NA				NA	NA			
				Copper	7440-50-8	2E+02	mg/kg	NA	NA				NA	NA			
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	9.2E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	7E-06	1.6E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	2.1E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-06	3.7E-06	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	NA	NA				NA	NA			
				Manganese	7439-96-5	4E+02	mg/kg	NA	NA				NA	NA			
				Mercury	7439-97-6	1E+00	mg/kg	NA	NA				NA	NA			
				Naphthalene	91-20-3	3E-01	mg/kg	2.2E-08	(mg/kg-day)				2.6E-07	(mg/kg-day)	2.0E-02	(mg/kg-day)	1E-05
				Nickel	7440-02-0	1E+02	mg/kg	NA	NA				NA	NA			
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	1.0E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	1.2E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	6E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	6.5E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	7.6E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E-02
				Silver	7440-22-4	2E+01	mg/kg	NA	NA				NA	NA			

TABLE 7.3a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									5E-05					7E-01
		Exposure Point Total										1E-04					2E+00
	Exposure Medium Total											1E-04					2E+00
Medium Total												1E-04					2E+00

TABLE 7.3b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Recreational Visitor
Receptor Age: Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5	1E+04	mg/kg	4.4E-03	(mg/kg-day)				5.1E-02	(mg/kg-day)	1.0E+00	(mg/kg-day)	5E-02
				Antimony	7440-36-0	3E+00	mg/kg	1.6E-06	(mg/kg-day)				1.8E-05	(mg/kg-day)	4.0E-04	(mg/kg-day)	5E-02
				Arsenic	7440-38-2	1E+01	mg/kg	4.4E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	7E-06	5.1E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-01
				Benzene	71-43-2	8E-03	mg/kg	3.7E-09	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	2E-10	4.3E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	1E-05
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	3.4E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-05	5.7E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	2.1E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-04	3.6E-05	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	2.2E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-05	3.8E-05	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	1.7E-05	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	1E-06	2.9E-05	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	5.5E-05	(mg/kg-day)				6.4E-04	(mg/kg-day)	1.0E-03	(mg/kg-day)	6E-01
				Chromium	7440-47-3	4E+02	mg/kg	1.9E-04	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	9E-05	2.2E-03	(mg/kg-day)	3.0E-03	(mg/kg-day)	7E-01
				Chrysene	218-01-9	1E+01	mg/kg	3.6E-05	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	3E-07	6.1E-05	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	3.5E-06	(mg/kg-day)				4.1E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-01
				Copper	7440-50-8	2E+02	mg/kg	9.9E-05	(mg/kg-day)				1.2E-03	(mg/kg-day)	4.0E-02	(mg/kg-day)	3E-02
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	5.2E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-05	9.0E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	1.2E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	9E-06	2.0E-05	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	9.0E-03	(mg/kg-day)				1.1E-01	(mg/kg-day)	7.0E-01	(mg/kg-day)	2E-01
				Manganese	7439-96-5	4E+02	mg/kg	1.6E-04	(mg/kg-day)				1.9E-03	(mg/kg-day)	2.4E-02	(mg/kg-day)	8E-02
				Mercury	7439-97-6	1E+00	mg/kg	5.3E-07	(mg/kg-day)				6.2E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-02
				Naphthalene	91-20-3	3E-01	mg/kg	1.2E-07	(mg/kg-day)				1.4E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	7E-05
				Nickel	7440-02-0	1E+02	mg/kg	5.0E-05	(mg/kg-day)				5.9E-04	(mg/kg-day)	2.0E-02	(mg/kg-day)	3E-02
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	5.3E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-05	6.2E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E+00
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	3.3E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	7E-07	3.8E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-01
				Silver	7440-22-4	2E+01	mg/kg	8.3E-06	(mg/kg-day)				9.7E-05	(mg/kg-day)	5.0E-03	(mg/kg-day)	2E-02
				Trichloroethene	79-01-6	8E-03	mg/kg	2.4E-08	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	1E-09	4.1E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	8E-05
			Exp. Route Total									4E-04					5E+00
			Dermal	Aluminum	7429-90-5	1E+04	mg/kg	NA	NA				NA	NA			
				Antimony	7440-36-0	3E+00	mg/kg	NA	NA				NA	NA			
				Arsenic	7440-38-2	1E+01	mg/kg	5.1E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	8E-06	6.0E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	2E-01
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	1E+01	mg/kg	1.9E-04	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-04	2.9E-04	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	7E+00	mg/kg	1.2E-04	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-04	1.8E-04	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	7E+00	mg/kg	1.3E-04	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	9E-05	1.9E-04	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9	6E+00	mg/kg	9.8E-05	(mg/kg-day)	7.3E-02	(mg/kg-day)-1	7E-06	1.5E-04	(mg/kg-day)			
				Cadmium	7440-43-9	1E+02	mg/kg	2.1E-06	(mg/kg-day)				2.5E-05	(mg/kg-day)	1.0E-03	(mg/kg-day)	6E-04
				Chromium	7440-47-3	4E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9	1E+01	mg/kg	2.0E-04	(mg/kg-day)	7.3E-03	(mg/kg-day)-1	1E-06	3.1E-04	(mg/kg-day)			
				Cobalt	7440-48-4	8E+00	mg/kg	NA	NA				NA	NA			
				Copper	7440-50-8	2E+02	mg/kg	NA	NA				NA	NA			
				Dibenzo(a,h)anthracene	53-70-3	2E+00	mg/kg	3.0E-05	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-04	4.6E-05	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	4E+00	mg/kg	6.9E-05	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-05	1.0E-04	(mg/kg-day)			
				Iron	7439-89-6	2E+04	mg/kg	NA	NA				NA	NA			
				Manganese	7439-96-5	4E+02	mg/kg	NA	NA				NA	NA			
				Mercury	7439-97-6	1E+00	mg/kg	NA	NA				NA	NA			
				Naphthalene	91-20-3	3E-01	mg/kg	6.1E-07	(mg/kg-day)				7.1E-06	(mg/kg-day)	2.0E-02	(mg/kg-day)	4E-04
				Nickel	7440-02-0	1E+02	mg/kg	NA	NA				NA	NA			
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.9E-05	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-05	3.4E-04	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E+01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.8E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	4E-06	2.1E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E+00
				Silver	7440-22-4	2E+01	mg/kg	NA	NA				NA	NA			

TABLE 7.3b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									1E-03					2E+01
		Exposure Point Total										2E-03					2E+01
	Exposure Medium Total											2E-03					2E+01
Medium Total												2E-03					2E+01

TABLE 7.4a.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
CENTRAL TENDENCY
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soils 0-8 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5												
				Antimony	7440-36-0												
				Arsenic	7440-38-2	1E+01	mg/kg	4.6E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	7E-07	1.6E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-02
				Benzene	71-43-2	8E-03	mg/kg	3.7E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	2E-11	1.3E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	3E-06
				Benzo(a)anthracene	56-55-3	9E+00	mg/kg	4.2E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	3E-07	1.5E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	6E+00	mg/kg	2.7E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	2E-06	9.4E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	6E+00	mg/kg	2.8E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	9.9E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9												
				Cadmium	7440-43-9	8E+01	mg/kg	3.6E-06	(mg/kg-day)				1.3E-04	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-01
				Chromium	7440-47-3	3E+02	mg/kg	1.3E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	6E-06	4.4E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	1E-01
				Chrysene	218-01-9												
				Cobalt	7440-48-4												
				Copper	7440-50-8												
				Dibenzo(a,h)anthracene	53-70-3	1E+00	mg/kg	4.4E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	3E-07	1.6E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	3E+00	mg/kg	1.5E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	5.3E-06	(mg/kg-day)			
				Iron	7439-89-6												
				Manganese	7439-96-5												
				Mercury	7439-97-6												
				Naphthalene	91-20-3												
				Nickel	7440-02-0												
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	5.3E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-06	1.8E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	9E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	3.1E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	6E-08	1.1E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	5E-02
				Silver	7440-22-4												
				Trichloroethene	79-01-6	8E-03	mg/kg	3.6E-10	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	2E-11	1.3E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	3E-05
			Exp. Route Total									1E-05					1E+00
			Dermal	Aluminum	7429-90-5												
				Antimony	7440-36-0												
				Arsenic	7440-38-2	1E+01	mg/kg	4.8E-08	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	7E-08	1.7E-06	(mg/kg-day)	3.0E-04	(mg/kg-day)	6E-03
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	9E+00	mg/kg	1.9E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-07	6.7E-06	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	6E+00	mg/kg	1.2E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	9E-07	4.2E-06	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	6E+00	mg/kg	1.3E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	9E-08	4.4E-06	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9												
				Cadmium	7440-43-9	8E+01	mg/kg	1.2E-08	(mg/kg-day)				4.3E-07	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-05
				Chromium	7440-47-3	3E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9												
				Cobalt	7440-48-4												
				Copper	7440-50-8												
				Dibenzo(a,h)anthracene	53-70-3	1E+00	mg/kg	2.0E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-07	7.0E-07	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	3E+00	mg/kg	6.8E-08	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	5E-08	2.4E-06	(mg/kg-day)			
				Iron	7439-89-6												
				Manganese	7439-96-5												
				Mercury	7439-97-6												
				Naphthalene	91-20-3												
				Nickel	7440-02-0												
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.5E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-07	8.9E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E-01
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.5E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-08	5.3E-07	(mg/kg-day)	2.0E-05	(mg/kg-day)	3E-02
				Silver	7440-22-4												

TABLE 7.4a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS

CENTRAL TENDENCY

Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									2E-06					5E-01
		Exposure Point Total										1E-05					2E+00
	Exposure Medium Total											1E-05					2E+00
Medium Total												1E-05					2E+00

TABLE 7.4b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soils 0-8 feet depth	Lower Ley Creek	Ingestion	Aluminum	7429-90-5												
				Antimony	7440-36-0												
				Arsenic	7440-38-2	1E+01	mg/kg	9.2E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1E-06	3.2E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	1E-01
				Benzene	71-43-2	8E-03	mg/kg	7.4E-10	(mg/kg-day)	5.5E-02	(mg/kg-day)-1	4E-11	2.6E-08	(mg/kg-day)	4.0E-03	(mg/kg-day)	6E-06
				Benzo(a)anthracene	56-55-3	9E+00	mg/kg	8.5E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	6E-07	3.0E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	6E+00	mg/kg	5.4E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	4E-06	1.9E-05	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	6E+00	mg/kg	5.7E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	2.0E-05	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9												
				Cadmium	7440-43-9	8E+01	mg/kg	7.2E-06	(mg/kg-day)				2.5E-04	(mg/kg-day)	1.0E-03	(mg/kg-day)	3E-01
				Chromium	7440-47-3	3E+02	mg/kg	2.5E-05	(mg/kg-day)	5.0E-01	(mg/kg-day)-1	1E-05	8.9E-04	(mg/kg-day)	3.0E-03	(mg/kg-day)	3E-01
				Chrysene	218-01-9												
				Cobalt	7440-48-4												
				Copper	7440-50-8												
				Dibenzo(a,h)anthracene	53-70-3	1E+00	mg/kg	8.9E-08	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	6E-07	3.1E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	3E+00	mg/kg	3.0E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	2E-07	1.1E-05	(mg/kg-day)			
				Iron	7439-89-6												
				Manganese	7439-96-5												
				Mercury	7439-97-6												
				Naphthalene	91-20-3												
				Nickel	7440-02-0												
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	1.1E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	2E-06	3.7E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E+00
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	6.2E-08	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	1E-07	2.2E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	1E-01
				Silver	7440-22-4												
				Trichloroethene	79-01-6	8E-03	mg/kg	7.2E-10	(mg/kg-day)	4.6E-02	(mg/kg-day)-1	3E-11	2.5E-08	(mg/kg-day)	5.0E-04	(mg/kg-day)	5E-05
			Exp. Route Total									2E-05					3E+00
			Dermal	Aluminum	7429-90-5												
				Antimony	7440-36-0												
				Arsenic	7440-38-2	1E+01	mg/kg	4.3E-07	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	6E-07	1.5E-05	(mg/kg-day)	3.0E-04	(mg/kg-day)	5E-02
				Benzene	71-43-2	8E-03	mg/kg	NA	NA				NA	NA			
				Benzo(a)anthracene	56-55-3	9E+00	mg/kg	1.7E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	1E-06	6.0E-05	(mg/kg-day)			
				Benzo(a)pyrene	50-32-8	6E+00	mg/kg	1.1E-06	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	8E-06	3.8E-05	(mg/kg-day)			
				Benzo(b)fluoranthene	205-99-2	6E+00	mg/kg	1.1E-06	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	8E-07	4.0E-05	(mg/kg-day)			
				Benzo(k)fluoranthene	207-08-9												
				Cadmium	7440-43-9	8E+01	mg/kg	1.1E-07	(mg/kg-day)				3.9E-06	(mg/kg-day)	1.0E-03	(mg/kg-day)	1E-04
				Chromium	7440-47-3	3E+02	mg/kg	NA	NA				NA	NA			
				Chrysene	218-01-9												
				Cobalt	7440-48-4												
				Copper	7440-50-8												
				Dibenzo(a,h)anthracene	53-70-3	1E+00	mg/kg	1.8E-07	(mg/kg-day)	7.3E+00	(mg/kg-day)-1	1E-06	6.3E-06	(mg/kg-day)			
				Indeno(1,2,3-cd)pyrene	193-39-5	3E+00	mg/kg	6.2E-07	(mg/kg-day)	7.3E-01	(mg/kg-day)-1	4E-07	2.2E-05	(mg/kg-day)			
				Iron	7439-89-6												
				Manganese	7439-96-5												
				Mercury	7439-97-6												
				Naphthalene	91-20-3												
				Nickel	7440-02-0												
				PCB-1248 (Aroclor 1248)	12672-29-6	1E+01	mg/kg	2.3E-06	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	5E-06	8.0E-05	(mg/kg-day)	2.0E-05	(mg/kg-day)	4E+00
				PCB-1260 (Aroclor 1260)	11096-82-5	7E-01	mg/kg	1.4E-07	(mg/kg-day)	2.0E+00	(mg/kg-day)-1	3E-07	4.8E-06	(mg/kg-day)	2.0E-05	(mg/kg-day)	2E-01
				Silver	7440-22-4												

TABLE 7.4b.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZRDS
REASONABLE MAXIMUM EXPOSURE
Lower Ley Creek

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CAS Number	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
						Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
								Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	79-01-6	8E-03	mg/kg	NA	NA				NA	NA			
			Exp. Route Total									2E-05					4E+00
		Exposure Point Total										4E-05					7E+00
	Exposure Medium Total											4E-05					7E+00
Medium Total												4E-05					7E+00

Table 7.5. Consolidated Human Intake Factor (HIF) Values

Media (Location)	Receptor	RME		CTE	
		Non-Cancer	Cancer	Non-Cancer	Cancer
Soil Ing (LLC)	Adult Rec Vis	6E-07	2E-07	1E-07	2E-08
Soil Ing (LLC)	Older Child (6 to <16) Rec Vis	7E-07	1E-07	2E-07	2E-08
Soil Ing (LLC)	Young Child (less than 6) Rec Vis	5E-06	4E-07	1E-06	1E-07
Soil Ing (LLC)	Construction Worker	3E-06	9E-08	2E-06	5E-08
Soil Dermal (LLC)	Adult Rec Vis	1E-05	4E-06	2E-06	3E-07
Soil Dermal (LLC)	Older Child (6 to <16) Rec Vis	1E-04	2E-05	4E-06	4E-07
Soil Dermal (LLC)	Young Child (less than 6) Rec Vis	2E-04	2E-05	7E-06	6E-07
Soil Dermal (LLC)	Construction Worker	5E-05	1E-06	6E-06	2E-07

NA = not applicable, pathway incomplete.

HIFs MMOA Chemicals

Media (Location)	Receptor	RME	CTE
Soil Ing (LLC)	Older Child (6 to <16) Rec Vis	5E-07	1E-07
Soil Ing (LLC)	Young Child (less than 6) Rec Vis	3E-06	8E-07
Soil Dermal (LLC)	Older Child (6 to <16) Rec Vis	5E-07	1E-07
Soil Dermal (LLC)	Young Child (less than 6) Rec Vis	6E-05	2E-06

7.8 Series 9 Tables

TABLE 9.1a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Aluminum				CNS	1E-03		1E-03
			Antimony				Blood	1E-03		1E-03
			Arsenic	3E-07	1E-07	4E-07	Skin	5E-03	2E-03	7E-03
			Benzene	8E-12		8E-12	Blood	3E-07		3E-07
			Benzo(a)anthracene	1E-07	3E-07	5E-07	--			
			Benzo(a)pyrene	9E-07	2E-06	3E-06	--			
			Benzo(b)fluoranthene	1E-07	2E-07	3E-07	--			
			Benzo(k)fluoranthene	7E-09	2E-08	2E-08	--			
			Cadmium				kidney	2E-02	7E-06	2E-02
			Chromium	4E-06		4E-06	GI	2E-02		2E-02
			Chrysene	2E-09	3E-09	5E-09	--			
			Cobalt				thyroid	4E-03		4E-03
			Copper				GI	8E-04		8E-04
			Dibenzo(a,h)anthracene	2E-07	5E-07	7E-07	--			
			Indeno(1,2,3-cd)pyrene	5E-08	1E-07	2E-07	--			
			Iron				GI	4E-03		4E-03
			Manganese				CNS	2E-03		2E-03
			Mercury				Immune	6E-04		6E-04
			Naphthalene				↓ body weight	2E-06	4E-06	6E-06
			Nickel				↓ body/liver/heart weights	8E-04		8E-04
			PCB-1248 (Aroclor 1248)	4E-07	1E-06	1E-06	systemic	8E-02	2E-01	3E-01
			PCB-1260 (Aroclor 1260)	3E-08	6E-08	9E-08	systemic	5E-03	1E-02	2E-02
			Silver				Skin	5E-04		5E-04
			Trichloroethene	7E-12		7E-12	Immune, developmental, heart	2E-06		2E-06
			Chemical Total			1E-05				4E-01
		Exposure Point Total				1E-05				4E-01
	Exposure Medium Total					1E-05				4E-01
Medium Total						1E-05				4E-01

Blood HI =	1E-03
CNS HI =	1E-03
Developmental HI =	2E-06
GI HI =	2E-02
Kidney HI =	2E-02
Liver HI =	8E-04
Skin HI =	7E-03
Thyroid HI =	4E-03
Whole Body HI =	3E-01
Reproductive HI =	6E-04
Other HI =	8E-04

TABLE 9.1b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Aluminum				CNS	5E-03		5E-03
			Antimony				Blood	5E-03		5E-03
			Arsenic	4E-06	2E-06	5E-06	Skin	2E-02	9E-03	3E-02
			Benzene	1E-10		1E-10	Blood	1E-06		1E-06
			Benzo(a)anthracene	2E-06	4E-06	6E-06	--			
			Benzo(a)pyrene	1E-05	3E-05	4E-05	--			
			Benzo(b)fluoranthene	1E-06	3E-06	4E-06	--			
			Benzo(k)fluoranthene	1E-07	2E-07	3E-07	--			
			Cadmium				kidney	7E-02	3E-05	7E-02
			Chromium	5E-05		5E-05	GI	8E-02		8E-02
			Chrysene	2E-08	5E-08	7E-08	--			
			Cobalt				thyroid	1E-02		1E-02
			Copper				GI	3E-03		3E-03
			Dibenzo(a,h)anthracene	3E-06	7E-06	1E-05	--			
			Indeno(1,2,3-cd)pyrene	7E-07	2E-06	2E-06	--			
			Iron				GI	2E-02		2E-02
			Manganese				CNS	8E-03		8E-03
			Mercury				Immune	2E-03		2E-03
			Naphthalene				↓ body weight	7E-06	2E-05	2E-05
			Nickel				↓ body/liver/heart weights	3E-03		3E-03
			PCB-1248 (Aroclor 1248)	6E-06	1E-05	2E-05	systemic	3E-01	8E-01	1E+00
			PCB-1260 (Aroclor 1260)	4E-07	8E-07	1E-06	systemic	2E-02	5E-02	7E-02
			Silver				Skin	2E-03		2E-03
			Trichloroethene	9E-11		9E-11	Immune, developmental, heart	9E-06		9E-06
			Chemical Total			1E-04				1E+00
		Exposure Point Total				1E-04				1E+00
	Exposure Medium Total					1E-04				1E+00
Medium Total						1E-04				1E+00

Blood HI =	5E-03
CNS HI =	5E-03
Developmental HI =	9E-06
GI HI =	8E-02
Kidney HI =	7E-02
Liver HI =	3E-03
Skin HI =	3E-02
Thyroid HI =	1E-02
Whole Body HI =	1E+00
Reproductive HI =	2E-03
Other HI =	3E-03

TABLE 9.2a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Aluminum				CNS	2E-03		2E-03
			Antimony				Blood	1E-03		1E-03
			Arsenic	3E-07	2E-07	5E-07	Skin	6E-03	4E-03	9E-03
			Benzene	9E-12		9E-12	Blood	4E-07		4E-07
			Benzo(a)anthracene	9E-07	2E-06	3E-06	--			
			Benzo(a)pyrene	6E-06	1E-05	2E-05	--			
			Benzo(b)fluoranthene	6E-07	1E-06	2E-06	--			
			Benzo(k)fluoranthene	5E-08	1E-07	1E-07	--			
			Cadmium				kidney	2E-02	1E-05	2E-02
			Chromium	4E-06		4E-06	GI	2E-02		2E-02
			Chrysene	1E-08	2E-08	3E-08	--			
			Cobalt				thyroid	4E-03		4E-03
			Copper				GI	9E-04		9E-04
			Dibenzo(a,h)anthracene	1E-06	3E-06	4E-06	--			
			Indeno(1,2,3-cd)pyrene	3E-07	7E-07	1E-06	--			
			Iron				GI	5E-03		5E-03
			Manganese				CNS	3E-03		3E-03
			Mercury				Immune	7E-04		7E-04
			Naphthalene				↓ body weight	2E-06	6E-06	9E-06
			Nickel				↓ body/liver/heart weights	1E-03		1E-03
			PCB-1248 (Aroclor 1248)	5E-07	1E-06	2E-06	systemic	1E-01	3E-01	4E-01
			PCB-1260 (Aroclor 1260)	3E-08	9E-08	1E-07	systemic	6E-03	2E-02	3E-02
			Silver				Skin	6E-04		6E-04
			Trichloroethene	4E-11		4E-11	Immune, developmental, heart	3E-06		3E-06
			Chemical Total			3E-05				5E-01
		Exposure Point Total				3E-05				5E-01
	Exposure Medium Total					3E-05				5E-01
Medium Total						3E-05				5E-01

Blood HI =	1E-03
CNS HI =	2E-03
Developmental HI =	3E-06
GI HI =	2E-02
Kidney HI =	2E-02
Liver HI =	1E-03
Skin HI =	1E-02
Thyroid HI =	4E-03
Whole Body HI =	4E-01
Reproductive HI =	7E-04
Other HI =	1E-03

TABLE 9.2b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Older Child (6 to <16)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Aluminum				CNS	7E-03		7E-03
			Antimony				Blood	6E-03		6E-03
			Arsenic	1E-06	8E-06	9E-06	Skin	2E-02	1E-01	1E-01
			Benzene	4E-11		4E-11	Blood	1E-06		1E-06
			Benzo(a)anthracene	4E-06	6E-05	7E-05	--			
			Benzo(a)pyrene	2E-05	4E-04	4E-04	--			
			Benzo(b)fluoranthene	3E-06	4E-05	4E-05	--			
			Benzo(k)fluoranthene	2E-07	3E-06	3E-06	--			
			Cadmium				kidney	8E-02	4E-04	8E-02
			Chromium	2E-05		2E-05	GI	9E-02		9E-02
			Chrysene	4E-08	7E-07	7E-07	--			
			Cobalt				thyroid	2E-02		2E-02
			Copper				GI	4E-03		4E-03
			Dibenzo(a,h)anthracene	6E-06	1E-04	1E-04	--			
			Indeno(1,2,3-cd)pyrene	1E-06	2E-05	2E-05	--			
			Iron				GI	2E-02		2E-02
			Manganese				CNS	1E-02		1E-02
			Mercury				Immune	3E-03		3E-03
			Naphthalene				↓ body weight	9E-06	2E-04	2E-04
			Nickel				↓ body/liver/heart weights	4E-03		4E-03
			PCB-1248 (Aroclor 1248)	2E-06	6E-05	6E-05	systemic	4E-01	1E+01	1E+01
			PCB-1260 (Aroclor 1260)	1E-07	4E-06	4E-06	systemic	2E-02	6E-01	6E-01
			Silver				Skin	2E-03		2E-03
			Trichloroethene	2E-10		2E-10	Immune, developmental, heart	1E-05		1E-05
			Chemical Total			8E-04				1E+01
		Exposure Point Total				8E-04				1E+01
	Exposure Medium Total					8E-04				1E+01
Medium Total						8E-04				1E+01

Blood HI =	6E-03
CNS HI =	7E-03
Developmental HI =	1E-05
GI HI =	1E-01
Kidney HI =	8E-02
Liver HI =	4E-03
Skin HI =	1E-01
Thyroid HI =	2E-02
Whole Body HI =	1E+01
Reproductive HI =	3E-03
Other HI =	4E-03

TABLE 9.3a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Aluminum				CNS	1E-02		1E-02
			Antimony				Blood	1E-02		1E-02
			Arsenic	2E-06	3E-07	2E-06	Skin	4E-02	7E-03	5E-02
			Benzene	5E-11		5E-11	Blood	3E-06		3E-06
			Benzo(a)anthracene	6E-06	4E-06	1E-05	--			
			Benzo(a)pyrene	4E-05	3E-05	7E-05	--			
			Benzo(b)fluoranthene	4E-06	3E-06	7E-06	--			
			Benzo(k)fluoranthene	3E-07	2E-07	5E-07	--			
			Cadmium				kidney	2E-01	2E-05	2E-01
			Chromium	2E-05		2E-05	GI	2E-01		2E-01
			Chrysene	7E-08	5E-08	1E-07	--			
			Cobalt				thyroid	3E-02		3E-02
			Copper				GI	7E-03		7E-03
			Dibenzo(a,h)anthracene	1E-05	7E-06	2E-05	--			
			Indeno(1,2,3-cd)pyrene	2E-06	2E-06	4E-06	--			
			Iron				GI	4E-02		4E-02
			Manganese				CNS	2E-02		2E-02
			Mercury				Immune	5E-03		5E-03
			Naphthalene				↓ body weight	2E-05	1E-05	3E-05
			Nickel				↓ body/liver/heart weights	7E-03		7E-03
			PCB-1248 (Aroclor 1248)	3E-06	2E-06	5E-06	systemic	8E-01	6E-01	1E+00
			PCB-1260 (Aroclor 1260)	2E-07	1E-07	3E-07	systemic	5E-02	4E-02	9E-02
			Silver				Skin	5E-03		5E-03
			Trichloroethene	3E-10		3E-10	Immune, developmental, heart	2E-05		2E-05
			Chemical Total			1E-04				2E+00
		Exposure Point Total				1E-04				2E+00
	Exposure Medium Total					1E-04				2E+00
Medium Total						1E-04				2E+00

Blood HI =	1E-02
CNS HI =	1E-02
Developmental HI =	2E-05
GI HI =	2E-01
Kidney HI =	2E-01
Liver HI =	7E-03
Skin HI =	5E-02
Thyroid HI =	3E-02
Whole Body HI =	1E+00
Reproductive HI =	5E-03
Other HI =	7E-03

TABLE 9.3b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Recreational Visitor
Receptor Age:	Young Child (less than 6)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Surface Soils 0-2 feet depth	Lower Ley Creek	Aluminum				CNS	5E-02		5E-02
			Antimony				Blood	5E-02		5E-02
			Arsenic	7E-06	8E-06	1E-05	Skin	2E-01	2E-01	4E-01
			Benzene	2E-10		2E-10	Blood	1E-05		1E-05
			Benzo(a)anthracene	2E-05	1E-04	2E-04	--			
			Benzo(a)pyrene	2E-04	9E-04	1E-03	--			
			Benzo(b)fluoranthene	2E-05	9E-05	1E-04	--			
			Benzo(k)fluoranthene	1E-06	7E-06	8E-06	--			
			Cadmium				kidney	6E-01	6E-04	6E-01
			Chromium	9E-05		9E-05	GI	7E-01		7E-01
			Chrysene	3E-07	1E-06	2E-06	--			
			Cobalt				thyroid	1E-01		1E-01
			Copper				GI	3E-02		3E-02
			Dibenzo(a,h)anthracene	4E-05	2E-04	3E-04	--			
			Indeno(1,2,3-cd)pyrene	9E-06	5E-05	6E-05	--			
			Iron				GI	2E-01		2E-01
			Manganese				CNS	8E-02		8E-02
			Mercury				Immune	2E-02		2E-02
			Naphthalene				↓ body weight	7E-05	4E-04	4E-04
			Nickel				↓ body/liver/heart weights	3E-02		3E-02
			PCB-1248 (Aroclor 1248)	1E-05	6E-05	7E-05	systemic	3E+00	2E+01	2E+01
			PCB-1260 (Aroclor 1260)	7E-07	4E-06	4E-06	systemic	2E-01	1E+00	1E+00
			Silver				Skin	2E-02		2E-02
			Trichloroethene	1E-09		1E-09	Immune, developmental, heart	8E-05		8E-05
			Chemical Total			2E-03				2E+01
		Exposure Point Total				2E-03				2E+01
	Exposure Medium Total					2E-03				2E+01
Medium Total						2E-03				2E+01

Blood HI =	5E-02
CNS HI =	5E-02
Developmental HI =	8E-05
GI HI =	7E-01
Kidney HI =	6E-01
Liver HI =	3E-02
Skin HI =	4E-01
Thyroid HI =	1E-01
Whole Body HI =	2E+01
Reproductive HI =	2E-02
Other HI =	3E-02

TABLE 9.4a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Subsurface Soils 0-8 feet depth	Lower Ley Creek	Aluminum				CNS			
			Antimony				Blood			
			Arsenic	7E-07	7E-08	8E-07	Skin	5E-02	6E-03	6E-02
			Benzene	2E-11		2E-11	Blood	3E-06		3E-06
			Benzo(a)anthracene	3E-07	1E-07	4E-07	--			
			Benzo(a)pyrene	2E-06	9E-07	3E-06	--			
			Benzo(b)fluoranthene	2E-07	9E-08	3E-07	--			
			Benzo(k)fluoranthene				--			
			Cadmium				kidney	1E-01	1E-05	1E-01
			Chromium	6E-06		6E-06	GI	1E-01		1E-01
			Chrysene				--			
			Cobalt				thyroid			
			Copper				GI			
			Dibenzo(a,h)anthracene	3E-07	1E-07	5E-07	--			
			Indeno(1,2,3-cd)pyrene	1E-07	5E-08	2E-07	--			
			Iron				GI			
			Manganese				CNS			
			Mercury				Immune			
			Naphthalene				↓ body weight			
			Nickel				↓ body/liver/heart weights			
			PCB-1248 (Aroclor 1248)	1E-06	5E-07	2E-06	systemic	9E-01	4E-01	1E+00
			PCB-1260 (Aroclor 1260)	6E-08	3E-08	9E-08	systemic	5E-02	3E-02	8E-02
			Silver				Skin			
			Trichloroethene	2E-11		2E-11	Immune, developmental, heart	3E-05		3E-05
			Chemical Total			1E-05				2E+00
		Exposure Point Total				1E-05				2E+00
	Exposure Medium Total					1E-05				2E+00
Medium Total						1E-05				2E+00

Blood HI =	3E-06
CNS HI =	0E+00
Developmental HI =	3E-05
GI HI =	1E-01
Kidney HI =	1E-01
Liver HI =	0E+00
Skin HI =	6E-02
Thyroid HI =	0E+00
Whole Body HI =	1E+00
Reproductive HI =	3E-05
Other HI =	3E-05

TABLE 9.4b.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
LOWER LEY CREEK

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk			Non-Carcinogenic Hazard Quotient			
				Ingestion	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Exposure Routes Total
Soil	Subsurface Soils 0-8 feet depth	Lower Ley Creek	Aluminum				CNS			
			Antimony				Blood			
			Arsenic	1E-06	6E-07	2E-06	Skin	1E-01	5E-02	2E-01
			Benzene	4E-11		4E-11	Blood	6E-06		6E-06
			Benzo(a)anthracene	6E-07	1E-06	2E-06	--			
			Benzo(a)pyrene	4E-06	8E-06	1E-05	--			
			Benzo(b)fluoranthene	4E-07	8E-07	1E-06	--			
			Benzo(k)fluoranthene				--			
			Cadmium				kidney	3E-01	1E-04	3E-01
			Chromium	1E-05		1E-05	GI	3E-01		3E-01
			Chrysene				--			
			Cobalt				thyroid			
			Copper				GI			
			Dibenzo(a,h)anthracene	6E-07	1E-06	2E-06	--			
			Indeno(1,2,3-cd)pyrene	2E-07	4E-07	7E-07	--			
			Iron				GI			
			Manganese				CNS			
			Mercury				Immune			
			Naphthalene				↓ body weight			
			Nickel				↓ body/liver/heart weights			
			PCB-1248 (Aroclor 1248)	2E-06	5E-06	7E-06	systemic	2E+00	4E+00	6E+00
			PCB-1260 (Aroclor 1260)	1E-07	3E-07	4E-07	systemic	1E-01	2E-01	3E-01
			Silver				Skin			
			Trichloroethene	3E-11		3E-11	Immune, developmental, heart	5E-05		5E-05
			Chemical Total			4E-05				7E+00
		Exposure Point Total				4E-05				7E+00
	Exposure Medium Total					4E-05				7E+00
Medium Total						4E-05				7E+00

Blood HI =	6E-06
CNS HI =	0E+00
Developmental HI =	5E-05
GI HI =	3E-01
Kidney HI =	3E-01
Liver HI =	0E+00
Skin HI =	2E-01
Thyroid HI =	0E+00
Whole Body HI =	6E+00
Reproductive HI =	5E-05
Other HI =	5E-05

8.0 FIGURES

Base map created using color digital orthoimagery of New York state, site survey GPS data,.

Map Creation Date: 26 January 2012

Coordinate system: New York State Plane
FIPS: 3102
Datum: NAD83
Units: Feet

N
W E
S
Magnetic North

Legend

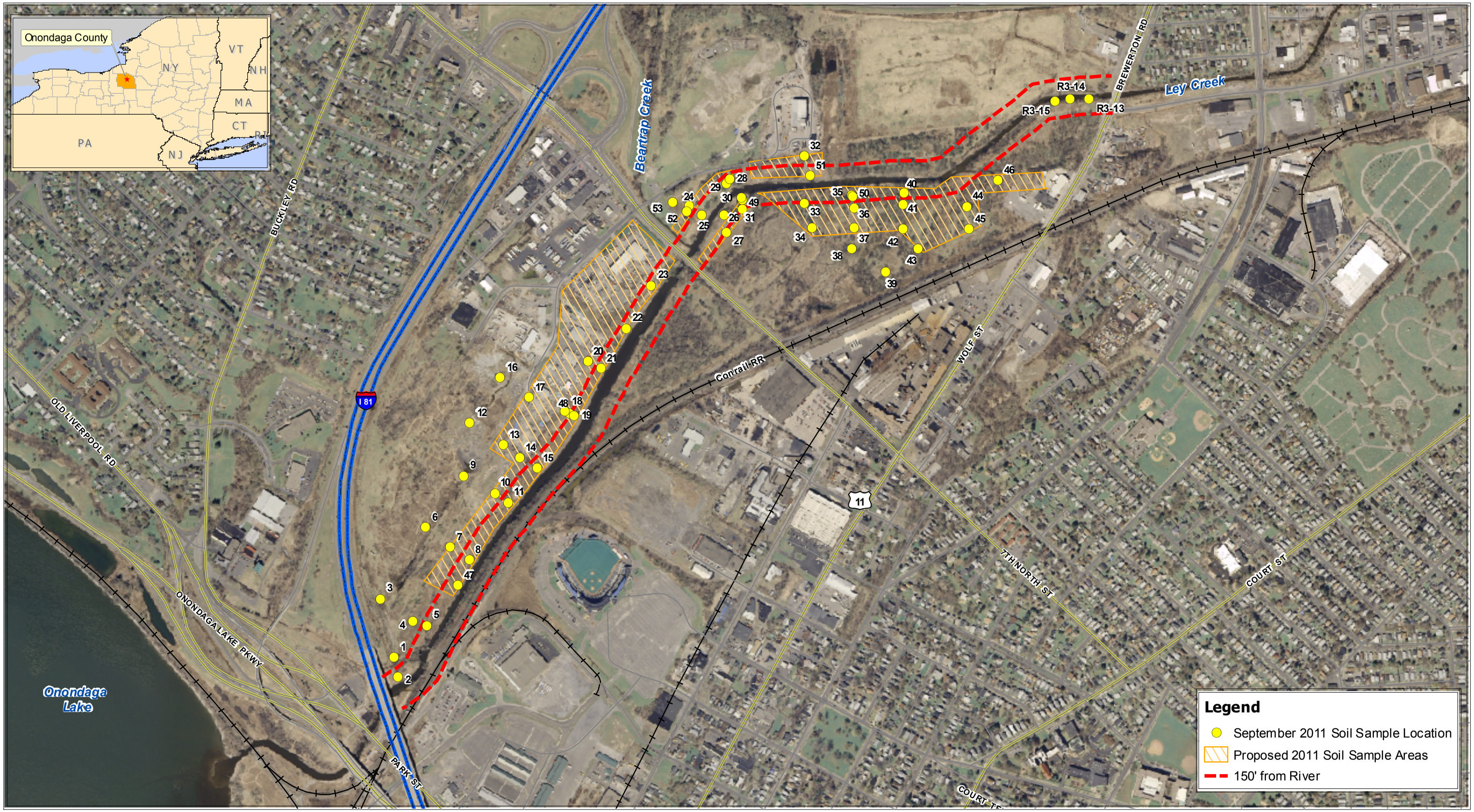
- Soil Boring Sample Location (Aug 2010)
- Swale Sample Location (May 2010)
- Proposed Swale Transect Line

100 0 100
Feet

U.S EPA Environmental Response Team
Scientific Engineering Response and Analytical Services
EP-W-09-031
W.A. # 0-007

Figure 1
Soil Bore Sample Locations
in the Swale Area
Lower Ley Creek
Syracuse, New York

Data: g:\arcviewprojects\SERAS01\00-007
MXD file: g:\arcinfoprojects\rSERAS01\SER00007_Lower_Ley_Creek\BERA_Report/007_Soil_Boring_Sample_Location_Aug2010_F1



Base map created using color digital orthoimagery of New York state, site survey GPS data.

Map Creation Date: 26 January 2012

Coordinate system: New York State Plane Central
FIPS: 3102
Datum: NAD83
Units: Feet

750 0 750
Feet

N
W E
S

Data: g:\arcviewprojects\SERAS01\00-007
MXD file: g:\arcinfoprojects\SERAS01\SER00007_Lower_Ley_Creek\BERA_Report/007_092011_Sediment_Sampling_Location_F2

U.S EPA Environmental Response Team
Scientific Engineering Response and Analytical Services
EP-W-09-031
W.A. # 0-007

Figure 2
September/October 2011
Soil Sampling Locations
Lower Ley Creek
Syracuse, New York

APPENDIX A

ProUCL Output

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	SURF_SOIL.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	32

Raw Statistics		Log-transformed Statistics	
Minimum	3890	Minimum of Log Data	8.266
Maximum	15300	Maximum of Log Data	9.636
Mean	8897	Mean of log Data	9.04
Median	8030	SD of log Data	0.337
SD	2878		
Coefficient of Variation	0.323		
Skewness	0.389		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.968	Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9746	95% H-UCL	9954
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11245
95% Adjusted-CLT UCL (Chen-1995)	9757	97.5% Chebyshev (MVUE) UCL	12253
95% Modified-t UCL (Johnson-1978)	9751	99% Chebyshev (MVUE) UCL	14233

Gamma Distribution Test		Data Distribution
k star (bias corrected)	8.738	Data appear Normal at 5% Significance Level
Theta Star	1018	
MLE of Mean	8897	
MLE of Standard Deviation	3010	
nu star	576.7	
Approximate Chi Square Value (.05)	522	**Nonparametric Statistics**

Adjusted Level of Significance	0.0419	95% CLT UCL	9721
Adjusted Chi Square Value	519.3	95% Jackknife UCL	9746
		95% Standard Bootstrap UCL	9722
Anderson-Darling Test Statistic	0.232	95% Bootstrap-t UCL	9789
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	9771
Kolmogorov-Smirnov Test Statistic	0.0957	95% Percentile Bootstrap UCL	9729
Kolmogorov-Smirnov 5% Critical Value	0.153	95% BCA Bootstrap UCL	9802
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11081
		97.5% Chebyshev(Mean, Sd) UCL	12026
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13882
95% Approximate Gamma UCL	9829		
95% Adjusted Gamma UCL	9880		
Potential UCL to Use		Use 95% Student's-t UCL	9746

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Antimony

General Statistics

Number of Valid Data	33	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	24
		Percent Non-Detects	72.73%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.991	Minimum Detected	-0.00904
Maximum Detected	19.6	Maximum Detected	2.976
Mean of Detected	5.681	Mean of Detected	1.344
SD of Detected	5.868	SD of Detected	0.922
Minimum Non-Detect	0.816	Minimum Non-Detect	-0.203
Maximum Non-Detect	7	Maximum Non-Detect	1.946

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	30
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	90.91%

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.762
5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level	

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.973
5% Shapiro Wilk Critical Value	0.829
Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	2.399
SD	3.704
95% DL/2 (t) UCL	3.491
Maximum Likelihood Estimate(MLE) Method	
Mean	14.6
SD	5.323
95% MLE (t) UCL	16.17
95% MLE (Tiku) UCL	19.64

Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	0.212
SD	1.087
95% H-Stat (DL/2) UCL	3.636
Log ROS Method	
Mean in Log Scale	-0.567
SD in Log Scale	1.301
Mean in Original Scale	1.76
SD in Original Scale	3.816
95% t UCL	2.885
95% Percentile Bootstrap UCL	2.912
95% BCA Bootstrap UCL	3.427

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	1.017
Theta Star	5.587
nu star	18.3
A-D Test Statistic	0.368
5% A-D Critical Value	0.736
K-S Test Statistic	0.736
5% K-S Critical Value	0.284
Data appear Gamma Distributed at 5% Significance Level	

Assuming Gamma Distribution	

Data Distribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	2.341
SD	3.56
SE of Mean	0.661
95% KM (t) UCL	3.462
95% KM (z) UCL	3.429

Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.264
Minimum	0.454	95% KM (bootstrap t) UCL	4.423
Maximum	19.6	95% KM (BCA) UCL	4.325
Mean	6.081	95% KM (Percentile Bootstrap) UCL	3.964
Median	5.683	95% KM (Chebyshev) UCL	5.224
SD	3.788	97.5% KM (Chebyshev) UCL	6.472
k star	2.31	99% KM (Chebyshev) UCL	8.922
Theta star	2.633		
Nu star	152.4	Potential UCLs to Use	
AppChi2	124.9	95% KM (t) UCL	3.462
95% Gamma Approximate UCL	7.422		
95% Adjusted Gamma UCL	7.499		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	32

Raw Statistics		Log-transformed Statistics	
Minimum	2.59	Minimum of Log Data	0.952
Maximum	17.4	Maximum of Log Data	2.856
Mean	8.176	Mean of log Data	1.937
Median	7.8	SD of log Data	0.595
SD	4.625		
Coefficient of Variation	0.566		
Skewness	0.613		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.899	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	9.54

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	9.592
95% Modified-t UCL (Johnson-1978)	9.554

Assuming Lognormal Distribution

95% H-UCL	10.24
95% Chebyshev (MVUE) UCL	12.18
97.5% Chebyshev (MVUE) UCL	13.89
99% Chebyshev (MVUE) UCL	17.25

Gamma Distribution Test

k star (bias corrected)	2.926
Theta Star	2.794
MLE of Mean	8.176
MLE of Standard Deviation	4.78
nu star	193.1
Approximate Chi Square Value (.05)	162
Adjusted Level of Significance	0.0419
Adjusted Chi Square Value	160.5
Anderson-Darling Test Statistic	0.662
Anderson-Darling 5% Critical Value	0.753
Kolmogorov-Smirnov Test Statistic	0.166
Kolmogorov-Smirnov 5% Critical Value	0.154

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	9.749
95% Adjusted Gamma UCL	9.838

Data Distribution

Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	9.5
95% Jackknife UCL	9.54
95% Standard Bootstrap UCL	9.488
95% Bootstrap-t UCL	9.66
95% Hall's Bootstrap UCL	9.567
95% Percentile Bootstrap UCL	9.504
95% BCA Bootstrap UCL	9.618
95% Chebyshev(Mean, Sd) UCL	11.69
97.5% Chebyshev(Mean, Sd) UCL	13.2
99% Chebyshev(Mean, Sd) UCL	16.19

Potential UCL to Use	Use 95% Approximate Gamma UCL 9.749

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Benzene

General Statistics

Number of Valid Data	28	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	22

Percent Non-Detects	78.57%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.00119	Minimum Detected	-6.734
Maximum Detected	0.0573	Maximum Detected	-2.859
Mean of Detected	0.013	Mean of Detected	-5.24
SD of Detected	0.0219	SD of Detected	1.354
Minimum Non-Detect	0.00262	Minimum Non-Detect	-5.945
Maximum Non-Detect	0.0326	Maximum Non-Detect	-3.423

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	27
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	96.43%

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.6	Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00616	Mean	-5.538
SD	0.0105	SD	0.782
95% DL/2 (t) UCL	0.00952	95% H-Stat (DL/2) UCL	0.00744
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-6.04
		SD in Log Scale	0.738
		Mean in Original Scale	0.0043
		SD in Original Scale	0.0105
		95% t UCL	0.00767
		95% Percentile Bootstrap UCL	0.00817

95% BCA Bootstrap UCL	0.0104

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.451
Theta Star	0.0287
nu star	5.409
A-D Test Statistic	0.628
5% A-D Critical Value	0.725
K-S Test Statistic	0.725
5% K-S Critical Value	0.345

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00119
Maximum	0.0573
Mean	0.013
Median	0.0129
SD	0.00941
k star	2.494
Theta star	0.0052
Nu star	139.7
AppChi2	113.4
95% Gamma Approximate UCL	0.016
95% Adjusted Gamma UCL	0.0162

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00457
SD	0.0103
SE of Mean	0.00218
95% KM (t) UCL	0.00828
95% KM (z) UCL	0.00816
95% KM (jackknife) UCL	0.00808
95% KM (bootstrap t) UCL	0.0161
95% KM (BCA) UCL	0.0103
95% KM (Percentile Bootstrap) UCL	0.00873
95% KM (Chebyshev) UCL	0.0141
97.5% KM (Chebyshev) UCL	0.0182
99% KM (Chebyshev) UCL	0.0262

Potential UCLs to Use

95% KM (t) UCL	0.00828

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)anthracene

General Statistics

Number of Valid Data	28	Number of Detected Data	25
Number of Distinct Detected Data	25	Number of Non-Detect Data	3
		Percent Non-Detects	10.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0816	Minimum Detected	-2.506
Maximum Detected	36.2	Maximum Detected	3.589
Mean of Detected	3.337	Mean of Detected	0.362
SD of Detected	7.082	SD of Detected	1.253
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	17
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	39.29%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.404	Shapiro Wilk Test Statistic	0.973
5% Shapiro Wilk Critical Value	0.918	5% Shapiro Wilk Critical Value	0.918
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.002	Mean	0.127
SD	6.75	SD	1.389
95% DL/2 (t) UCL	5.174	95% H-Stat (DL/2) UCL	6.595
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.252	Mean in Log Scale	0.149
SD	9.054	SD in Log Scale	1.346
95% MLE (t) UCL	3.166	Mean in Original Scale	3.002
95% MLE (Tiku) UCL	3.521	SD in Original Scale	6.749
		95% t UCL	5.175
		95% Percentile Bootstrap UCL	5.283
		95% BCA Bootstrap UCL	7.416

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.656	Data appear Lognormal at 5% Significance Level
Theta Star	5.088	
nu star	32.79	
A-D Test Statistic	1.178	Nonparametric Statistics

5% A-D Critical Value	0.787	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.787	Mean	3.003
5% K-S Critical Value	0.182	SD	6.628
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.278
		95% KM (t) UCL	5.18
Assuming Gamma Distribution		95% KM (z) UCL	5.105
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	5.175
Minimum	1E-12	95% KM (bootstrap t) UCL	11.18
Maximum	36.2	95% KM (BCA) UCL	5.667
Mean	2.979	95% KM (Percentile Bootstrap) UCL	5.329
Median	1.235	95% KM (Chebyshev) UCL	8.575
SD	6.759	97.5% KM (Chebyshev) UCL	10.99
k star	0.2	99% KM (Chebyshev) UCL	15.72
Theta star	14.87		
Nu star	11.22	**Potential UCLs to Use**	
AppChi2	4.717	97.5% KM (Chebyshev) UCL	10.99
95% Gamma Approximate UCL	7.085		
95% Adjusted Gamma UCL	7.497		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Number of Valid Data	28	Number of Detected Data	27
Number of Distinct Detected Data	27	Number of Non-Detect Data	1
		Percent Non-Detects	3.57%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0593	Minimum Detected	-2.825
Maximum Detected	27.4	Maximum Detected	3.311
Mean of Detected	2.814	Mean of Detected	0.266
SD of Detected	5.167	SD of Detected	1.29
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.194	Maximum Non-Detect	-1.64

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.456	Shapiro Wilk Test Statistic	0.971
5% Shapiro Wilk Critical Value	0.923	5% Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.717	Mean	0.173
SD	5.096	SD	1.358
95% DL/2 (t) UCL	4.357	95% H-Stat (DL/2) UCL	6.426
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2.342	Mean in Log Scale	0.181
SD	5.393	SD in Log Scale	1.342
95% MLE (t) UCL	4.078	Mean in Original Scale	2.718
95% MLE (Tiku) UCL	3.963	SD in Original Scale	5.096
		95% t UCL	4.358
		95% Percentile Bootstrap UCL	4.505
		95% BCA Bootstrap UCL	5.685
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.714	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.943		
nu star	38.54		
A-D Test Statistic	0.716	**Nonparametric Statistics**	
5% A-D Critical Value	0.783	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.783	Mean	2.716
5% K-S Critical Value	0.175	SD	5.005
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.964
		95% KM (t) UCL	4.358
Assuming Gamma Distribution		95% KM (z) UCL	4.302
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	4.357
Minimum	1E-12	95% KM (bootstrap t) UCL	7.29
Maximum	27.4	95% KM (BCA) UCL	4.706
Mean	2.713	95% KM (Percentile Bootstrap) UCL	4.645
Median	1.32	95% KM (Chebyshev)	6.918

		UCL	
SD	5.098	97.5% KM (Chebyshev) UCL	8.735
k star	0.366	99% KM (Chebyshev) UCL	12.31
Theta star	7.414		
Nu star	20.5	**Potential UCLs to Use**	
AppChi2	11.22	95% KM (Chebyshev) UCL	6.918
95% Gamma Approximate UCL	4.958		
95% Adjusted Gamma UCL	5.153		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(b)fluoranthene

General Statistics

Number of Valid Data	28	Number of Detected Data	26
Number of Distinct Detected Data	26	Number of Non-Detect Data	2
		Percent Non-Detects	7.14%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0636	Minimum Detected	-2.755
Maximum Detected	29.1	Maximum Detected	3.371
Mean of Detected	2.99	Mean of Detected	0.287
SD of Detected	5.614	SD of Detected	1.317
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	17
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	39.29%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.457	Shapiro Wilk Test Statistic	0.975
5% Shapiro Wilk Critical Value	0.92	5% Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	2.795
SD	5.449
95% DL/2 (t) UCL	4.55
Maximum Likelihood Estimate(MLE) Method	
Mean	0.64
SD	7.339
95% MLE (t) UCL	3.003
95% MLE (Tiku) UCL	3.284

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	0.153
SD	1.374
95% H-Stat (DL/2) UCL	6.537
Log ROS Method	
Mean in Log Scale	0.152
SD in Log Scale	1.367
Mean in Original Scale	2.793
SD in Original Scale	5.45
95% t UCL	4.547
95% Percentile Bootstrap UCL	4.639
95% BCA Bootstrap UCL	6.065

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.682
Theta Star	4.387
nu star	35.44
A-D Test Statistic	0.726
5% A-D Critical Value	0.785
K-S Test Statistic	0.785
5% K-S Critical Value	0.178

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	29.1
Mean	2.776
Median	1.345
SD	5.459
k star	0.255
Theta star	10.89
Nu star	14.28
AppChi2	6.761
95% Gamma Approximate UCL	5.862

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	2.794
SD	5.352
SE of Mean	1.032
95% KM (t) UCL	4.551
95% KM (z) UCL	4.491
95% KM (jackknife) UCL	4.549
95% KM (bootstrap t) UCL	8.283
95% KM (BCA) UCL	4.852
95% KM (Percentile Bootstrap) UCL	4.77
95% KM (Chebyshev) UCL	7.29
97.5% KM (Chebyshev) UCL	9.236
99% KM (Chebyshev) UCL	13.06

Potential UCLs to Use

95% KM (Chebyshev) UCL	7.29

95% Adjusted Gamma UCL	6.153

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(k)fluoranthene

General Statistics

Number of Valid Data	28	Number of Detected Data	25
Number of Distinct Detected Data	25	Number of Non-Detect Data	3
		Percent Non-Detects	10.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0895	Minimum Detected	-2.414
Maximum Detected	20.9	Maximum Detected	3.04
Mean of Detected	2.513	Mean of Detected	0.253
SD of Detected	4.145	SD of Detected	1.165
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	12
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	16
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	42.86%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.507	Shapiro Wilk Test Statistic	0.984
5% Shapiro Wilk Critical Value	0.918	5% Shapiro Wilk Critical Value	0.918
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.267	Mean	0.0294
SD	3.975	SD	1.301
95% DL/2 (t) UCL	3.546	95% H-Stat (DL/2) UCL	4.899
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	

Mean	0.502
SD	5.557
95% MLE (t) UCL	2.291
95% MLE (Tiku) UCL	2.57

Mean in Log Scale	0.0563
SD in Log Scale	1.25
Mean in Original Scale	2.269
SD in Original Scale	3.974
95% t UCL	3.548
95% Percentile Bootstrap UCL	3.631
95% BCA Bootstrap UCL	4.554

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.798
Theta Star	3.149
nu star	39.91
A-D Test Statistic	0.735
5% A-D Critical Value	0.778
K-S Test Statistic	0.778
5% K-S Critical Value	0.18

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	20.9
Mean	2.246
Median	1.14
SD	3.986
k star	0.26
Theta star	8.652
Nu star	14.54
AppChi2	6.941
95% Gamma Approximate UCL	4.704
95% Adjusted Gamma UCL	4.934

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	2.269
SD	3.903
SE of Mean	0.753
95% KM (t) UCL	3.551
95% KM (z) UCL	3.507
95% KM (jackknife) UCL	3.548
95% KM (bootstrap t) UCL	6.036
95% KM (BCA) UCL	3.622
95% KM (Percentile Bootstrap) UCL	3.517
95% KM (Chebyshev) UCL	5.55
97.5% KM (Chebyshev) UCL	6.97
99% KM (Chebyshev) UCL	9.759

Potential UCLs to Use

95% KM (Chebyshev) UCL	5.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Data	33	Number of Detected Data	25
Number of Distinct Detected Data	25	Number of Non-Detect Data	8
		Percent Non-Detects	24.24%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.067	Minimum Detected	-2.703
Maximum Detected	337	Maximum Detected	5.82
Mean of Detected	21.84	Mean of Detected	0.385
SD of Detected	68.92	SD of Detected	2.252
Minimum Non-Detect	0.161	Minimum Non-Detect	-1.826
Maximum Non-Detect	0.53	Maximum Non-Detect	-0.635

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	18
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	15
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	54.55%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.355	Shapiro Wilk Test Statistic	0.906
5% Shapiro Wilk Critical Value	0.918	5% Shapiro Wilk Critical Value	0.918
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	16.57	Mean	-0.264
SD	60.43	SD	2.28
95% DL/2 (t) UCL	34.39	95% H-Stat (DL/2) UCL	58.06
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.511
		SD in Log Scale	2.537
		Mean in Original Scale	16.56
		SD in Original Scale	60.43
		95% t UCL	34.38
		95% Percentile Bootstrap UCL	35.83
		95% BCA Bootstrap UCL	52.34

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.257
Theta Star	85.12
nu star	12.83
A-D Test Statistic	2.611
5% A-D Critical Value	0.869
K-S Test Statistic	0.869
5% K-S Critical Value	0.191

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	337
Mean	16.55
Median	0.297
SD	60.44
k star	0.101
Theta star	163.1
Nu star	6.696
AppChi2	2.005
95% Gamma Approximate UCL	55.25
95% Adjusted Gamma UCL	59.06

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	16.58
SD	59.51
SE of Mean	10.57
95% KM (t) UCL	34.49
95% KM (z) UCL	33.97
95% KM (jackknife) UCL	34.4
95% KM (bootstrap t) UCL	131.7
95% KM (BCA) UCL	36.7
95% KM (Percentile Bootstrap) UCL	35.51
95% KM (Chebyshev) UCL	62.66
97.5% KM (Chebyshev) UCL	82.6
99% KM (Chebyshev) UCL	121.8

Potential UCLs to Use

99% KM (Chebyshev) UCL	121.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	31

Raw Statistics		Log-transformed Statistics	
Minimum	8.1	Minimum of Log Data	2.092
Maximum	1320	Maximum of Log Data	7.185

Mean	163.4	Mean of log Data	3.684
Median	19.4	SD of log Data	1.556
SD	329.7		
Coefficient of Variation	2.017		
Skewness	2.784		

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.528
Shapiro Wilk Critical Value	0.931

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.794
Shapiro Wilk Critical Value	0.931

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	260.7

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	287.6
95% Modified-t UCL (Johnson-1978)	265.3

Assuming Lognormal Distribution

95% H-UCL	320.4
95% Chebyshev (MVUE) UCL	312.4
97.5% Chebyshev (MVUE) UCL	393.9
99% Chebyshev (MVUE) UCL	554.1

Gamma Distribution Test

k star (bias corrected)	0.435
Theta Star	375.8
MLE of Mean	163.4
MLE of Standard Deviation	247.8
nu star	28.71
Approximate Chi Square Value (.05)	17.48
Adjusted Level of Significance	0.0419
Adjusted Chi Square Value	17.03
Anderson-Darling Test Statistic	4.059
Anderson-Darling 5% Critical Value	0.821
Kolmogorov-Smirnov Test Statistic	0.354
Kolmogorov-Smirnov 5% Critical Value	0.163

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	268.4
95% Adjusted Gamma UCL	275.6

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	257.9
95% Jackknife UCL	260.7
95% Standard Bootstrap UCL	257.9
95% Bootstrap-t UCL	362.1
95% Hall's Bootstrap UCL	354.6
95% Percentile Bootstrap UCL	260.7
95% BCA Bootstrap UCL	287.6
95% Chebyshev(Mean, Sd) UCL	413.6
97.5% Chebyshev(Mean, Sd) UCL	521.9
99% Chebyshev(Mean, Sd) UCL	734.5

Potential UCL to Use		Use 95% Chebyshev	413.6

(Mean, Sd) UCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chrysene

General Statistics

Number of Valid Data	28	Number of Detected Data	26
Number of Distinct Detected Data	26	Number of Non-Detect Data	2
		Percent Non-Detects	7.14%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0659	Minimum Detected	-2.72
Maximum Detected	36.7	Maximum Detected	3.603
Mean of Detected	3.572	Mean of Detected	0.369
SD of Detected	7.246	SD of Detected	1.368
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	19
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	32.14%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.44	Shapiro Wilk Test Statistic	0.965
5% Shapiro Wilk Critical Value	0.92	5% Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.336	Mean	0.23
SD	7.027	SD	1.427
95% DL/2 (t) UCL	5.598	95% H-Stat (DL/2) UCL	7.999
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1.294	Mean in Log Scale	0.222

SD	8.792
95% MLE (t) UCL	4.124
95% MLE (Tiku) UCL	4.283

SD in Log Scale	1.428
Mean in Original Scale	3.331
SD in Original Scale	7.029
95% t UCL	5.594
95% Percentile Bootstrap UCL	5.599
95% BCA Bootstrap UCL	7.245

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.621
Theta Star	5.756
nu star	32.27
A-D Test Statistic	1.089
5% A-D Critical Value	0.792
K-S Test Statistic	0.792
5% K-S Critical Value	0.179

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	36.7
Mean	3.317
Median	1.41
SD	7.035
k star	0.248
Theta star	13.39
Nu star	13.88
AppChi2	6.487
95% Gamma Approximate UCL	7.095
95% Adjusted Gamma UCL	7.453

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	3.332
SD	6.902
SE of Mean	1.33
95% KM (t) UCL	5.598
95% KM (z) UCL	5.52
95% KM (jackknife) UCL	5.595
95% KM (bootstrap t) UCL	12.04
95% KM (BCA) UCL	5.923
95% KM (Percentile Bootstrap) UCL	5.659
95% KM (Chebyshev) UCL	9.13
97.5% KM (Chebyshev) UCL	11.64
99% KM (Chebyshev) UCL	16.57

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	11.64

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	33

Raw Statistics		Log-transformed Statistics	
Minimum	3.61	Minimum of Log Data	1.284
Maximum	12.2	Maximum of Log Data	2.501
Mean	7.352	Mean of log Data	1.96
Median	7.11	SD of log Data	0.272
SD	1.946		
Coefficient of Variation	0.265		
Skewness	0.39		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.985	Shapiro Wilk Test Statistic	0.989
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	7.925	95% H-UCL	8.027
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.9
95% Adjusted-CLT UCL (Chen-1995)	7.933	97.5% Chebyshev (MVUE) UCL	9.568
95% Modified-t UCL (Johnson-1978)	7.929	99% Chebyshev (MVUE) UCL	10.88

Gamma Distribution Test		Data Distribution
k star (bias corrected)	13.18	Data appear Normal at 5% Significance Level
Theta Star	0.558	
MLE of Mean	7.352	
MLE of Standard Deviation	2.025	
nu star	869.8	
Approximate Chi Square Value (.05)	802.4	**Nonparametric Statistics**
Adjusted Level of Significance	0.0419	95% CLT UCL 7.909
Adjusted Chi Square Value	799.1	95% Jackknife UCL 7.925
		95% Standard Bootstrap UCL 7.893
Anderson-Darling Test Statistic	0.0985	95% Bootstrap-t UCL 7.935
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL 8.005
Kolmogorov-Smirnov Test Statistic	0.062	95% Percentile Bootstrap UCL 7.916
Kolmogorov-Smirnov 5% Critical Value	0.153	95% BCA Bootstrap UCL 7.898
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, 8.828

		Sd) UCL	
		97.5% Chebyshev(Mean, Sd) UCL	9.467
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.72
95% Approximate Gamma UCL	7.969		
95% Adjusted Gamma UCL	8.003		
Potential UCL to Use		Use 95% Student's-t UCL	7.925

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	33

Raw Statistics		**Log-transformed Statistics**	
Minimum	13.3	Minimum of Log Data	2.588
Maximum	731	Maximum of Log Data	6.594
Mean	139.5	Mean of log Data	4.331
Median	68.9	SD of log Data	1.081
SD	178.8		
Coefficient of Variation	1.282		
Skewness	2.189		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.683	Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	192.2	95% H-UCL	221.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	260.9
95% Adjusted-CLT UCL (Chen-1995)	203.3	97.5% Chebyshev (MVUE) UCL	316.3
95% Modified-t UCL (Johnson-1978)	194.2	99% Chebyshev (MVUE) UCL	425.1

Gamma Distribution Test	**Data Distribution**

k star (bias corrected)	0.89
Theta Star	156.7
MLE of Mean	139.5
MLE of Standard Deviation	147.9
nu star	58.73
Approximate Chi Square Value (.05)	42.11
Adjusted Level of Significance	0.0419
Adjusted Chi Square Value	41.38
Anderson-Darling Test Statistic	1.346
Anderson-Darling 5% Critical Value	0.778
Kolmogorov-Smirnov Test Statistic	0.196
Kolmogorov-Smirnov 5% Critical Value	0.158

Data not Gamma Distributed at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	194.5
95% Adjusted Gamma UCL	197.9

Nonparametric Statistics

95% CLT UCL	190.7
95% Jackknife UCL	192.2
95% Standard Bootstrap UCL	189.9
95% Bootstrap-t UCL	217.8
95% Hall's Bootstrap UCL	209.6
95% Percentile Bootstrap UCL	191.4
95% BCA Bootstrap UCL	200.7
95% Chebyshev(Mean, Sd) UCL	275.2
97.5% Chebyshev(Mean, Sd) UCL	333.9
99% Chebyshev(Mean, Sd) UCL	449.2

Potential UCL to Use	Use 95% H-UCL 221.6

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.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Dibenzo(a,h)anthracene

General Statistics

Number of Valid Data	28	Number of Detected Data	20
Number of Distinct Detected Data	20	Number of Non-Detect Data	8
		Percent Non-Detects	28.57%

Raw Statistics **Log-transformed Statistics**

Minimum Detected	0.103	Minimum Detected	-2.273
Maximum Detected	6.4	Maximum Detected	1.856
Mean of Detected	0.9	Mean of Detected	-0.633
SD of Detected	1.358	SD of Detected	0.979
Minimum Non-Detect	0.187	Minimum Non-Detect	-1.677
Maximum Non-Detect	2.19	Maximum Non-Detect	0.784

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	27
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	96.43%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.506	Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.905	5% Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.767	Mean	-0.832
SD	1.179	SD	1.045
95% DL/2 (t) UCL	1.147	95% H-Stat (DL/2) UCL	1.245
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.901
		SD in Log Scale	0.968
		Mean in Original Scale	0.71
		SD in Original Scale	1.181
		95% t UCL	1.09
		95% Percentile Bootstrap UCL	1.113
		95% BCA Bootstrap UCL	1.384

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.955	Data appear Gamma Distributed at 5% Significance Level
Theta Star	0.942	
nu star	38.21	
A-D Test Statistic	0.751	Nonparametric Statistics
5% A-D Critical Value	0.766	Kaplan-Meier (KM) Method
K-S Test Statistic	0.766	Mean 0.726

5% K-S Critical Value	0.199	SD	1.162
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.227
		95% KM (t) UCL	1.113
Assuming Gamma Distribution		95% KM (z) UCL	1.099
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.11
Minimum	1E-12	95% KM (bootstrap t) UCL	1.637
Maximum	6.4	95% KM (BCA) UCL	1.17
Mean	0.796	95% KM (Percentile Bootstrap) UCL	1.137
Median	0.577	95% KM (Chebyshev) UCL	1.715
SD	1.184	97.5% KM (Chebyshev) UCL	2.143
k star	0.283	99% KM (Chebyshev) UCL	2.984
Theta star	2.812		
Nu star	15.84	**Potential UCLs to Use**	
AppChi2	7.853	95% KM (Chebyshev) UCL	1.715
95% Gamma Approximate UCL	1.605		
95% Adjusted Gamma UCL	1.679		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Data	28	Number of Detected Data	25
Number of Distinct Detected Data	25	Number of Non-Detect Data	3
		Percent Non-Detects	10.71%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0809	Minimum Detected	-2.515
Maximum Detected	14.3	Maximum Detected	2.66
Mean of Detected	1.866	Mean of Detected	0.0335
SD of Detected	2.785	SD of Detected	1.118
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	14

For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	14
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	50.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.532	Shapiro Wilk Test Statistic	0.983
5% Shapiro Wilk Critical Value	0.918	5% Shapiro Wilk Critical Value	0.918
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.689	Mean	-0.166
SD	2.677	SD	1.23
95% DL/2 (t) UCL	2.55	95% H-Stat (DL/2) UCL	3.46
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.17	Mean in Log Scale	-0.149
SD	4.042	SD in Log Scale	1.195
95% MLE (t) UCL	1.471	Mean in Original Scale	1.689
95% MLE (Tiku) UCL	1.794	SD in Original Scale	2.677
		95% t UCL	2.55
		95% Percentile Bootstrap UCL	2.577
		95% BCA Bootstrap UCL	3.113

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.889	Data appear Gamma Distributed at 5% Significance Level
Theta Star	2.098	
nu star	44.47	
A-D Test Statistic	0.475	
5% A-D Critical Value	0.774	
K-S Test Statistic	0.774	
5% K-S Critical Value	0.18	
Data appear Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution		Nonparametric Statistics	
Gamma ROS Statistics using Extrapolated Data		Kaplan-Meier (KM) Method	
Minimum	1E-12	Mean	1.689
Maximum	14.3	SD	2.629
		SE of Mean	0.507
		95% KM (t) UCL	2.553
		95% KM (z) UCL	2.523
		95% KM (jackknife) UCL	2.551
		95% KM (bootstrap t) UCL	3.655
		95% KM (BCA) UCL	2.747

Mean	1.682	95% KM (Percentile Bootstrap) UCL	2.562
Median	0.967	95% KM (Chebyshev) UCL	3.9
SD	2.681	97.5% KM (Chebyshev) UCL	4.856
k star	0.274	99% KM (Chebyshev) UCL	6.735
Theta star	6.146		
Nu star	15.32	Potential UCLs to Use	
AppChi2	7.486	95% KM (Chebyshev) UCL	3.9
95% Gamma Approximate UCL	3.442		
95% Adjusted Gamma UCL	3.604		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Iron

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	31

Raw Statistics		Log-transformed Statistics	
Minimum	10400	Minimum of Log Data	9.25
Maximum	31100	Maximum of Log Data	10.34
Mean	18515	Mean of log Data	9.778
Median	19100	SD of log Data	0.319
SD	5752		
Coefficient of Variation	0.311		
Skewness	0.283		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.935	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	20211	95% H-UCL	20553
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23100

95% Adjusted-CLT UCL (Chen-1995)	20215	97.5% Chebyshev (MVUE) UCL	25076
95% Modified-t UCL (Johnson-1978)	20219	99% Chebyshev (MVUE) UCL	28958

Gamma Distribution Test

k star (bias corrected)	9.585
Theta Star	1932
MLE of Mean	18515
MLE of Standard Deviation	5980
nu star	632.6
Approximate Chi Square Value (.05)	575.2
Adjusted Level of Significance	0.0419
Adjusted Chi Square Value	572.4
Anderson-Darling Test Statistic	0.71
Anderson-Darling 5% Critical Value	0.747
Kolmogorov-Smirnov Test Statistic	0.145
Kolmogorov-Smirnov 5% Critical Value	0.153

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	20361
95% Adjusted Gamma UCL	20461

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	20162
95% Jackknife UCL	20211
95% Standard Bootstrap UCL	20153
95% Bootstrap-t UCL	20270
95% Hall's Bootstrap UCL	20176
95% Percentile Bootstrap UCL	20085
95% BCA Bootstrap UCL	20152
95% Chebyshev(Mean, Sd) UCL	22879
97.5% Chebyshev(Mean, Sd) UCL	24768
99% Chebyshev(Mean, Sd) UCL	28477

Potential UCL to Use		Use 95% Student's-t UCL	20211

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	32

Raw Statistics		Log-transformed Statistics	
Minimum	5.09	Minimum of Log Data	1.627
Maximum	575	Maximum of Log Data	6.354
Mean	122.1	Mean of log Data	4.247
Median	71.2	SD of log Data	1.16

SD	131.9
Coefficient of Variation	1.08
Skewness	1.951

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.78
Shapiro Wilk Critical Value	0.931

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.977
Shapiro Wilk Critical Value	0.931

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	161

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	168.2
95% Modified-t UCL (Johnson-1978)	162.3

Assuming Lognormal Distribution

95% H-UCL	235.4
95% Chebyshev (MVUE) UCL	272.2
97.5% Chebyshev (MVUE) UCL	332.5
99% Chebyshev (MVUE) UCL	451.1

Gamma Distribution Test

k star (bias corrected)	0.957
Theta Star	127.5
MLE of Mean	122.1
MLE of Standard Deviation	124.8
nu star	63.19
Approximate Chi Square Value (.05)	45.9
Adjusted Level of Significance	0.0419
Adjusted Chi Square Value	45.15
Anderson-Darling Test Statistic	0.276
Anderson-Darling 5% Critical Value	0.775
Kolmogorov-Smirnov Test Statistic	0.11
Kolmogorov-Smirnov 5% Critical Value	0.158

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	168.1
95% Adjusted Gamma UCL	170.9

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	159.9
95% Jackknife UCL	161
95% Standard Bootstrap UCL	159.1
95% Bootstrap-t UCL	177.6
95% Hall's Bootstrap UCL	174.8
95% Percentile Bootstrap UCL	161.3
95% BCA Bootstrap UCL	167.8
95% Chebyshev(Mean, Sd) UCL	222.2
97.5% Chebyshev(Mean, Sd) UCL	265.5
99% Chebyshev(Mean, Sd) UCL	350.6

Potential UCL to Use

Use 95% Approximate Gamma UCL	168.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	32

Raw Statistics		Log-transformed Statistics	
Minimum	140	Minimum of Log Data	4.942
Maximum	554	Maximum of Log Data	6.317
Mean	334.2	Mean of log Data	5.767
Median	319	SD of log Data	0.308
SD	101.5		
Coefficient of Variation	0.304		
Skewness	0.685		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	364.2	95% H-UCL	369.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	414.1
95% Adjusted-CLT UCL (Chen-1995)	365.5	97.5% Chebyshev (MVUE) UCL	448.5
95% Modified-t UCL (Johnson-1978)	364.5	99% Chebyshev (MVUE) UCL	516

Gamma Distribution Test		Data Distribution
k star (bias corrected)	10.33	Data appear Normal at 5% Significance Level
Theta Star	32.34	
MLE of Mean	334.2	
MLE of Standard Deviation	104	
nu star	682	
Approximate Chi Square Value (.05)	622.5	Nonparametric Statistics
Adjusted Level of Significance	0.0419	95% CLT UCL 363.3
Adjusted Chi Square Value	619.5	95% Jackknife UCL 364.2

		95% Standard Bootstrap UCL	363.3
Anderson-Darling Test Statistic	0.492	95% Bootstrap-t UCL	366.7
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	367.9
Kolmogorov-Smirnov Test Statistic	0.123	95% Percentile Bootstrap UCL	362.4
Kolmogorov-Smirnov 5% Critical Value	0.153	95% BCA Bootstrap UCL	366.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	411.2
		97.5% Chebyshev(Mean, Sd) UCL	444.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	510
95% Approximate Gamma UCL	366.2		
95% Adjusted Gamma UCL	368		
Potential UCL to Use		Use 95% Student's-t UCL	364.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Mercury

General Statistics

Number of Valid Data	33	Number of Detected Data	32
Number of Distinct Detected Data	31	Number of Non-Detect Data	1
		Percent Non-Detects	3.03%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.018	Minimum Detected	-4.017
Maximum Detected	4.11	Maximum Detected	1.413
Mean of Detected	0.578	Mean of Detected	-1.347
SD of Detected	0.821	SD of Detected	1.32
Minimum Non-Detect	0.034	Minimum Non-Detect	-3.381
Maximum Non-Detect	0.034	Maximum Non-Detect	-3.381

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.666	Shapiro Wilk Test Statistic	0.969
5% Shapiro Wilk Critical Value	0.93	5% Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.561
SD	0.814
95% DL/2 (t) UCL	0.801
Maximum Likelihood Estimate(MLE) Method	
Mean	0.531
SD	0.837
95% MLE (t) UCL	0.777
95% MLE (Tiku) UCL	0.759

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.429
SD	1.383
95% H-Stat (DL/2) UCL	1.28
Log ROS Method	
Mean in Log Scale	-1.432
SD in Log Scale	1.39
Mean in Original Scale	0.561
SD in Original Scale	0.814
95% t UCL	0.801
95% Percentile Bootstrap UCL	0.799
95% BCA Bootstrap UCL	0.877

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.701
Theta Star	0.825
nu star	44.84
A-D Test Statistic	0.894
5% A-D Critical Value	0.788
K-S Test Statistic	0.788
5% K-S Critical Value	0.162

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	4.11
Mean	0.56
Median	0.193
SD	0.814
k star	0.4
Theta star	1.401
Nu star	26.4
AppChi2	15.69
95% Gamma Approximate	0.943

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.561
SD	0.801
SE of Mean	0.142
95% KM (t) UCL	0.801
95% KM (z) UCL	0.794
95% KM (jackknife) UCL	0.8
95% KM (bootstrap t) UCL	0.94
95% KM (BCA) UCL	0.833
95% KM (Percentile Bootstrap) UCL	0.796
95% KM (Chebyshev) UCL	1.179
97.5% KM (Chebyshev) UCL	1.446
99% KM (Chebyshev) UCL	1.971

Potential UCLs to Use

95% KM (Chebyshev) UCL	1.179

UCL	
95% Adjusted Gamma UCL	0.969

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics

Number of Valid Data	55	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	43
		Percent Non-Detects	78.18%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.00112	Minimum Detected	-6.794
Maximum Detected	3.68	Maximum Detected	1.303
Mean of Detected	0.59	Mean of Detected	-1.701
SD of Detected	1.032	SD of Detected	1.98
Minimum Non-Detect	0.00262	Minimum Non-Detect	-5.945
Maximum Non-Detect	2.19	Maximum Non-Detect	0.784

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	54
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	98.18%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.576	Shapiro Wilk Test Statistic	0.879
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.27	Mean	-3.445
SD	0.566	SD	2.451
95% DL/2 (t) UCL	0.398	95% H-Stat (DL/2) UCL	2.835
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-4.835

SD in Log Scale	1.964
Mean in Original Scale	0.132
SD in Original Scale	0.526
95% t UCL	0.25
95% Percentile Bootstrap UCL	0.266
95% BCA Bootstrap UCL	0.341

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.457
Theta Star	1.289
nu star	10.98
A-D Test Statistic	0.473
5% A-D Critical Value	0.782
K-S Test Statistic	0.782
5% K-S Critical Value	0.258

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00112
Maximum	3.68
Mean	0.637
Median	0.567
SD	0.483
k star	1.872
Theta star	0.34
Nu star	206
AppChi2	173.8
95% Gamma Approximate UCL	0.755
95% Adjusted Gamma UCL	0.758

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.143
SD	0.524
SE of Mean	0.0747
95% KM (t) UCL	0.268
95% KM (z) UCL	0.266
95% KM (jackknife) UCL	0.243
95% KM (bootstrap t) UCL	0.515
95% KM (BCA) UCL	0.349
95% KM (Percentile Bootstrap) UCL	0.309
95% KM (Chebyshev) UCL	0.469
97.5% KM (Chebyshev) UCL	0.61
99% KM (Chebyshev) UCL	0.887

Potential UCLs to Use

95% KM (t) UCL	0.268

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Nickel

General Statistics

Number of Valid Observations	33	Number of Distinct Observations	32

Raw Statistics		Log-transformed Statistics	
Minimum	10.3	Minimum of Log Data	2.332
Maximum	434	Maximum of Log Data	6.073
Mean	53.39	Mean of log Data	3.483
Median	23.7	SD of log Data	0.896
SD	78.21		
Coefficient of Variation	1.465		
Skewness	3.945		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.533	Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	76.46	95% H-UCL	70.21
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	84.54
95% Adjusted-CLT UCL (Chen-1995)	85.78	97.5% Chebyshev (MVUE) UCL	100.4
95% Modified-t UCL (Johnson-1978)	78.01	99% Chebyshev (MVUE) UCL	131.6

Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.065	Data do not follow a Discernable Distribution (0.05)
Theta Star	50.14	
MLE of Mean	53.39	
MLE of Standard Deviation	51.74	
nu star	70.29	
Approximate Chi Square Value (.05)	51.99	**Nonparametric Statistics**
Adjusted Level of Significance	0.0419	95% CLT UCL 75.79
Adjusted Chi Square Value	51.17	95% Jackknife UCL 76.46
		95% Standard Bootstrap UCL 75.6
Anderson-Darling Test Statistic	2.023	95% Bootstrap-t UCL 104.4
Anderson-Darling 5% Critical Value	0.772	95% Hall's Bootstrap UCL 171.2
Kolmogorov-Smirnov Test Statistic	0.224	95% Percentile Bootstrap UCL 78.82
Kolmogorov-Smirnov 5% Critical Value	0.157	95% BCA Bootstrap UCL 91.07
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, 112.7

		Sd) UCL	
		97.5% Chebyshev(Mean, Sd) UCL	138.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	188.9
95% Approximate Gamma UCL	72.19		
95% Adjusted Gamma UCL	73.33		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	112.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB-1248 (Aroclor 1248)

General Statistics

Number of Valid Data	33	Number of Detected Data	18
Number of Distinct Detected Data	17	Number of Non-Detect Data	15
		Percent Non-Detects	45.45%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0263	Minimum Detected	-3.638
Maximum Detected	86.1	Maximum Detected	4.456
Mean of Detected	12.42	Mean of Detected	0.719
SD of Detected	22.24	SD of Detected	2.432
Minimum Non-Detect	0.0453	Minimum Non-Detect	-3.094
Maximum Non-Detect	0.0926	Maximum Non-Detect	-2.379

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	18
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	15
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	54.55%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.607	Shapiro Wilk Test Statistic	0.938
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution
DL/2 Substitution Method	DL/2 Substitution Method

Mean	6.787
SD	17.38
95% DL/2 (t) UCL	11.91
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Mean	-1.276
SD	2.842
95% H-Stat (DL/2) UCL	215.3
Log ROS Method	
Mean in Log Scale	-1.59
SD in Log Scale	3.179
Mean in Original Scale	6.783
SD in Original Scale	17.38
95% t UCL	11.91
95% Percentile Bootstrap UCL	12.23
95% BCA Bootstrap UCL	14.53

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.345
Theta Star	35.96
nu star	12.44
A-D Test Statistic	0.428
5% A-D Critical Value	0.827
K-S Test Statistic	0.827
5% K-S Critical Value	0.219

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0263
Maximum	86.1
Mean	10.98
Median	8.276
SD	16.47
k star	0.569
Theta star	19.29
Nu star	37.56
AppChi2	24.53
95% Gamma Approximate UCL	16.81
95% Adjusted Gamma UCL	17.19

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	6.787
SD	17.12
SE of Mean	3.066
95% KM (t) UCL	11.98
95% KM (z) UCL	11.83
95% KM (jackknife) UCL	11.9
95% KM (bootstrap t) UCL	18.11
95% KM (BCA) UCL	11.86
95% KM (Percentile Bootstrap) UCL	12.28
95% KM (Chebyshev) UCL	20.15
97.5% KM (Chebyshev) UCL	25.93
99% KM (Chebyshev) UCL	37.29

Potential UCLs to Use

95% KM (BCA) UCL	11.86

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

PCB-1260 (Aroclor 1260)

General Statistics

Number of Valid Data	33	Number of Detected Data	22
Number of Distinct Detected Data	22	Number of Non-Detect Data	11
		Percent Non-Detects	33.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0266	Minimum Detected	-3.627
Maximum Detected	2.94	Maximum Detected	1.078
Mean of Detected	0.744	Mean of Detected	-1.177
SD of Detected	0.897	SD of Detected	1.543
Minimum Non-Detect	0.0453	Minimum Non-Detect	-3.094
Maximum Non-Detect	0.0556	Maximum Non-Detect	-2.89

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	16
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	17
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	48.48%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.772	Shapiro Wilk Test Statistic	0.929
5% Shapiro Wilk Critical Value	0.911	5% Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.504	Mean	-2.025
SD	0.804	SD	1.745
95% DL/2 (t) UCL	0.741	95% H-Stat (DL/2) UCL	1.762
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0141	Mean in Log Scale	-1.915
SD	1.282	SD in Log Scale	1.654
95% MLE (t) UCL	0.392	Mean in Original Scale	0.508

95% MLE (Tiku) UCL	0.473

SD in Original Scale	0.802
95% t UCL	0.745
95% Percentile Bootstrap UCL	0.756
95% BCA Bootstrap UCL	0.799

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.624
Theta Star	1.193
nu star	27.44
A-D Test Statistic	0.417
5% A-D Critical Value	0.788
K-S Test Statistic	0.788
5% K-S Critical Value	0.193

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.507
SD	0.79
SE of Mean	0.141
95% KM (t) UCL	0.746
95% KM (z) UCL	0.739
95% KM (jackknife) UCL	0.744
95% KM (bootstrap t) UCL	0.867
95% KM (BCA) UCL	0.737
95% KM (Percentile Bootstrap) UCL	0.748
95% KM (Chebyshev) UCL	1.121
97.5% KM (Chebyshev) UCL	1.386
99% KM (Chebyshev) UCL	1.908

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	2.94
Mean	0.58
Median	0.235
SD	0.771
k star	0.297
Theta star	1.953
Nu star	19.59
AppChi2	10.55
95% Gamma Approximate UCL	1.076
95% Adjusted Gamma UCL	1.112

Potential UCLs to Use

95% KM (BCA) UCL	0.737

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Silver

General Statistics

Number of Valid Data	33	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	23
		Percent Non-Detects	69.70%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.44	Minimum Detected	0.365
Maximum Detected	136	Maximum Detected	4.913
Mean of Detected	22.96	Mean of Detected	2.217
SD of Detected	41.59	SD of Detected	1.277
Minimum Non-Detect	0.445	Minimum Non-Detect	-0.81
Maximum Non-Detect	2.36	Maximum Non-Detect	0.859

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	24
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	9
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	72.73%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.546	Shapiro Wilk Test Statistic	0.885
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.213	Mean	-0.103
SD	24.45	SD	1.731
95% DL/2 (t) UCL	14.42	95% H-Stat (DL/2) UCL	11.55
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.774
		SD in Log Scale	2.156
		Mean in Original Scale	7.058
		SD in Original Scale	24.49
		95% t UCL	14.28
		95% Percentile Bootstrap UCL	14.96
		95% BCA Bootstrap UCL	19.54

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.531	Data appear Lognormal at 5% Significance Level
Theta Star	43.21	

nu star	10.63
A-D Test Statistic	1.171
5% A-D Critical Value	0.764
K-S Test Statistic	0.764
5% K-S Critical Value	0.278

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1.44
Maximum	136
Mean	22.68
Median	22.96
SD	22.39
k star	1.679
Theta star	13.51
Nu star	110.8
AppChi2	87.5
95% Gamma Approximate UCL	28.72
95% Adjusted Gamma UCL	29.08

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	7.962
SD	23.86
SE of Mean	4.379
95% KM (t) UCL	15.38
95% KM (z) UCL	15.17
95% KM (jackknife) UCL	13.98
95% KM (bootstrap t) UCL	66.16
95% KM (BCA) UCL	18.48
95% KM (Percentile Bootstrap) UCL	16.94
95% KM (Chebyshev) UCL	27.05
97.5% KM (Chebyshev) UCL	35.31
99% KM (Chebyshev) UCL	51.53

Potential UCLs to Use

95% KM (BCA) UCL	18.48

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics

Number of Valid Data	28	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	23
		Percent Non-Detects	82.14%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.00191	Minimum Detected	-6.261
Maximum Detected	0.00918	Maximum Detected	-4.691
Mean of Detected	0.00607	Mean of Detected	-5.256
SD of Detected	0.00314	SD of Detected	0.67
Minimum Non-Detect	0.00262	Minimum Non-Detect	-5.945

Maximum Non-Detect	0.0326	Maximum Non-Detect	-3.423

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	28
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.855
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00426	Mean	-5.657
SD	0.00322	SD	0.601
95% DL/2 (t) UCL	0.00529	95% H-Stat (DL/2) UCL	0.00529
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-5.934
		SD in Log Scale	0.443
		Mean in Original Scale	0.00299
		SD in Original Scale	0.00193
		95% t UCL	0.00361
		95% Percentile Bootstrap UCL	0.00363
		95% BCA Bootstrap UCL	0.00384

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.518	Data appear Normal at 5% Significance Level
Theta Star	0.004	
nu star	15.18	
A-D Test Statistic	0.461	Nonparametric Statistics

5% A-D Critical Value	0.682	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.682	Mean	0.00314
5% K-S Critical Value	0.359	SD	0.00217
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0006041
		95% KM (t) UCL	0.00417
Assuming Gamma Distribution		95% KM (z) UCL	0.00414
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.00432
Minimum	0.00191	95% KM (bootstrap t) UCL	0.004
Maximum	0.00918	95% KM (BCA) UCL	0.00823
Mean	0.00617	95% KM (Percentile Bootstrap) UCL	0.00782
Median	0.00615	95% KM (Chebyshev) UCL	0.00578
SD	0.00145	97.5% KM (Chebyshev) UCL	0.00692
k star	12.6	99% KM (Chebyshev) UCL	0.00915
Theta star	0.0004899		
Nu star	705.8	**Potential UCLs to Use**	
AppChi2	645.2	95% KM (t) UCL	0.00417
95% Gamma Approximate UCL	0.00675	95% KM (Percentile Bootstrap) UCL	0.00782
95% Adjusted Gamma UCL	0.00679		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	SUB_SOIL.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Data	52	Number of Detected Data	50
Number of Distinct Detected Data	46	Number of Non-Detect Data	2
		Percent Non-Detects	3.85%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.59	Minimum Detected	0.952
Maximum Detected	17.4	Maximum Detected	2.856
Mean of Detected	7.663	Mean of Detected	1.894
SD of Detected	4.158	SD of Detected	0.541
Minimum Non-Detect	3.11	Minimum Non-Detect	1.135
Maximum Non-Detect	4.95	Maximum Non-Detect	1.599

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	21
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	31
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	40.38%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.888	Shapiro Wilk Test Statistic	0.94
5% Shapiro Wilk Critical Value	0.947	5% Shapiro Wilk Critical Value	0.947
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.445	Mean	1.847
SD	4.222	SD	0.583
95% DL/2 (t) UCL	8.426	95% H-Stat (DL/2) UCL	8.801
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.333	Mean in Log Scale	1.866

SD	5.591
95% MLE (t) UCL	7.632
95% MLE (Tiku) UCL	7.803

SD in Log Scale	0.551
Mean in Original Scale	7.494
SD in Original Scale	4.166
95% t UCL	8.462
95% Percentile Bootstrap UCL	8.495
95% BCA Bootstrap UCL	8.525

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	3.467
Theta Star	2.21
nu star	346.7
A-D Test Statistic	0.99
5% A-D Critical Value	0.755
K-S Test Statistic	0.755
5% K-S Critical Value	0.126

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.474
Maximum	17.4
Mean	7.465
Median	5.95
SD	4.216
k star	2.868
Theta star	2.603
Nu star	298.2
AppChi2	259.2
95% Gamma Approximate UCL	8.589
95% Adjusted Gamma UCL	8.623

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	7.494
SD	4.126
SE of Mean	0.578
95% KM (t) UCL	8.463
95% KM (z) UCL	8.445
95% KM (jackknife) UCL	8.462
95% KM (bootstrap t) UCL	8.562
95% KM (BCA) UCL	8.419
95% KM (Percentile Bootstrap) UCL	8.443
95% KM (Chebyshev) UCL	10.01
97.5% KM (Chebyshev) UCL	11.1
99% KM (Chebyshev) UCL	13.25

Potential UCLs to Use

95% KM (Chebyshev) UCL	10.01

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzene

General Statistics

Number of Valid Data	34	Number of Detected Data	8
Number of Distinct Detected Data	8	Number of Non-Detect Data	26
		Percent Non-Detects	76.47%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.00119	Minimum Detected	-6.734
Maximum Detected	0.0573	Maximum Detected	-2.859
Mean of Detected	0.0105	Mean of Detected	-5.379
SD of Detected	0.019	SD of Detected	1.175
Minimum Non-Detect	0.00262	Minimum Non-Detect	-5.945
Maximum Non-Detect	0.0376	Maximum Non-Detect	-3.281

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	33
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	97.06%

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.52	Shapiro Wilk Test Statistic	0.875
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00673	Mean	-5.423
SD	0.00983	SD	0.808
95% DL/2 (t) UCL	0.00958	95% H-Stat (DL/2) UCL	0.00838
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-5.904
		SD in Log Scale	0.636

Mean in Original Scale	0.00427
SD in Original Scale	0.00944
95% t UCL	0.00701
95% Percentile Bootstrap UCL	0.0074
95% BCA Bootstrap UCL	0.00957

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.541
Theta Star	0.0194
nu star	8.653
A-D Test Statistic	1.016
5% A-D Critical Value	0.746
K-S Test Statistic	0.746
5% K-S Critical Value	0.304

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00119
Maximum	0.0573
Mean	0.0105
Median	0.0105
SD	0.00877
k star	2.522
Theta star	0.00416
Nu star	171.5
AppChi2	142.2
95% Gamma Approximate UCL	0.0126
95% Adjusted Gamma UCL	0.0128

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00447
SD	0.00933
SE of Mean	0.00175
95% KM (t) UCL	0.00743
95% KM (z) UCL	0.00735
95% KM (jackknife) UCL	0.00731
95% KM (bootstrap t) UCL	0.0137
95% KM (BCA) UCL	0.00803
95% KM (Percentile Bootstrap) UCL	0.00775
95% KM (Chebyshev) UCL	0.0121
97.5% KM (Chebyshev) UCL	0.0154
99% KM (Chebyshev) UCL	0.0219

Potential UCLs to Use

95% KM (BCA) UCL	0.00803

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)anthracene

General Statistics

Number of Valid Data	34	Number of Detected Data	27
Number of Distinct Detected Data	27	Number of Non-Detect Data	7
		Percent Non-Detects	20.59%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0816	Minimum Detected	-2.506
Maximum Detected	36.2	Maximum Detected	3.589
Mean of Detected	3.128	Mean of Detected	0.279
SD of Detected	6.846	SD of Detected	1.248
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	17
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	17
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	50.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.395	Shapiro Wilk Test Statistic	0.98
5% Shapiro Wilk Critical Value	0.923	5% Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.538	Mean	-0.0892
SD	6.19	SD	1.357
95% DL/2 (t) UCL	4.334	95% H-Stat (DL/2) UCL	4.579
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.113
		SD in Log Scale	1.372
		Mean in Original Scale	2.529
		SD in Original Scale	6.193
		95% t UCL	4.327
		95% Percentile Bootstrap UCL	4.552
		95% BCA Bootstrap UCL	5.831

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.648	Data appear Lognormal at 5% Significance Level

Theta Star	4.827
nu star	35

A-D Test Statistic	1.26
5% A-D Critical Value	0.788
K-S Test Statistic	0.788
5% K-S Critical Value	0.176

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	36.2
Mean	2.527
Median	0.925
SD	6.198
k star	0.147
Theta star	17.22
Nu star	9.978
AppChi2	3.928
95% Gamma Approximate UCL	6.419
95% Adjusted Gamma UCL	6.739

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	2.534
SD	6.1
SE of Mean	1.066
95% KM (t) UCL	4.338
95% KM (z) UCL	4.287
95% KM (jackknife) UCL	4.331
95% KM (bootstrap t) UCL	9.015
95% KM (BCA) UCL	4.629
95% KM (Percentile Bootstrap) UCL	4.625
95% KM (Chebyshev) UCL	7.181
97.5% KM (Chebyshev) UCL	9.192
99% KM (Chebyshev) UCL	13.14

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	9.192

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Number of Valid Data	34	Number of Detected Data	30
Number of Distinct Detected Data	30	Number of Non-Detect Data	4
		Percent Non-Detects	11.76%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0593	Minimum Detected	-2.825
Maximum Detected	27.4	Maximum Detected	3.311

Mean of Detected	2.576	Mean of Detected	0.146
SD of Detected	4.946	SD of Detected	1.283
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	15
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	19
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	44.12%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.446	Shapiro Wilk Test Statistic	0.985
5% Shapiro Wilk Critical Value	0.927	5% Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.303	Mean	-0.0523
SD	4.699	SD	1.338
95% DL/2 (t) UCL	3.666	95% H-Stat (DL/2) UCL	4.554
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0474	Mean in Log Scale	-0.0676
SD	6.648	SD in Log Scale	1.349
95% MLE (t) UCL	1.977	Mean in Original Scale	2.297
95% MLE (Tiku) UCL	2.313	SD in Original Scale	4.701
		95% t UCL	3.662
		95% Percentile Bootstrap UCL	3.748
		95% BCA Bootstrap UCL	4.626

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.696	Data appear Gamma Distributed at 5% Significance Level
Theta Star	3.703	
nu star	41.74	
A-D Test Statistic	0.781	Nonparametric Statistics
5% A-D Critical Value	0.788	Kaplan-Meier (KM) Method
K-S Test Statistic	0.788	Mean 2.299
5% K-S Critical Value	0.166	SD 4.631
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.808

		95% KM (t) UCL	3.666
Assuming Gamma Distribution		95% KM (z) UCL	3.628
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.664
Minimum	1E-12	95% KM (bootstrap t) UCL	6.24
Maximum	27.4	95% KM (BCA) UCL	3.84
Mean	2.273	95% KM (Percentile Bootstrap) UCL	3.88
Median	0.949	95% KM (Chebyshev) UCL	5.821
SD	4.713	97.5% KM (Chebyshev) UCL	7.344
k star	0.191	99% KM (Chebyshev) UCL	10.34
Theta star	11.88		
Nu star	13.01	**Potential UCLs to Use**	
AppChi2	5.901	95% KM (Chebyshev) UCL	5.821
95% Gamma Approximate UCL	5.013		
95% Adjusted Gamma UCL	5.222		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Benzo(b)fluoranthene

General Statistics

Number of Valid Data	34	Number of Detected Data	28
Number of Distinct Detected Data	28	Number of Non-Detect Data	6
		Percent Non-Detects	17.65%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0636	Minimum Detected	-2.755
Maximum Detected	29.1	Maximum Detected	3.371
Mean of Detected	2.817	Mean of Detected	0.22
SD of Detected	5.44	SD of Detected	1.296
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	17
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	17
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	50.00%

UCL Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.447
5% Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level	

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.983
5% Shapiro Wilk Critical Value	0.924
Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	2.371
SD	5.017
95% DL/2 (t) UCL	3.827
Maximum Likelihood Estimate(MLE) Method	N/A
MLE yields a negative mean	

Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	-0.0611
SD	1.344
95% H-Stat (DL/2) UCL	4.576
Log ROS Method	
Mean in Log Scale	-0.0989
SD in Log Scale	1.38
Mean in Original Scale	2.361
SD in Original Scale	5.021
95% t UCL	3.818
95% Percentile Bootstrap UCL	3.94
95% BCA Bootstrap UCL	4.944

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.681
Theta Star	4.139
nu star	38.12
A-D Test Statistic	0.81
5% A-D Critical Value	0.786
K-S Test Statistic	0.786
5% K-S Critical Value	0.172
Data follow Appr. Gamma Distribution at 5% Significance Level	

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	29.1
Mean	2.358
Median	1.015

Data Distribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	2.365
SD	4.946
SE of Mean	0.864
95% KM (t) UCL	3.827
95% KM (z) UCL	3.786
95% KM (jackknife) UCL	3.822
95% KM (bootstrap t) UCL	6.313
95% KM (BCA) UCL	4.01
95% KM (Percentile Bootstrap) UCL	3.876
95% KM (Chebyshev) UCL	6.13

SD	5.026	97.5% KM (Chebyshev) UCL	7.76
k star	0.166	99% KM (Chebyshev) UCL	10.96
Theta star	14.19		
Nu star	11.3	Potential UCLs to Use	
AppChi2	4.77	95% KM (Chebyshev) UCL	6.13
95% Gamma Approximate UCL	5.587		
95% Adjusted Gamma UCL	5.843		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics

Number of Valid Data	52	Number of Detected Data	39
Number of Distinct Detected Data	39	Number of Non-Detect Data	13
		Percent Non-Detects	25.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.062	Minimum Detected	-2.781
Maximum Detected	337	Maximum Detected	5.82
Mean of Detected	14.45	Mean of Detected	-0.0657
SD of Detected	55.69	SD of Detected	2.111
Minimum Non-Detect	0.161	Minimum Non-Detect	-1.826
Maximum Non-Detect	0.619	Maximum Non-Detect	-0.48

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	32
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	20
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	61.54%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.287	Shapiro Wilk Test Statistic	0.92
5% Shapiro Wilk Critical Value	0.939	5% Shapiro Wilk Critical Value	0.939
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	10.87
SD	48.47
95% DL/2 (t) UCL	22.13

Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

DL/2 Substitution Method	
Mean	-0.555
SD	2.028
95% H-Stat (DL/2) UCL	12.53

Log ROS Method	
Mean in Log Scale	-0.655
SD in Log Scale	2.101
Mean in Original Scale	10.86
SD in Original Scale	48.48
95% t UCL	22.12
95% Percentile Bootstrap UCL	23.52
95% BCA Bootstrap UCL	32.2

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.255
Theta Star	56.55
nu star	19.93
A-D Test Statistic	4.413
5% A-D Critical Value	0.876
K-S Test Statistic	0.876
5% K-S Critical Value	0.155

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	337
Mean	10.83
Median	0.262
SD	48.48
k star	0.096
Theta star	112.8
Nu star	9.986
AppChi2	3.933
95% Gamma Approximate UCL	27.51
95% Adjusted Gamma UCL	28.29

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	10.87
SD	48.01
SE of Mean	6.744
95% KM (t) UCL	22.16
95% KM (z) UCL	21.96
95% KM (jackknife) UCL	22.13
95% KM (bootstrap t) UCL	83.39
95% KM (BCA) UCL	23.65
95% KM (Percentile Bootstrap) UCL	23.31
95% KM (Chebyshev) UCL	40.26
97.5% KM (Chebyshev) UCL	52.98
99% KM (Chebyshev) UCL	77.97

Potential UCLs to Use

99% KM (Chebyshev) UCL	77.97

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Chromium

General Statistics

Number of Valid Observations	52	Number of Distinct Observations	47

Raw Statistics		Log-transformed Statistics	
Minimum	7.04	Minimum of Log Data	1.952
Maximum	1320	Maximum of Log Data	7.185
Mean	112	Mean of log Data	3.397
Median	18.55	SD of log Data	1.345
SD	270.2		
Coefficient of Variation	2.413		
Skewness	3.645		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.39	Lilliefors Test Statistic	0.271
Lilliefors Critical Value	0.123	Lilliefors Critical Value	0.123
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	174.8	95% H-UCL	123.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	146.2
95% Adjusted-CLT UCL (Chen-1995)	193.9	97.5% Chebyshev (MVUE) UCL	178.5
95% Modified-t UCL (Johnson-1978)	177.9	99% Chebyshev (MVUE) UCL	242

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.468	Data do not follow a Discernable Distribution (0.05)
Theta Star	239.2	
MLE of Mean	112	
MLE of Standard Deviation	163.7	
nu star	48.69	
Approximate Chi Square Value (.05)	33.67	Nonparametric Statistics
Adjusted Level of Significance	0.0454	95% CLT UCL 173.6
Adjusted Chi Square Value	33.32	95% Jackknife UCL 174.8

		95% Standard Bootstrap UCL	172.1
Anderson-Darling Test Statistic	7.708	95% Bootstrap-t UCL	246.3
Anderson-Darling 5% Critical Value	0.819	95% Hall's Bootstrap UCL	224.4
Kolmogorov-Smirnov Test Statistic	0.342	95% Percentile Bootstrap UCL	180.2
Kolmogorov-Smirnov 5% Critical Value	0.13	95% BCA Bootstrap UCL	205.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	275.3
		97.5% Chebyshev(Mean, Sd) UCL	346
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	484.8
95% Approximate Gamma UCL	162		
95% Adjusted Gamma UCL	163.7		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	275.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Dibenzo(a,h)anthracene

General Statistics

Number of Valid Data	34	Number of Detected Data	22
Number of Distinct Detected Data	22	Number of Non-Detect Data	12
		Percent Non-Detects	35.29%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0805	Minimum Detected	-2.519
Maximum Detected	6.4	Maximum Detected	1.856
Mean of Detected	0.83	Mean of Detected	-0.768
SD of Detected	1.311	SD of Detected	1.036
Minimum Non-Detect	0.187	Minimum Non-Detect	-1.677
Maximum Non-Detect	2.19	Maximum Non-Detect	0.784

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	33
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	97.06%

UCL Statistics

Normal Distribution Test with Detected Values Only | Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.498
5% Shapiro Wilk Critical Value	0.911

Data not Normal at 5% Significance Level

Shapiro Wilk Test Statistic	0.968
5% Shapiro Wilk Critical Value	0.911

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	0.675
SD	1.087
95% DL/2 (t) UCL	0.99
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-0.958
SD	1.012
95% H-Stat (DL/2) UCL	0.987
Log ROS Method	
Mean in Log Scale	-1.073
SD in Log Scale	0.958
Mean in Original Scale	0.612
SD in Original Scale	1.089
95% t UCL	0.928
95% Percentile Bootstrap UCL	0.965
95% BCA Bootstrap UCL	1.135

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.889
Theta Star	0.934
nu star	39.11
A-D Test Statistic	0.744
5% A-D Critical Value	0.771
K-S Test Statistic	0.771
5% K-S Critical Value	0.191

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	6.4
Mean	0.749
Median	0.482
SD	1.086
k star	0.481
Theta star	1.558

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.626
SD	1.076
SE of Mean	0.19
95% KM (t) UCL	0.949
95% KM (z) UCL	0.94
95% KM (jackknife) UCL	0.946
95% KM (bootstrap t) UCL	1.377
95% KM (BCA) UCL	0.961
95% KM (Percentile Bootstrap) UCL	0.984
95% KM (Chebyshev) UCL	1.456
97.5% KM (Chebyshev) UCL	1.816
99% KM (Chebyshev) UCL	2.521

Nu star	32.71	Potential UCLs to Use	
AppChi2	20.64	95% KM (BCA) UCL	0.961
95% Gamma Approximate UCL	1.188		
95% Adjusted Gamma UCL	1.216		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Data	34	Number of Detected Data	27
Number of Distinct Detected Data	27	Number of Non-Detect Data	7
		Percent Non-Detects	20.59%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0809	Minimum Detected	-2.515
Maximum Detected	14.3	Maximum Detected	2.66
Mean of Detected	1.752	Mean of Detected	-0.0553
SD of Detected	2.707	SD of Detected	1.126
Minimum Non-Detect	0.194	Minimum Non-Detect	-1.64
Maximum Non-Detect	0.877	Maximum Non-Detect	-0.131

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	20
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	14
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	58.82%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.525	Shapiro Wilk Test Statistic	0.99
5% Shapiro Wilk Critical Value	0.923	5% Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.445	Mean	-0.355
SD	2.48	SD	1.196

95% DL/2 (t) UCL	2.165
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

95% H-Stat (DL/2) UCL	2.515
Log ROS Method	
Mean in Log Scale	-0.375
SD in Log Scale	1.208
Mean in Original Scale	1.438
SD in Original Scale	2.483
95% t UCL	2.159
95% Percentile Bootstrap UCL	2.114
95% BCA Bootstrap UCL	2.687

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.863
Theta Star	2.03
nu star	46.61
A-D Test Statistic	0.513
5% A-D Critical Value	0.776
K-S Test Statistic	0.776
5% K-S Critical Value	0.173

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-12
Maximum	14.3
Mean	1.471
Median	0.736
SD	2.479
k star	0.24
Theta star	6.119
Nu star	16.35
AppChi2	8.21
95% Gamma Approximate UCL	2.93
95% Adjusted Gamma UCL	3.036

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1.441
SD	2.446
SE of Mean	0.428
95% KM (t) UCL	2.165
95% KM (z) UCL	2.144
95% KM (jackknife) UCL	2.162
95% KM (bootstrap t) UCL	3.092
95% KM (BCA) UCL	2.27
95% KM (Percentile Bootstrap) UCL	2.239
95% KM (Chebyshev) UCL	3.305
97.5% KM (Chebyshev) UCL	4.112
99% KM (Chebyshev) UCL	5.697

Potential UCLs to Use

95% KM (Chebyshev) UCL	3.305

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Lead

General Statistics

Number of Valid Observations	52	Number of Distinct Observations	51

Raw Statistics		Log-transformed Statistics	
Minimum	3.9	Minimum of Log Data	1.361
Maximum	575	Maximum of Log Data	6.354
Mean	99.13	Mean of log Data	3.855
Median	59.35	SD of log Data	1.338
SD	120.3		
Coefficient of Variation	1.214		
Skewness	2.078		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.214	Lilliefors Test Statistic	0.106
Lilliefors Critical Value	0.123	Lilliefors Critical Value	0.123
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	127.1	95% H-UCL	192.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	228.2
95% Adjusted-CLT UCL (Chen-1995)	131.7	97.5% Chebyshev (MVUE) UCL	278.4
95% Modified-t UCL (Johnson-1978)	127.9	99% Chebyshev (MVUE) UCL	377.1

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.767	Data appear Gamma Distributed at 5% Significance Level
Theta Star	129.3	
MLE of Mean	99.13	
MLE of Standard Deviation	113.2	
nu star	79.72	
Approximate Chi Square Value (.05)	60.15	**Nonparametric Statistics**
Adjusted Level of Significance	0.0454	95% CLT UCL 126.6
Adjusted Chi Square Value	59.67	95% Jackknife UCL 127.1
		95% Standard Bootstrap UCL 126.3
Anderson-Darling Test Statistic	0.578	95% Bootstrap-t UCL 134.8

Anderson-Darling 5% Critical Value	0.79	95% Hall's Bootstrap UCL	134.7
Kolmogorov-Smirnov Test Statistic	0.108	95% Percentile Bootstrap UCL	128
Kolmogorov-Smirnov 5% Critical Value	0.128	95% BCA Bootstrap UCL	131.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	171.9
		97.5% Chebyshev(Mean, Sd) UCL	203.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	265.2
95% Approximate Gamma UCL	131.4		
95% Adjusted Gamma UCL	132.5		
Potential UCL to Use		Use 95% Approximate Gamma UCL	131.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

PCB-1248 (Aroclor 1248)

General Statistics

Number of Valid Data	37	Number of Detected Data	19
Number of Distinct Detected Data	18	Number of Non-Detect Data	18
		Percent Non-Detects	48.65%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0263	Minimum Detected	-3.638
Maximum Detected	86.1	Maximum Detected	4.456
Mean of Detected	11.89	Mean of Detected	0.727
SD of Detected	21.74	SD of Detected	2.364
Minimum Non-Detect	0.0453	Minimum Non-Detect	-3.094
Maximum Non-Detect	0.219	Maximum Non-Detect	-1.519

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	22
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	15
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	59.46%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.592	Shapiro Wilk Test Statistic	0.941
5% Shapiro Wilk Critical Value	0.901	5% Shapiro Wilk Critical Value	0.901

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	6.124
SD	16.5
95% DL/2 (t) UCL	10.7
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-1.331
SD	2.736
95% H-Stat (DL/2) UCL	101.4
Log ROS Method	
Mean in Log Scale	-1.699
SD in Log Scale	3.086
Mean in Original Scale	6.117
SD in Original Scale	16.51
95% t UCL	10.7
95% Percentile Bootstrap UCL	10.71
95% BCA Bootstrap UCL	13.55

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.355
Theta Star	33.54
nu star	13.48
A-D Test Statistic	0.476
5% A-D Critical Value	0.827
K-S Test Statistic	0.827
5% K-S Critical Value	0.213

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0263
Maximum	86.1
Mean	11.07
Median	9.484
SD	15.46
k star	0.632
Theta star	17.5
Nu star	46.79
AppChi2	32.1

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	6.121
SD	16.28
SE of Mean	2.75
95% KM (t) UCL	10.76
95% KM (z) UCL	10.64
95% KM (jackknife) UCL	10.69
95% KM (bootstrap t) UCL	15.82
95% KM (BCA) UCL	11.41
95% KM (Percentile Bootstrap) UCL	10.97
95% KM (Chebyshev) UCL	18.11
97.5% KM (Chebyshev) UCL	23.29
99% KM (Chebyshev) UCL	33.48

Potential UCLs to Use

95% KM (BCA) UCL	11.41

95% Gamma Approximate UCL	16.14
95% Adjusted Gamma UCL	16.41

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

PCB-1260 (Aroclor 1260)

General Statistics

Number of Valid Data	37	Number of Detected Data	22
Number of Distinct Detected Data	22	Number of Non-Detect Data	15
		Percent Non-Detects	40.54%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0266	Minimum Detected	-3.627
Maximum Detected	2.94	Maximum Detected	1.078
Mean of Detected	0.744	Mean of Detected	-1.177
SD of Detected	0.897	SD of Detected	1.543
Minimum Non-Detect	0.0453	Minimum Non-Detect	-3.094
Maximum Non-Detect	0.219	Maximum Non-Detect	-1.519

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	23
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	14
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	62.16%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.772	Shapiro Wilk Test Statistic	0.929
5% Shapiro Wilk Critical Value	0.911	5% Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.458	Mean	-2.093
SD	0.77	SD	1.661
95% DL/2 (t) UCL	0.672	95% H-Stat (DL/2) UCL	1.203

Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Log ROS Method	
Mean in Log Scale	-2.057
SD in Log Scale	1.621
Mean in Original Scale	0.458
SD in Original Scale	0.77
95% t UCL	0.672
95% Percentile Bootstrap UCL	0.686
95% BCA Bootstrap UCL	0.715

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.624
Theta Star	1.193
nu star	27.44
A-D Test Statistic	0.417
5% A-D Critical Value	0.788
K-S Test Statistic	0.788
5% K-S Critical Value	0.193

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0266
Maximum	2.94
Mean	0.676
Median	0.522
SD	0.699
k star	0.975
Theta star	0.693
Nu star	72.13
AppChi2	53.57
95% Gamma Approximate UCL	0.91
95% Adjusted Gamma UCL	0.922

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.457
SD	0.76
SE of Mean	0.128
95% KM (t) UCL	0.673
95% KM (z) UCL	0.667
95% KM (jackknife) UCL	0.671
95% KM (bootstrap t) UCL	0.774
95% KM (BCA) UCL	0.677
95% KM (Percentile Bootstrap) UCL	0.672
95% KM (Chebyshev) UCL	1.014
97.5% KM (Chebyshev) UCL	1.255
99% KM (Chebyshev) UCL	1.729

Potential UCLs to Use

95% KM (BCA) UCL	0.677

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics

Number of Valid Data	34	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	29
		Percent Non-Detects	85.29%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.00191	Minimum Detected	-6.261
Maximum Detected	0.00918	Maximum Detected	-4.691
Mean of Detected	0.00607	Mean of Detected	-5.256
SD of Detected	0.00314	SD of Detected	0.67
Minimum Non-Detect	0.00262	Minimum Non-Detect	-5.945
Maximum Non-Detect	0.0376	Maximum Non-Detect	-3.281

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	34
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.855
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00524	Mean	-5.504
SD	0.00424	SD	0.691
95% DL/2 (t) UCL	0.00647	95% H-Stat (DL/2) UCL	0.00666
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-5.947

SD in Log Scale	0.402
Mean in Original Scale	0.0029
SD in Original Scale	0.00176
95% t UCL	0.00341
95% Percentile Bootstrap UCL	0.00342
95% BCA Bootstrap UCL	0.00358

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.518
Theta Star	0.004
nu star	15.18
A-D Test Statistic	0.461
5% A-D Critical Value	0.682
K-S Test Statistic	0.682
5% K-S Critical Value	0.359

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00191
Maximum	0.00918
Mean	0.00625
Median	0.00615
SD	0.00133
k star	15.34
Theta star	0.0004076
Nu star	1043
AppChi2	969.4
95% Gamma Approximate UCL	0.00673
95% Adjusted Gamma UCL	0.00676

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.00311
SD	0.00213
SE of Mean	0.0005896
95% KM (t) UCL	0.00411
95% KM (z) UCL	0.00408
95% KM (jackknife) UCL	0.00427
95% KM (bootstrap t) UCL	0.00384
95% KM (BCA) UCL	0.00818
95% KM (Percentile Bootstrap) UCL	0.00776
95% KM (Chebyshev) UCL	0.00568
97.5% KM (Chebyshev) UCL	0.00679
99% KM (Chebyshev) UCL	0.00897

Potential UCLs to Use

95% KM (t) UCL	0.00411
95% KM (Percentile Bootstrap) UCL	0.00776

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

LOWER LEY CREEK SITE
SYRACUSE, NEW YORK
HUMAN HEALTH RISK ASSESSMENT ADDENDUM

APPENDIX B
CANCER RISK AND NON-CANCER HQs

Table B.1. Cancer Risk and Non-Cancer HIs based on exposure to soil only or exposure to sediment only.

Receptor	Cancer Risk				Non-cancer HI			
	Risks from Soil		Risks from Sediment		HI Soil		HI Sediment	
	CTE	RME	CTE	RME	CTE	RME	CTE	RME
Adult recreational visitor	1E-05	1E-04	1E-05	1E-04	4E-01	1E+00	4E-01	1E+00
Older child recreational visitor (ages 6-<16 years)	3E-05	8E-04	3E-05	4E-04	5E-01	1E+01	5E-01	7E+00
Young child recreational visitor (< 6 years of age)	1E-04	2E-03	1E-04	1E-03	2E+00	2E+01	2E+00	2E+01

Shading indicates non-cancer HI that exceeds 1E+00 or a cancer risk that exceeds 1E-04.

Table B.2. Cancer Risk and Non-Cancer HQs based on exposure to soil and sediment (75% soil, 25% sediment)

Receptor	Cancer Risk		Non-cancer HQ	
	Total Risk (soil + sediment)		Total Risk (soil + sediment)	
	CTE	RME	CTE	RME
Adult recreational visitor	1E-05	1E-04	4E-01	1E+00
Older child recreational visitor (ages 6-<16 years)	3E-05	7E-04	5E-01	1E+01
Young child recreational visitor (< 6 years of age)	1E-04	2E-03	2E+00	2E+01

Shading indicates non-cancer HI that exceeds 1E+00 or a cancer risk that exceeds 1E-04.

Table B.3. Cancer Risk and Non-Cancer HQs based on exposure to soil and sediment (50% soil, 50% sediment)

Receptor	Cancer Risk		Non-cancer HQ	
	Total Risk		Total Risk	
	CTE	RME	CTE	RME
Adult recreational visitor	1E-05	1E-04	4E-01	1E+00
Older child recreational visitor (ages 6-<16 years)	3E-05	6E-04	5E-01	9E+00
Young child recreational visitor (< 6 years of age)	1E-04	1E-03	2E+00	2E+01

Shading indicates non-cancer HI that exceeds 1E+00 or a cancer risk that exceeds 1E-04.

Table B.4. Cancer Risk and Non-Cancer HQs based on exposure to soil and sediment (25% soil, 75% sediment)

Receptor	Cancer Risk		Non-cancer HQ	
	Total Risk		Total Risk	
	CTE	RME	CTE	RME
Adult recreational visitor	1E-05	1E-04	4E-01	1E+00
Older child recreational visitor (ages 6-<16 years)	3E-05	5E-04	5E-01	8E+00
Young child recreational visitor (< 6 years of age)	1E-04	1E-03	2E+00	2E+01